

DISCUSSION PAPER

TOWARDS IMPROVED MEASURES OF GENDER INEQUALITY:

An evaluation of the UNDP gender inequality index and a proposal



No. 41, November 2022

GÜNSELİ BERİK, UNIVERSITY OF UTAH

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ACRONYMS AND ABBREVIATIONS

CEDAW	Convention on the Elimination of All Forms of Discrimination against Women
EDEP	equally distributed equivalent percentage
EIGE	European Institute for Gender Equality
EU-GEI	European Union Gender Equality Index
GDI	Gender Development Index
GDP	gross domestic product
GEM	Gender Empowerment Measure
GGGI	Global Gender Gap Index
GGM	Gender Gap Measure
GGPI	Global Gender Parity Index
GII	Gender Inequality Index
HALE	healthy life expectancy
HDI	Human Development Index
IPV	intimate partner violence
ILO	International Labour Organization
LE	life expectancy
NEET	not in education, employment or training
OECD	Organisation for Economic Co-operation and Development
PPP	purchasing power parity
RSW	Relative Status of Women
SDG	Sustainable Development Goal
SIGI	Social Institutions and Gender Index
STEM	science, technology, engineering and math
UNDP	United Nations Development Programme
WEF	World Economic Forum
WEI	Women's Empowerment Index
WHO	World Health Organization

SUMMARY

This paper proposes replacing the United Nations Development Programme's (UNDP) Gender Inequality Index (GII) with two new gender indexes: the Global Gender Parity Index (GGPI) and the Women's Empowerment Index (WEI). The proposal builds on a review of concepts of gender equality in the capability approach that underpins UNDP's human development paradigm and the international policy frameworks of the Convention on the Elimination of All Forms of Discrimination against Women (CEDAW), the Beijing Platform for Action and the 2030 Agenda for Sustainable Development. It also implements current proposals for reform, which emphasize measuring gender inequality in capabilities (rather than institutional inputs or resources that enable or constrain these capabilities) and measuring gaps in achievements between women and men and

the level of women's potential for empowerment by different indexes.

Evaluating the options for measurement, the paper identifies several Sustainable Development Goal (SDG) indicators and novel data as potentially useful in translating the selected capabilities into new indexes. The first index, the GGPI, is a relative measure of well-being, which encompasses the dimensions of health, education, decent standard of living and decision-making. The second, the WEI, focuses solely on women and measures freedom from early motherhood, reproductive choice and freedom from intimate partner violence as well as women's capabilities to seek education, pursue science, technology, engineering and math (STEM) degrees, have voice in national and local governing bodies and hold economic leadership positions.

RÉSUMÉ

Ce document se propose de remplacer l'indice d'inégalité de genre (IIG) du Programme des Nations Unies pour le développement (PNUD) dans le contexte de deux nouveaux indices de genre: l'indice mondial de parité de genre (IMPG) et l'indice d'autonomisation des femmes (IAF). Cette proposition s'appuie sur un examen des concepts d'égalité de genre en utilisant l'approche fondée sur les capacités qui sous-tend le modèle de développement humain du PNUD et les cadres politiques internationaux de la Convention sur l'élimination de toutes les formes de discrimination à l'égard des femmes (CEDAW), du Programme d'action de Beijing et du Programme de développement durable à l'horizon 2030. Ce document présente également des propositions en faveur d'une réforme, qui mettrait l'accent sur l'évaluation des inégalités de genre au sein des capacités (plutôt que les apports ou les ressources institutionnels qui permettent ou entravent ces capacités), ainsi que sur l'évaluation des écarts de résultats entre les hommes et les femmes et des niveaux que les

femmes pourraient atteindre en matière d'autonomisation en fonction des différents indices.

En jaugant des différentes options d'évaluation, ce document considère que plusieurs indices liés aux objectifs de développement durable et que les données nouvelles peuvent être utiles pour traduire les capacités sélectionnées en indices nouveaux. Le premier indice, l'IMPG, est une mesure relative permettant d'évaluer le bien-être, qui s'intéresse aux dimensions de la santé, de l'éducation, d'un niveau de vie décent et de la prise de décision. Le deuxième, l'IAF, se concentre uniquement sur les femmes et évalue leur degré d'autonomie en matière de maternité précoce, de procréation, de capacité à ne pas subir la violence de leur partenaire ainsi que leur accès à l'éducation et aux diplômes sanctionnant des études scientifiques, technologiques, mathématiques et d'ingénieur, de même que leurs capacités à siéger dans les organes directeurs nationaux et locaux et à occuper des postes de direction.

RESUMEN

En este trabajo se propone sustituir el Índice de Igualdad de Género (IIG) del Programa de las Naciones Unidas para el Desarrollo (PNUD) por dos índices nuevos, a saber: el Índice Mundial de Paridad de Género (IMPG) y el Índice de Empoderamiento de las Mujeres (IEM). La propuesta se basa en un examen de los conceptos de igualdad de género del enfoque de capacidades que subyace al paradigma de desarrollo humano del PNUD y los marcos internacionales de políticas como la Convención sobre la eliminación de todas las formas de discriminación contra la mujer (CEDAW), la Plataforma de Acción de Beijing y la Agenda 2030 para el Desarrollo Sostenible. Asimismo, se plantean propuestas actuales de reforma, en las que se enfatiza la medición de la desigualdad de género en las capacidades (más que en las fuerzas o recursos que permiten o limitan dichas capacidades) y la medición de las brechas entre los logros de mujeres

y hombres y el nivel del potencial de las mujeres para el empoderamiento según los diferentes índices.

Mediante la evaluación de las opciones de medición, en el documento se identifican distintos indicadores de los Objetivos de Desarrollo Sostenible (ODS) y nuevos datos como dispositivos potencialmente útiles para traducir las capacidades seleccionadas en los nuevos índices. El primer índice, el IMPG, es una medición relativa del bienestar, lo cual engloba las dimensiones de salud, educación, niveles decentes de vida y toma de decisiones. El segundo, el IEM, se enfoca únicamente en las mujeres y mide una vida libre de maternidad temprana y de violencia en la pareja y las decisiones reproductivas, así como la capacidad de las mujeres para procurarse una educación, alcanzar un título en ciencias, tecnología, ingeniería y matemáticas, influir en los órganos nacionales y locales y ostentar cargos de liderazgo económico.

1.

INTRODUCTION

The United Nations Development Programme (UNDP) was a pioneer in introducing composite gender indexes: the Gender-related Development Index (GDI) and the Gender Empowerment Measure (GEM) in 1995. Today, several composite gender-equality measures allow assessment of women's well-being relative to men's across countries and over time. These measures highlight countries' relative performance and thereby help stimulate policy discussions in both international fora and within countries on how to improve the well-being of women. The 2030 Agenda for Sustainable Development¹ has catalysed measurement efforts to capture gender inequalities as it includes targets to assess progress on gender equality and women's empowerment under Sustainable Development Goal (SDG) 5 and several other SDGs. In addition, there has been growing demand for internationally comparable composite gender indexes to examine the consequences of gender (in)equality for economic growth and a variety of well-being outcomes.

UNDP's Gender Inequality Index (GII), introduced in 2010 in response to critiques of the GDI and GEM, is prominent in the contemporary landscape of composite gender measures. It is widely used in cross-country studies that examine the correlates of gender inequality. There is a widespread recognition, however, that the GII does not live up to its promise as a tool for monitoring gender inequality and designing policies to reduce women's disadvantages. Concerns centre on its design as a synthetic measure of gender inequality and its complicated technical aspects. Moreover, since its introduction, new gender inequality issues have emerged and the adoption of the 2030 Agenda, with its extensive integration of gender concerns, underscores the need to revisit the GII periodically to ensure its relevance to current conditions and emerging issues. This paper reviews the GII in light of the history of UNDP's gender indexes, contemporary competing composite measures and reform proposals. Based on this review and a conceptual discussion, the paper makes the case for two separate composite measures: a Global Gender Parity Index (GGPI) and a Women's Empowerment Index (WEI).

After this introduction, the second section of the paper reviews the case for composite measures of gender inequality. This is followed in the third section by a brief history of efforts to generate internationally comparable gender indexes, with a focus on UNDP's pioneering indexes: the GDI, GEM and GII. The fourth part reviews the critiques of the GII and the proposals for reforming or replacing it. The fifth section provides a conceptual discussion for the new gender inequality and women's empowerment indexes. The conceptualization of gender inequality draws on the capability approach, which underpins the human development paradigm, feminist scholarship and the international policy frameworks of the Convention on the Elimination of All Forms of Discrimination against Women (CEDAW)² and the Beijing Platform for Action,³ which were rooted in the 1975-1985 UN World Conferences on Women, and the SDGs. The sixth section presents the proposal for the two new indexes. The paper complements Azcona et al. (forthcoming), which develops the proposal for new indexes and provides a measurement framework, empirical evidence and assessment of these indexes.

1 UN General Assembly 2015.

2 UN General Assembly 1979.

3 UN General Assembly 1995.

2.

THE CASE FOR A COMPOSITE INDEX OF GENDER INEQUALITY

Gender inequality is a multidimensional problem. It has “many faces”, as Sen (2001) highlighted: Inequalities in health, education and wages manifest at various levels (the household, the community, markets, the macroeconomy) and can be expressed in individual or societal terms. In recent decades, in tandem with growing interest in analysing gender inequality, there has been an expansion of gender equality indicators across many dimensions. One alternative to tracking individual indicators is to construct a composite measure (often an index) that combines different dimensions of gender inequality at the country level, as is the case with UNDP’s Gender Inequality Index (GII). Another approach is to choose a small number of indicators for a ‘dashboard’ to track them and to highlight their importance.

To construct a composite index, several dimensions have to be selected.⁴ The selection is generally informed by a conceptual framework, though measurement is constrained by data availability. The advantage of a composite gender index is to provide a summary communications tool to generate attention, stimulate policy debate, help monitor progress towards gender equality and support advocacy. The ambition of composite indexes is to present comparable information for a large number of countries, for example, all UN Member States. The index is typically used to rank countries and track country progress.⁵

A composite gender index encapsulates policy-relevant feminist knowledge on women’s experiences

and disadvantaged social position.⁶ The downside of composite indexes is that they provide a limited representation of gender equality; they ‘shrink’ the concept through the choice of dimensions included.⁷ Omissions as well as inclusion of dimensions signal what is important to measure. Thus, construction of each index both represents and reinforces a particular concept of gender inequality, and each generates different country rankings. In addition, composite indexes do not capture diversity by class, race or intersectionality or the size of gaps between groups within countries. A related issue is that gender indexes represent gender as binary at a time when more countries are recognizing non-binary gender identities. Moreover, composite indexes inevitably face questions about aggregation methods: their weighting and the implicit trade-offs underlying the aggregation.⁸ Index construction is a highly technical process, which conceals how the concept of gender equality is translated into an index.

4 Robeyns 2003.

5 Country rankings can be contested for disregarding the colonial history that limits the capacity of those in the Global South to fulfil their obligations on gender equality. Accordingly, rankings may reinforce the notion that each country is functioning on its own to address gender inequality. However, some countries with low resources are doing well relative to their peers in promoting gender equality and women’s empowerment, and country rankings show these efforts. Comparing peers is thus useful from a policy perspective.

6 van Staveren 2021.

7 Einarsdottir 2020.

8 Klasen 2006a.

Similar challenges are present for aggregate measures of well-being, such as the recent ‘beyond GDP’ (gross domestic product) alternatives. As a result, many scholars favour reliance on dashboards to maintain attention to a small number of detailed, non-monetary indicators.⁹ An example is the Organisation for Economic Co-operation and Development’s (OECD) How’s Life? dashboard, developed as a quality-of-life tracking tool.¹⁰ UNDP’s Life-Course Gender Gap and Women’s Empowerment dashboards are pioneering gender-aware dashboards for tracking selected indicators, most of which measure progress on SDG targets.¹¹ These dashboard indicators complement the indicators underlying the GDI and GII, reported in Tables 4 and 5 of the *Human Development Report*.

The problem with the dashboard approach is that dashboards are no match for a summary measure that reflects overall well-being and the direction of overall change. In fact, as insightful as they are, dashboards tend to be sidelined and signal lesser importance, and “naming and shaming is much harder based on a dashboard”.¹² Importantly, dashboards are of limited use in guiding policy, other than spotlighting issues for policy attention.¹³ As a set of non-monetary indicators, a dashboard cannot help assess the benefits and costs of policy options, choose among competing priorities or guide budget and financing decisions. Unless these indicators are aggregated into an index, dashboards are also of limited value for policy-relevant empirical analysis that seeks to identify the association of gender

inequality with various policy variables. They can be valuable, however, in curating indicators for potential aggregation in a gender index.

Thus, a multidimensional gender inequality index is attractive in conveying the overall status of women’s well-being and rights, and changes in this, and allowing cross-country comparisons. The challenge is how best to reflect gender inequality based on a conceptual framework and sound measurement principles while responding to data constraints. Basic criteria for a composite gender index are that it has a strong theoretical foundation, it clearly articulates what is being measured, it is easy to interpret so as to have policy and advocacy value and it has broad (universal) relevance.¹⁴ Further, it should include “a limited number of indicators that together capture as many dimensions of gender inequality as possible”.¹⁵ In the new millennium, new and better data have become available for many indicators that will allow more innovative and insightful dimensions to be incorporated in composite measures. The new gender indexes can thus reflect and reinforce a broader concept of gender equality. The demand for broad country coverage means that new gender indexes will highlight data gaps and encourage investment in data generation. Given the multidimensionality of gender equality, however, there will always be a need to complement a composite gender index with a dashboard to reflect additional facets of the concept of gender equality.

9 For example, Stiglitz et al. 2010; Stiglitz et al. 2018.

10 OECD 2020.

11 UNDP 2020a.

12 Klasen 2018, p. 22.

13 Berik 2020.

14 Hsu and Kovacevic 2015.

15 Dijkstra 2006, p. 276.

3.

UNDP'S GENDER INDEXES: A BRIEF HISTORY

3.1

The Gender-Related Development Index and Gender Empowerment Measure

The first composite gender measures were developed by UNDP's Human Development Report Office and reported in the 1995 *Human Development Report* as an extension of the concept of human development,

which was first operationalized in the Human Development Index (HDI) in 1990. The HDI measured country well-being in a single index based on the dimensions of a long and healthy life, knowledge and a decent standard of living, measured by life expectancy at birth, educational achievement and GDP per capita, respectively. The GDI focused on gender differences in HDI, while the GEM was designed to measure women's political and economic empowerment (Table 1). Annex I presents the methodology and technical details for how each UNDP gender index combines the indicators.

TABLE 1.
UNDP gender indexes

Indices	Dimensions	Indicators
Gender-related Development Index (GDI) UNDP, 1995 - 2009	Longevity	Life expectancy at birth
	Educational Attainment	Adult literacy rate
		Combined gross enrolment ratio
	Standard of Living	Estimated earned income
Gender Empowerment Measure (GEM) UNDP, 1995 - 2009	Political Participation	Share in national parliament
	Economic Participation	Share in legislators, senior officials, managers
		Share of professional and technical positions
Standard of Living	Estimated earned income	
Gender Inequality Index (GII) UNDP, 2010	Health	Maternal mortality ratio
		Adolescent birth rate
	Empowerment	Share of seats in parliament
		Population with at least some secondary education
Labour Market	Labour force participation	
Gender Development Index (GDI) UNDP, 2014	Long and Healthy Life	Life expectancy at birth
	Knowledge	Expected years of schooling
		Mean years of schooling
Standard of Living	Estimated gross national income (GNI) per capita	

In designing the HDI in 1990, the Human Development Report Office's goal was to come up with a plausible and superior alternative to GDP per capita, one that can be readily calculated based on internationally comparable data, annually reported and easily interpreted.¹⁶ The HDI was informed by Amartya K. Sen's capability approach (used interchangeably with the 'capabilities approach' in this paper). Its central tenet is that well-being comprises what people are able to do or be rather than their access to resources (including personal income). The latter are necessary for people's well-being but do not ensure or constitute well-being. Thus, the HDI measured three capabilities: health, education and the ability to secure a decent standard of living. GDP per capita was used for this third capability as a proxy for being nourished, having access to shelter, etc. Although unpaid work, whether in subsistence production or the household, is also necessary for securing these capabilities, only a market proxy was used for the capability to attain them. To be useful as a global evaluation tool, HDI focused on a few universally relevant, basic capabilities ("i.e., capabilities on which many choices in life depended").¹⁷ While not incorporated in the HDI, from 2001 onward Human Development Reports have emphasized 'agency' (the ability to participate in decisions in one's community) and political and civil freedoms as core dimensions of human development.¹⁸

The GDI was inextricably linked to the HDI. It represented the welfare penalty imposed by gender gaps in the three components of the HDI. In the GDI, national income is proxied by the estimated earned incomes of women and men. The GEM measured political decision-making in terms of gender inequalities in the share of seats held in national parliaments, economic empowerment in terms of high-level economic decision-making positions and the female and male shares of national income. The GDI was intended as an 'evaluative measure' of well-being while the GEM was conceived as an 'agency' measure of women's relative influence in decision-making in political and economic life.¹⁹

The GDI and GEM brought attention to gender inequality in international policy debates and measurement, and they were reported in the *Human Development Reports* from 1995 to 2009. One could argue that they fulfilled an important role in highlighting gender inequalities in access to education, health outcomes, labour market positions and political representation. They have also stimulated the construction of new indexes on gender inequalities by other organizations and served as catalysts for the collection of more gender-differentiated data.

Almost from the start, there were critiques of the GDI and GEM and proposals for improvement, which laid down the terms of the debate on UNDP's gender indexes for the next two decades.²⁰ Critics raised conceptual and measurement questions about the indexes and their component indicators. They observed that the GDI mixed absolute human development levels with gender inequality; it measured the human development cost of gender inequality rather than measuring gender inequality itself; it used an inequality-aversion adjustment rather than directly measuring women's well-being achievements relative to men's (see Annex I); its high correlation with GDP per capita meant it had limited value added as a measure of gender inequality; and its dimensions were limited in capturing the concept of gender inequality. The earned-income indicator was deemed conceptually and empirically weak: it did not measure individual consumption (the means to secure capabilities beyond health and education); it had a formal sector, urban bias; and it depended on a large number of imputed values. Dijkstra and Hanmer (2000) proposed a simpler, more direct measure of gender inequality, the Relative Status of Women (RSW) index, which expressed the same dimensions and indicators used in the GDI in terms of female-to-male ratios. While the RSW was superior to the GDI, Dijkstra and Hanmer argued that it was still limited in the dimensions of gender equality it represented. They delineated ideas on how a more adequate index might be drawn from a conceptual framework of gender inequality.

16 Klasen 2006a.

17 Fukuda-Parr 2003, p. 306.

18 Fukuda-Parr 2003.

19 Ibid.

20 Bardhan and Klasen 1999; Dijkstra and Hanmer 2000.

A major stocktaking by UNDP in 2006 highlighted these and other conceptual and measurement problems and discussed proposals to address them.²¹ A decade of evidence indicated that the GDI was being misinterpreted as a measure of gender inequality, which undermined its potential policy use.²² Dijkstra (2006) and Klasen (2006b) both favoured measuring gender inequality in terms of female-to-male ratios—as RSW and HDI ratios, respectively.

These evaluations also pointed to the GEM's class and formal sector bias. The GEM measured inequality among the most educated and most economically advantaged groups and, given data constraints, it showcased mainly the high human development countries.²³ In addition, women's representation in national parliaments was viewed as a weak proxy for political empowerment, though better indicators (female representation in local governments, voter turnout by sex, female share of candidates running for and winning elections, strength of women's movements) all ran into data constraints at the time.²⁴ And there were no feasible indicators to capture economic empowerment (or disempowerment) in the GEM beyond economically advantaged women.²⁵ Klasen (2006b) argued in favour of revising the GEM to make it a consistent measure of relative female empowerment by measuring each of its components as gender ratios.

In addition, there was consensus that the GEM was missing dimensions that ought to belong in gender inequality indexes. It did not incorporate women's decision-making power in the household—their control over income, their bodies and sexuality²⁶—and represented a male yardstick (“universal breadwinner” model) for women's empowerment.²⁷ Specifically, unpaid care work was missing from both the GDI and the GEM, despite being central to generating well-being, propping up the formal economy, being

disproportionately performed by women and posing substantial financial and time constraints on women. Folbre (2006) made the case for better accounting for care inputs that enable the improved health and education outcomes captured by the HDI. She proposed creative ways of measuring gender inequality in care responsibilities within the human development framework. These included a measure of individual disposable time, which would track gender gaps in leisure and personal time, and a gender care empowerment index that would measure men's participation in direct unpaid care work and in care occupations relative to women's participation.

The 2006 stocktaking also incorporated discussion of better ways of measuring the education and health components of the GDI²⁸ and better ways for the Human Development Report Office to communicate the methodology and data of indexes and to spotlight gender inequality issues beyond the main tables.

The proposals generated in the 2006 evaluation of the GDI and GEM were partially implemented. In 2010, as part of its overhaul of the suite of human development indexes, UNDP introduced the GII and discontinued the GDI and GEM.²⁹ A new GDI was introduced in 2014. Since 2016, *Human Development Reports* have also tracked relevant gender inequality indicators in dashboards. In the 2020 *Human Development Report*, the Life-Course Gender Gap dashboard contains 12 indicators that capture gender disparities in outcomes from childhood to old age. The Women's Empowerment dashboard, introduced in 2018, reports 13 women-specific indicators that allow assessment of women's reproductive health and access to family planning, violence against women and girls and their socio-economic empowerment, which comprises women's access to STEM (science, technology, engineering and math) occupations, upper-management positions and mandatory paid maternity leave. These dashboards also report the number of countries with missing values on each of the indicators, which is useful for tracking their potential for inclusion in future gender inequality indexes.

21 Klasen 2006a.

22 Schüler 2006.

23 Cueva Beteta 2006.

24 Female representation in local governments is now part of the SDG global monitoring framework; there are data on this indicator (SDG 5.5.1) for 130 countries.

25 Cueva Beteta 2006.

26 Ibid.

27 Folbre 2006.

28 Lloyd and Hewett 2006; Hooper 2006.

29 Gaye et al. 2010.

3.2

Gender Inequality Index

The GII consists of five indicators that cover three dimensions referred to as ‘health’, ‘empowerment’ and ‘labour market’ (see Table 1). Health is conceptualized and measured as reproductive health by indicators relevant for women only, namely, women’s ability to survive pregnancy and childbirth (maternal mortality ratio) and to avoid being a teenage mother (adolescent birth rate). Empowerment is measured by gender gaps in the capability to attain at least some secondary education and the capability to have an impact on law-making, while the labour market dimension is measured by the gender gap in labour force participation rates as a proxy for the relative capability to earn an income. The GII was designed as a synthetic index with indicators that combine levels of women’s achievement with their potential for empowerment relative to men.³⁰ Among composite gender indexes, it is unique in including the dimension of women’s reproductive health, although this dimension introduces asymmetry into the index.

The GII aims to measure the human development cost of gender inequality through an inequality-aversion adjustment, also used in the earlier UNDP gender indexes (see Annex I). It measures gender gaps without favouring the disadvantages of one sex over the other, that is, female disadvantage in one dimension can be compensated by female advantage in another. The compensation is only partial, however, since the maternal mortality ratio and adolescent birth rate do not have male counterparts. The GII ranges between 0 and 1, with 0 representing no loss to human development due to disparities between women and men. The GII for 2019 was reported for 162 countries.³¹ Between 1995 and 2018, the mean GII for the world (calculated back to 1995) declined from 0.547 to 0.436, albeit the decline slowed in the last decade.³²

The GII has been used as an independent variable in policy-oriented research, particularly on health. Such

30 Gaye et al. 2010.
31 UNDP 2020a.
32 UNDP 2019, p. 150.

studies indicate that gender equality has health benefits in, for example, reducing child mortality;³³ reducing low-birth weight, child malnutrition and mortality;³⁴ increasing the life expectancy of both women and men;³⁵ lowering the gender differences in suicide rates;³⁶ and lowering excess female obesity prevalence.³⁷ Studies have also used the UNDP methodology to calculate subnational GIIs (community or state level) and demonstrated the positive association of the GII with the intimate partner violence (IPV) mortality rate³⁸ and IPV prevalence.³⁹ In addition, a higher GII value is associated with lower economic growth, higher household income inequality and higher poverty.⁴⁰ Some studies refer to the large country coverage of the GII as an advantage for cross-country analysis.⁴¹ Projections of the GII are also used to show the importance of reducing gender inequality in achieving climate resilience.⁴² All these studies conclude by underscoring the benefits of reducing gender inequality for achieving broader well-being goals. As discussed in Annex II, similar conclusions are drawn in studies that use other composite gender indexes.

3.3

Gender Development Index

In 2014, UNDP introduced a new GDI that incorporates the same dimensions as the original GDI—health, education and earned income—but updates the education indicators (see Table 1). The new GDI has the advantage of ease of interpretation: It drops the inequality-aversion adjustment and directly measures the gender inequality (gap) in human development rather than the welfare penalty attached to that gap (Annex I). As an index of female-to-male HDI ratios, its values are independent of country income (economic development) levels. This means that low-income countries can perform well on the GDI if they have low

33 Brinda et al. 2015.
34 Marphatia et al. 2016.
35 Kolip and Lange 2018.
36 Chang et al. 2019.
37 Wells et al. 2012.
38 Redding et al. 2017.
39 Willie and Kershaw 2019.
40 Gonzales et al. 2015.
41 Marphatia et al. 2016; Gonzales et al. 2015.
42 Andrijevic et al. 2020.

gender gaps. Despite these advantages, which respond to critiques of the original GDI, the new GDI is less well-known than the GII and is not used in scholarship that examines the consequences of gender (in) equality. This may be because the GDI does not rank countries, it groups them; and in some cases the values have been above 1, giving the impression that gender equality has been achieved, which would likely not ring true to gender advocates. As a result, the GII has attracted attention as the main gender inequality index of UNDP.

3.4

Other gender-equality measures

The new millennium has seen a flourishing of composite indexes designed and maintained by various international organizations. The proliferation of gender indexes was driven in part by the failure of UNDP's pioneering gender indexes to meet the demands for a gender inequality measure,⁴³ albeit this

effect can also be viewed as a success of the initial UNDP indexes. The list includes the Global Gender Gap Index (GGGI) of the World Economic Forum, available annually since 2006; the Gender Equality Index (GEI) launched in 2010 by the Institute of Social Studies in the Netherlands; the Gender Equality Index (EU-GEI) of the European Institute of Gender Equality introduced in 2013; the Social Institutions and Gender Index (SIGI) launched by the OECD in 2009; and the Women's Economic Opportunity (WEO) Index developed by the Economist Intelligence Unit and first published in 2010 (but not issued after 2012). Each of these indexes incorporates different aspects of gender equality: resources, capabilities, functionings, formal or informal institutions that are enabling or constraining equality or a combination of these aspects.⁴⁴ They also differ in their country coverage (e.g., all nations versus the European Union). Each index is used as an independent variable in cross-country regression analyses on a wide range of topics. Annex II describes the GGGI, SIGI and EU-GEI, the scholarship that uses these indexes and how the dimensions and indicators of each compare to the GII.

43 Gaye et al. 2010; Klasen 2018.

44 van Staveren 2013.

4.

EVALUATIONS OF THE GII AND PROPOSALS FOR REFORM

In the landscape of prominent gender indexes, the GII stands out with unique features, but it has also been the subject of conceptual and methodological critique.

Elements of these critiques and reform proposals were articulated in Dijkstra and Hanmer (2000), Dijkstra (2006), Klasen (2006b), Schüller (2006), Permanyer (2010, 2013) and Klasen and Schüller (2011). These researchers have proposed methodologies to improve the measurement of gender equality within the human development paradigm. More recently, UNDP convened two expert group meetings, in Reykjavik in 2015 and New York in 2018, to review its indexes and ways of revising them. Several proposals were discussed at the former meeting, where the consensus was that a new, policy- and advocacy-relevant gender composite index was needed to better communicate with policymakers and the public.⁴⁵ The most recent critiques and proposals for reform presented in the latter meeting are by Anand (2018) and Klasen (2018).

Both Anand and Klasen argued for dropping the GII. Their concerns focused on (1) its conceptual underpinnings and (2) its construction.

1) Conceptual underpinnings: One criticism is that the GII mixes well-being and empowerment dimensions—political representation and education are grouped together as proxies for empowerment. Klasen (2017) argues that well-being in terms of education, health and empowerment are conceptually distinct and do not necessarily correlate. He focuses on cases where women’s high levels of health and education achievements are not necessarily associated with more decision-making power for women, and there may also be instances where women use their agency to

undermine their own or other women’s well-being. There is also evidence, however, that women’s agency is positively correlated with women’s well-being outcomes.⁴⁶ Moreover, the distinction between well-being and agency is not entirely appropriate to warrant their measurement by separate indexes. In the human development framework, the ability to make decisions (participate in community decision-making processes) is a capability that is intrinsically and instrumentally important for well-being.⁴⁷

Another criticism focuses on the mixing of gaps and levels, which does not allow distinguishing the source of a country’s GII level—e.g., is a lower GII value due to a lower gender gap or women’s lower capability deprivation? A related issue, since the GII allows better performance on one dimension to compensate for poor performance on another, is that higher relative educational achievement may offset women’s limited political representation. The result potentially might be a lower gender inequality level for a country, which

⁴⁵ Hsu and Kovacevic 2015.

⁴⁶ Women’s agency is positively correlated with the promotion of child survival and other outcomes, including lower fertility rates (Sen 1999). Women in leadership positions are also more likely than their male counterparts to support gender equality initiatives and advocate for greater investments in education, health and other human development priorities, including access to clean water (Chattopadhyay and Duflo 2004; Volden et al. 2018). In addition, as recognized under Article 21 of the Universal Declaration of Human Rights (UN General Assembly 1948) and article 25 of the International Covenant on Civil and Political Rights (UN General Assembly 1966), the question of whether women can participate equally in the life of their community is fundamentally about women’s rights and women’s well-being and extends beyond agency and empowerment.

⁴⁷ Anand and Sen 2000; UNDP 2001; Fukuda-Parr 2003.

conceals adverse performance in a dimension of intrinsic value. These problems led Klasen (2018) to argue in favour of two separate measures of gender inequality, one for relative well-being and the other for relative empowerment, as originally conceived by UNDP in the GDI and GEM.

The GII is also criticized for mixing the absolute achievements of women (e.g., maternal mortality ratio) with women's achievements relative to men (e.g., gender inequality in educational achievement). This mixing means the GII is neither a gender inequality measure nor a female disadvantage index.⁴⁸ In a relative measure, all indicators have to be the same for women and men, whereas the maternal mortality ratio and adolescent birth ratio are specific to women only, and a female disadvantage measure cannot treat its components symmetrically. The mixing of absolute and relative elements confuses the inequality benchmark. While it is 50 per cent for the female share of parliamentary seats, it is 10 per 100,000 for the maternal mortality ratio.⁴⁹ Moreover, the interpretation of the maternal mortality ratio and adolescent birth rate values is unclear: A high value of either does not solely connote discrimination against women and girls. These indicators represent in part low levels of per capita income and poor health services in low human development countries rather than gender inequality. As Permanyer (2013) indicates, the negative correlation between the GII and GDP per capita is high (-0.87) and drops substantially (-0.34) when the maternal mortality ratio and adolescent birth rate are left out of the GII. This country income effect could be isolated if well-being were measured as a ratio of female-to-male capabilities, but that is not possible for the maternal mortality ratio and adolescent birth rate. Thus, critics propose dropping the two rates and using an alternative well-being indicator for the health dimension that can be expressed as a gender ratio, such as life expectancy at birth.⁵⁰ This choice has the advantage of keeping the gender inequality index closely related to the HDI, a solution

implemented since 2014 in the GDI, which uses the gender gap in life expectancy at birth.

Moreover, although use of the labour force participation rate in the GII overcomes problems with the estimated earned-income indicator in the original GDI, the rate does not measure employment or capture the quality or nature of jobs, and it undercounts the informal economy.⁵¹ In addition, as problematized in relation to the earlier UNDP gender indexes, the GII does not incorporate important dimensions of gender inequality: the disproportionate unpaid work performed by women, violence against women, gender asset gaps and women's representation in local governments.

2) Construction: The functional form is complicated and difficult to understand for policymakers. The GII uses the inequality-aversion adjustment of the earlier indexes, but index construction has become even more complicated and less transparent. The complicated construction conceals non-intuitive results: Lower maternal mortality ratio and adolescent birth rate values contribute to higher GII values; overall, the GII is non-monotonic in both rates.⁵² Since the GII and HDI are not measured in terms of the same indicators, it is difficult to communicate how gender inequality drives the loss of human development.⁵³ Specifically, while the GII is supposed to measure the human development cost of gender inequality, it is not clear what the equality benchmark for the GII is.⁵⁴ One solution, as proposed for the earlier indexes, would be to move from measuring the welfare loss of gender inequality to defining inequality simply as a gender ratio. In addition, the GII's non-transparent calculations and data imputations are problematized. The calculation of welfare loss of gender inequality is not reported or discussed in the HDRs, and for many low human development countries, maternal mortality statistics are not available and are imputed.⁵⁵

48 Anand 2018.

49 Klasen and Schüler 2011.

50 Permanyer 2013.

51 Ibid.

52 Anand 2018.

53 Permanyer 2013; Klasen 2018.

54 Permanyer 2013.

55 Klasen 2018.

Based on these critiques, Anand (2018) and Klasen (2018) recommended dropping the GII. Klasen proposed introducing a Gender Gap Measure (GGM) and a new GEM, with slight adjustments to the current GDI and the old GEM, respectively. With the introduction of the new GDI in 2014, the GGM recommendation is largely moot, as Klasen (2018) noted, since it addresses many of the earlier concerns. The GDI is the ratio of the female-to-male HDIs and measures the gender gap in human development; expressing components as ratios means that the GDI is not affected by country income levels. That said, Klasen (2018) expressed two concerns about the new GDI. The first pertains to its symmetric treatment of inequality. It is possible for the new GDI to exceed 1, which is a potential result of advantages cumulating for women in one or more dimensions. This feature is seen as a drawback, especially if it is reinforced by male disadvantages, such as in longevity. This problem can be addressed by capping the GDI at 1 and averaging via a geometric mean only the gender ratios that favour men. The index would then become a measure of the extent to which women are disadvantaged relative to men, in other words, the Women Disadvantage Index proposed by Permanyer (2013) or the capped GGM by Klasen (2018). The second problem with the new GDI pertains to its estimated earned-income component, which was a source of criticism against the original GDI and GEM and led Klasen and Schüler (2011) and Klasen (2018) to propose the use of gender inequality in the labour force participation rate as a proxy for gender gaps in consumption in a new gender inequality index, the GGM.

The proposals for a new gender inequality index by Permanyer (2013) and Klasen (2018) largely overlap in terms of how gender inequality should be measured (as relative achievements of women compared to men), which components to include (life expectancy, education and labour force participation) and how to aggregate the components into a gender inequality index (via a geometric mean of gender gaps in female disadvantage). They also favour population weighting of the components so that gender parity is achieved when the female-to-male population ratio equals female-to-male ratios in component indicators. Permanyer (2013) also questioned the equal weighting scheme of the GII, since it results in composite index

values driven by variables with the largest variability. To address this problem, he proposed using weights with magnitudes that are inversely proportional to the standard deviation of each variable.

While Anand (2018) also proposed a female disadvantage index to replace the GII, there are distinct aspects to his proposal. In general, Anand criticized statistical methods that alter the underlying data, such as capping at 1 the female-to-male disparity ratios that are larger than 1; using the geometric mean, which necessitates substituting non-zero values for zero values in the data to prevent zero index values; and assigning male values of 1 as the counterpart of the maternal mortality ratio and adolescent birth rate in the case of GII. Instead, he favoured calculating female disadvantage by using an averaging method that assigns larger weights to female disadvantage while avoiding both capping female disparities at 1 and using a geometric mean.

In addition to a revised GDI (referred to as the GGM), Klasen (2018) proposed introducing a variant of the original GEM with minor changes to the measurement of the original components: Each component would be measured as female-to-male ratios, and each would be weighted by the population shares of women and men. The new GEM would be a geometric mean of gender gaps in parliamentary representation, participation in economic leadership positions and income shares. Klasen defended retaining income shares as the third component in the GEM (as distinct from the labour force participation rate in the GGM) because he argued access to individual income is necessary for empowerment, whereas this is not the case for access to consumption.

Table 2 summarizes the options for constructing gender inequality indexes. Most of the actual or proposed gender indexes discussed so far are relative-status indexes that include only indicators that have a male and female component and where the focus is on quantifying women's status relative to men's. These examples are shown as option 2 in Table 2: The Relative Status of Women (RSW) index, Gender Relative Status (GRS), Women's Disadvantage (WD) index, Gender Development Index (GDI), Gender Empowerment

Measure (GEM) and the new GEM, Gender Gap Measure (GGM) and Global Gender Gap Index (GGGI).

A second vector of choice for measurement is women-specific indexes, which may include relative and absolute indicators but where the focus is on women's attainments and not the gender gap (option 1 in Table 2). An example is the Female Achievement Index (FemAI) of the European Commission. The counterpart of FemAI, the Female Disadvantage Index (FemDI), shown as option 2 in Table 2, relies on the same

indicators and domains as FemAI but focuses on the gender gap, specifically on whether gaps that disadvantage women are closing. Some scholars have supported developing such a women-specific measure as an addition to a relative-status index.⁵⁶

A third option is relative-status indexes that use a combination of relative and absolute indicators. An example of this option is the GII, which aims to assess women's status relative to men's based on a combination of absolute and relative measures.

TABLE 2.
Gaps or levels: Options for gender equality indexes

(1) Women-specific, focused on women's attainments (levels), not gender gaps	(2) Relative status, focused on gender gaps, not levels	(3) Gaps and levels, includes variables that are women-specific & variables that are defined for women and men
Female Achievement Index (FemAI) (European Commission)	The Female Disadvantage Index (FemDI) (European Commission)	Gender Inequality Index (GII) (UNDP 2010)
	Relative Status of Women (RSW) (Dijkstra and Hanmer 2000)	
	Gender Relative Status (GRS), Women's Disadvantage (WD) Index (Permanyer 2013)	
	Gender Development Index (GDI) (UNDP 2014)	
	Gender Gap Measure (GGM) (Klasen 2018)	
	Gender Empowerment Measure (GEM) (UNDP 1995) and New GEM (Klasen 2018)	
	Global Gender Gap Index (GGGI)	

Note: The table provides an illustrative list and is not intended to be exhaustive.

A relative status, 'gender gap', measure of women's well-being (option 2 in Table 2) is not entirely satisfactory, however, as recognized by researchers who have engaged with UNDP's gender indexes since 1995. One limitation is that it does not keep track of changes in the well-being *levels* of women and men.⁵⁷

This limitation of a relative status measure is illustrated by the perplexing country rankings on an index such as the GGGI. In the 2020 GGGI report, Nicaragua ranks as the fifth closest country to reaching gender

parity among 153 countries.⁵⁸ This high rank is due to equally low levels of achievement for both women and men in the country. But Nicaragua also has serious shortfalls in women's well-being that are partly the product of gender inequality and partly due to the country's low level of resources. If these considerations were incorporated, its GGGI rank would likely not be as high. For example, according to the 2019 GII values, Nicaragua ranks 101st among 162 countries, owing in part to the low reproductive health of women.⁵⁹ This case illustrates how a gender gap index (i.e., one based

56 Klasen 2006a.

57 Dijkstra and Hanmer 2000; Permanyer 2013.

58 World Economic Forum 2020.

59 UNDP 2020a.

on female-to-male ratios) can paint a misleading and incomplete picture of levels of well-being. It also shows the appeal of a synthetic index like the GII that combines the absolute achievements of women in the maternal mortality ratio and adolescent birth rate with gender gaps. The EU-GEI is designed to address this problem: Countries that have low levels of gender inequality are not assigned favourable index scores if underlying levels of well-being are low for both women and men.⁶⁰

Another problem with a measure that keeps attention solely focused on gender gaps (either female-to-male ratios or female-male differences) is that the source of measured gender inequality or the decline in gender inequality is hidden from view. For example, the gender gap in life-expectancy at birth may conceal male disadvantage. Life-expectancy gaps tend to favour women by five years, but in some countries the difference is greater than that due to shortfalls in men's life expectancy, which may contribute to better country performance on the gender gap index. Even when the female and male indicators underlying each gender ratio are also reported in the same table (as in Table 4 of the *Human Development Report*), it is easy to overlook these component variables and focus on the ratios or the value of the ultimate aggregate gender inequality index.

Likewise, in a relative status index the source of *changes* in inequality is difficult to decipher. Are gender inequalities declining due to improvement in the position of women or the worsening of men's position? A familiar case is the trend in gender earnings inequality, where inequality may have declined due to a decline in men's earnings with or without an improvement in women's earnings. An inequality measure that incorporates gender wage inequality into a composite index would obscure these underlying trends.

To sum up, key challenges and considerations relevant for discussing new and improved gender indexes are:

- Agency, along with basic achievements of health and education, is important for the evaluation of gender equality in capabilities.
- Combining women-specific indicators (e.g., the maternal mortality ratio) that do not have a men's counterpart with indicators aimed at capturing women's relative status in one index is problematic, particularly where the index focuses on gender gaps or gender parity. One reason is that the benchmark for what constitutes gender equality is not clear when both are included in one index, but not all measures are suited to provide information on relative status.
- A relative status measure, focused on female-to-male ratios, is insufficient for a number of reasons: First, the source of changes in inequality is hidden from view (e.g., is the improvement because men's position is worsening?), and second, levels of achievement are not accounted for (e.g., a country with very low levels of achievement in well-being may score high if both women and men have equally low levels of achievement).
- Other concerns relate to the selection of dimensions. Previous indexes have missed core areas of gender equality and women's agency, including violence against women and girls and unpaid care and domestic work. In other cases, indexes have focused on areas criticized for being elitist (e.g., a narrow focus on women in parliament) and not adequate for capturing the well-being of women and girls from poor and marginalized groups.

60 EIGE 2013.

5.

CONCEPTUAL FRAMEWORK FOR RETHINKING GENDER INDEXES

An appropriate starting point for rethinking the GII is to revisit the conceptualization of gender inequality, as emphasized by Dijkstra and Hanmer (2000), Robeyns (2003) and EIGE (2013). Feminist writings on the capabilities approach, which underpins UNDP’s human development paradigm, provide useful insights on potential dimensions of gender inequality to consider. The approach has great potential for assessing feminist concerns and questions, many of which are non-monetary outcomes beyond the usual focus on earnings inequalities, such as domestic violence, education, reproductive health and voting rights.⁶¹

Gender inequality in capabilities has been integral to the development of the capabilities approach, as illustrated by Sen’s writings on gender inequality in health and education in South Asia, intra-household bargaining power and the ‘missing women’ problem.⁶² The approach distinguishes between *capabilities*, which define the opportunities to be and to do, and *functionings*, which are the actual achieved outcomes. It provides a normative framework for the evaluation of well-being and current and prospective social arrangements. While not a theory, the approach recognizes resources and institutions as constraints on capabilities. Resources, such as income, unpaid work or government transfers, are inputs to capabilities. And societal arrangements (such as laws, norms, macro-economic policies, care systems and universal social protection floors) shape relationships among resources, capabilities and functionings as well as levels of each of these.⁶³

This broader capabilities framework, represented in Figure 1, overlaps with the social provisioning methodology in feminist economics.⁶⁴ Among its main

features, this methodology identifies human well-being (hence capabilities) as the yardstick for success of economic policies.⁶⁵ It may be used to illustrate the generation of gender inequalities in capabilities and their reproduction over time as in Figure 1: Gender inequalities in earnings or assets (*Resources*) are reinforced by unequal power relations embedded in laws and the operation of labour markets (*Institutions*). While unpaid care work is necessary for generating capabilities, and is a capability of the caregiver, women’s disproportionate responsibility for unpaid work does not support their bargaining power at home and reinforces existing employment and pay structures in the labour market (leading women into lower-paying jobs and resulting in undervaluation of women’s labour in sectors where they dominate). Inequalities in the ability to earn a living, in turn, constrain the ability to lead lives free of violence, be healthy, seek education and realize a host of other capabilities (*Capabilities*) and inequalities in actual achievements (*Functionings*). Over time, unequal functionings reinforce earnings

61 Robeyns 2003.

62 Sen 1990, 1999.

63 Robeyns 2005.

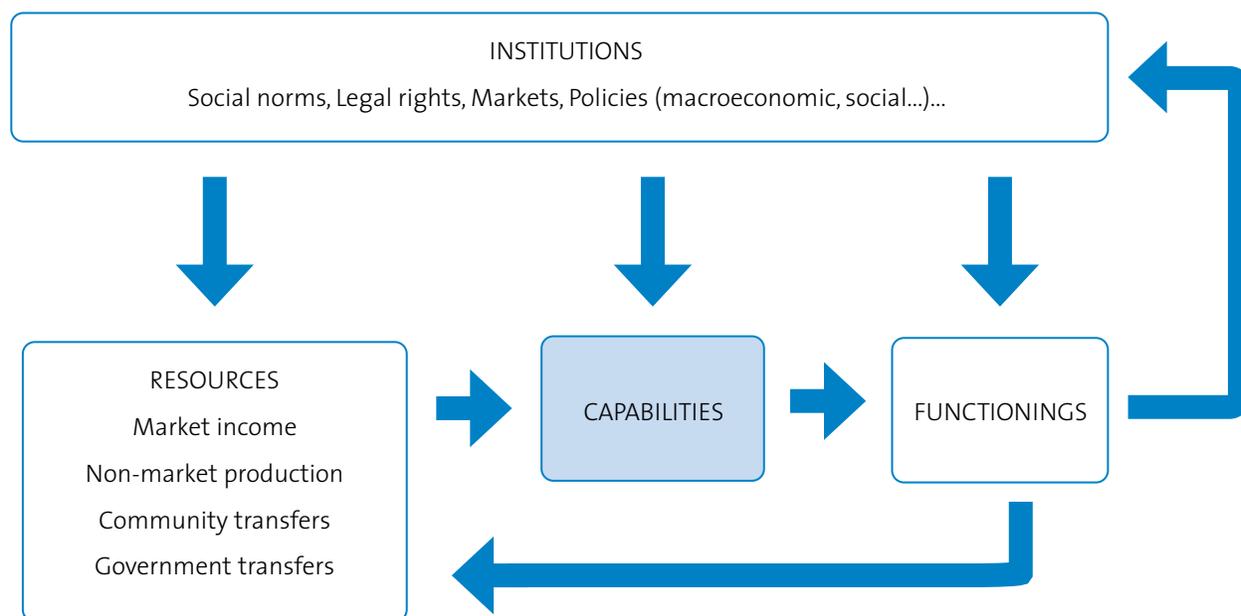
64 Berik and Kongar 2021.

65 Other features of social provisioning methodology are use of a broad concept of economic activity that encompasses unpaid as well as paid work, attention to power differentials, agency and intersecting social identities as part of economic analysis and acknowledgement of one’s ethical stance in scholarship.

inequalities and ability to alter the gender division of household labour (*Resources*) and perpetuate gender norms and constrain women’s voice in

shaping government policies, for example, in increasing government transfers to support provisioning (*Institutions*).

FIGURE 1.
The capabilities framework



Gender equality can be conceptualized within this broader capability framework. While the capabilities approach emphasizes capabilities as the appropriate space for evaluating well-being, most statistics measure achieved functionings of social groups.⁶⁶ Thus, following Robeyns (2003), this paper assumes that group inequalities in functionings are a proxy for capability inequalities. This perspective is consistent with Phillips (2004), who argues that inequality of *outcomes* is a good indicator of unequal *opportunities*.

The capabilities approach also has much in common with the human rights approach, which is an alternative normative framework for evaluating economic policies and outcomes. The human rights framework delineates some capabilities as rights and identifies the State as responsible (‘duty bearer’) in fulfilling and protecting these rights. In the modern era, the human

rights framework builds on the Universal Declaration of Human Rights (1948) and other treaties such as CEDAW (1979), which obligate States to take measures to eliminate discrimination against women and to ensure substantive equality of women with men.⁶⁷

The capabilities approach (along with the human rights framework and social provisioning methodology in feminist economics) is cognizant of variations in (dis)advantages among women and the unique vulnerabilities of different groups of women. The resource needs of different social groups to attain the same level of capabilities vary by gender, race, class, indigeneity and other socially assigned identities. Those who are historically disadvantaged in access to education or health care, for example, will need more resources through policy and appropriate institutional arrangements. Disability may also hinder people’s ability to convert a given level of resources into capabilities.

66 Some indicators, such as life expectancy at birth or expected years of schooling, measure opportunities to be or to do, thus capabilities.

67 Balakrishnan and Heintz 2021.

This awareness of intersectional inequalities as a factor that compounds (dis)advantage is articulated in international policy documents such as the Beijing Platform for Action (paras. 31 and 32), which builds on the universalism of the Universal Declaration of Human Rights (Article 2); in several articles of CEDAW (for example, articles 1, 2, 3 and 9); and in the ‘leave no one behind’ principle of the 2030 Agenda for Sustainable Development.

Figure 1 also shows the options for constructing composite measures of gender inequality. As highlighted by van Staveren (2013), composite indexes could assess well-being outcomes in terms of capabilities and functionings, as the GII does, or focus on institutional constraints to well-being, as in the case of the SIGI. They could mix capabilities, functionings and resources in an overall indicator (the GGGI and EU-GEI), or not differentiate between well-being inputs and outcomes (the Historic Gender Equality Index⁶⁸). While these options exist and have been implemented in composite gender indexes, proposals for revision of the GII (and the earlier GDI and GEM) have generally favoured focusing on gender inequalities in capabilities, thereby keeping the measure within the human development paradigm.⁶⁹ The capabilities focus contributes to the distinctiveness of the UNDP gender indexes. The embrace of the capabilities approach in the 2030 Agenda—the idea that the “ultimate purpose of development is to improve people’s well-being”⁷⁰—also supports measuring gender inequality in capabilities in a new gender index.

While Sen’s focus has been on the shortfalls in women’s life expectancy, health and education relative to men’s, he does not provide much guidance on which dimensions to include in an index of gender inequality.⁷¹ Yet, as Nussbaum (2003) and Robeyns (2003) emphasize, the usefulness of the capabilities approach in

assessing gender inequality depends on selecting the relevant capabilities. Taking up this challenge, Nussbaum (2003) has proposed a definite list of human capabilities that she argues should be upheld universally through constitutional guarantees, while Robeyns (2003) has identified a list for the Global North. Nussbaum’s list delineates 10 capabilities at a deliberately abstract level to allow them to be fleshed out through debate in specific contexts, while Robeyns has delineated a more concrete list of 14 capabilities with the goal of conceptualizing and measuring gender inequality. Robeyns favoured a bottom-up process in the generation of the list, specific to the context and sensitive to the purpose at hand. She identifies procedural criteria for the selection of capabilities, including identification and justification of the dimensions for inclusion without attention to data constraints. This approach entails drawing up two lists—an ideal one unconstrained by feasibility concerns and a pragmatic one responsive to the constraints—and then justifying the process for generating the list and making sure the list is appropriate to the context and objectives it is intended to serve.

While Nussbaum’s list is not intended for women only, it provides a gender-aware description of well-being, of valuable ‘doings and beings’. Underlying Nussbaum’s list is an embodied human being who interacts with others, needs care, cares for others, has opportunities to work with dignity or play, has influence over their environment and is able to lead a life free from discrimination or violence. Nussbaum’s and Robeyns’ lists largely overlap, as do earlier lists.⁷² In particular, the capabilities of life, bodily health, bodily integrity, senses, imagination and thought, affiliation and control over one’s environment could be represented in a new gender index. Neither Nussbaum nor Robeyns differentiate well-being and agency to attain well-being, incorporating agency on their lists, as discussed below.⁷³

68 Dilli et al. 2019.

69 Klasen 2018; Permyer 2013.

70 Fukuda-Parr and Cid-Martinez 2019, p. 442.

71 In fact, Sen does not endorse a predetermined list of capabilities but envisions the list to be generated by public discussion, depending on the purpose or the setting. But as Robeyns (2005) points out, since it is not certain that minimal democratic representation can be guaranteed in coming up with the list, the public debate method is problematic.

72 See Table 1 in Robeyns 2003.

73 Nussbaum (2003) also includes the institutional prerequisites for promoting some of the capabilities on her list, such as political rights or property rights under ‘control over one’s environment’ or religious and political freedoms under ‘practical reason’ and ‘affiliation’. These formal institutions are currently incorporated in the SIGI.

These lists also overlap to a large extent with the principles embodied in the Universal Declaration of Human Rights, CEDAW and the Beijing Platform for Action. In addition, the 2030 Agenda articulates the aspirations for gender equality of the feminist activists and scholars who participated in crafting the SDGs. Several SDG targets reflect dimensions of gender equality delineated in the earlier strategic international documents and the feminist capabilities conceptual frameworks.

The overlaps in what it means to achieve gender equality in the capabilities approach and international documents, indicated in Table 3, suggest a fundamental agreement on a core set of capabilities as central to well-being or advantage: life, bodily health, bodily integrity, senses, imagination and thought and control over one's environment. These capabilities have a counterpart in human rights in strategic international documents, which are elaborated in Annex III.

TABLE 3.
Conceptual and policy framework for rethinking gender indexes

Nussbaum “Central Capabilities”	CEDAW (1979) Articles*	Beijing Platform for Action (1995) Critical area of concern**	SDGs (2015)***
Life		L	SDG 3, 13.1, 16.1
Bodily Health	4, 11, 12	C, L	SDG 3
Bodily Integrity	6, 16	D, E, L	SDG 5.2, 5.3, 5.6
Senses, Imagination and Thought	10	B L	SDG 4, 8.6.1
Emotions			
Practical Reason			
Affiliation			
Other Species		K	SDG 6.6, 14.1, 15.1, 15.4, 15.5
Play			
Control over One's Environment	7, 8, 11, 13, 14	F, G	SDG 5.4, 5.5, 8

* UN General Assembly 1979.

** UN General Assembly 1995, para. 44.

*** See the list of SDG targets and indicators at UN DESA 2021.

B. Inequalities and inadequacies in and unequal access to education and training.

C. Inequalities and inadequacies in and unequal access to health care and related services.

D. Violence against women.

E. The effects of armed or other kinds of conflict on women, including those living under foreign occupation.

F. Inequality in economic structures and policies, in all forms of productive activities and in access to resources.

G. Inequality between men and women in the sharing of power and decision-making at all levels.

K. Gender inequalities in the management of natural resources and in the safeguarding of the environment.

L. Persistent discrimination against and violation of the rights of the girl child.

5.1

Life and bodily health

Nussbaum (2003, p. 41) defines the capability of life broadly as “being able to live to the end of a human life of normal length; [and] not dying prematurely, or before one’s life is so reduced as to be not worth living”. She refers to bodily health as “being able to have good health, including reproductive health; to be adequately nourished; [and] to have adequate shelter”.⁷⁴ Likewise, Robeyns’ list includes life and physical health. Both the HDI and GDI (original and new) incorporate the capability to live a long and healthy life as a dimension.

Life and bodily health are both intrinsically important and an input to achieving other capabilities, such as having bodily integrity, the capability to secure a decent level of provisioning and greater decision-making power in the household. To enjoy decent health equitably requires taking into account biological differences between women and men and acknowledging that some aspects (such as reproductive health) cannot be assessed in a relative way. On the other hand, women’s biological advantage over men in life expectancy also needs to be considered in identifying the benchmark of equality in life expectancy. Since this advantage is not linked to social causes, it cannot be viewed as an unjust inequality in favour of women.⁷⁵

Health is a critical area of concern in CEDAW and the Beijing Platform for Action. CEDAW article 12 calls on States to ensure equal access to and treatment of women and men in health-care services, including family planning, and women-specific services related to childbearing and reproductive health. The Beijing Platform for Action similarly emphasizes reducing inequalities in access to and the inadequacies of health-care services and combating son preference that results in sex selection and female infanticide as two of the 12 critical areas of concern.

⁷⁴ Ibid.

⁷⁵ Robeyns 2003; Dijkstra 2006.

5.2

Bodily integrity

Nussbaum (2003, p. 41) defines bodily integrity as being “secure against violent assault, including sexual assault and domestic violence; [and] having opportunities for sexual satisfaction and for choice in matters of reproduction”. The ability to be safe from violence is a central capability for both her and Robeyns (2003). Violence entails a serious capability deprivation that disproportionately affects women. It is an expression of domination by men and a manifestation of unequal power relations. It is a major feature of life that sustains gender inequalities in the household, workplace and society. Violence against women takes many forms, including female genital mutilation, rape and assault, sexual harassment in public spaces and physical and psychological violence in intimate partner relationships. Intimate partner violence (IPV) is the most common type of violence against women and girls, while men are more likely to experience physical violence from non-partners outside the home. IPV is a capability deprivation that has wide-reaching consequences, undermining not only women’s ability to be in good health (as well as enjoy bodily integrity) but also all their other capabilities.⁷⁶ In the capabilities approach, achieving gender equality in bodily integrity means ensuring women are safe from harm within the broader goal of reducing the risk of violence for everyone.

Under CEDAW, violence is the most extreme form of discrimination, though initially the convention focused only on specific forms of violence.⁷⁷ Articles 6 and 16 call on States to prevent trafficking and exploitation for prostitution of women and girls, and child marriage, respectively. It was not until 1992 that General Recommendation 19 of CEDAW clearly articulated violence against women as a violation of their human rights and a priority.⁷⁸ This was followed by the UN Declaration for the Elimination of Violence against Women, which first recognized violence against women as a violation of women’s rights.⁷⁹ The Beijing

⁷⁶ Strenio 2020.

⁷⁷ Weldon and Htun 2013.

⁷⁸ UN CEDAW 1992.

⁷⁹ UN General Assembly 1993.

Platform for Action identified violence against women and girls in the family, community and in armed conflict as critical areas of concern. SDG 5 includes targets 5.2 and 5.3, which seek to eliminate all forms of violence against all women and girls, including intimate partner and non-partner sexual violence and harmful practices such as child marriage and female genital mutilation.

Bodily integrity also encompasses the ability to have a satisfying and safe sex life, the ability to have children and the freedom to decide if, when and how often to do so. The United Nations Population Fund (UNFPA) defines reproductive choice in terms of three dimensions: decision-making power on health care, contraception and sexual activity.⁸⁰ Reproductive choice (in timing and spacing of births and ability to achieve desired births) is intrinsically important. It also affects women's capabilities to pursue their education or an occupation of their choice and to achieve economic security and bargaining power within the household.

5.3

Senses, imagination and thought

'Senses, imagination and thought' on Nussbaum's list, and 'education and knowledge' on Robeyns' list, represent the ability to seek knowledge. Education is a key dimension of gender equality—central to conceptual as well as all international policy frameworks. Having the capability to be educated and to develop one's talents and skills is intrinsically important as well as being an input for other capabilities such as being healthy and the ability to earn a living. CEDAW article 10 calls on States to ensure equal opportunity and treatment in education, while the Beijing Platform for Action includes reducing inequalities in access to education and training and eliminating gender discriminatory content at all levels of education as areas of critical concern. SDG 4 incorporates several targets for gender equitable education and training.

80 UNFPA 2021.

5.4

Emotions/affiliation

Nussbaum's list includes the capability of *emotion* (being able to form attachments) or *affiliation* (act in caring ways), thereby underscoring the centrality of the ability to form social relationships to human well-being. These capabilities encompass a range of social relationships (i.e., in the community or in social organizations), which Robeyns identifies as the capability to network and receive support ('social relations'). They also include relationships of care in the household—the ability to care for children and other dependents or be cared for (which for Robeyns is the capability of 'domestic work and unpaid care'). However, the exercise of the capability to care should not come with the obligation for women to bear the sole or disproportionate burden of unpaid domestic and care work as that would hinder the other capabilities of women. Moreover, in the related human rights framework, there is a right to be cared for and caregivers also have the right to receive support from the state (as the duty bearer). Neither emotion nor affiliation is explicit in the strategic international documents.

5.5

Practical reason

Women's participation in decisions that affect their lives is widely recognized as an important aspect of gender equality and pertains to both private and public spaces. Nussbaum includes the capability to exercise practical reason as a central capability, which refers to "[b]eing able to form a conception of the good and to engage in critical reflection about the planning of one's life" (2003, p. 41). This capability is a prerequisite for agency at both the individual and collective levels. She also includes practical reason under 'control over one's environment', which, as noted below, has economic and political dimensions. Robeyns (2003) includes 'political empowerment' on her list of capabilities. Practical reason is implicit in the strategic international policy frameworks.

5.6

Other species

Concern for the physical environment and non-human species is on Nussbaum's list of central capabilities, which she defines as "[b]eing able to live with concern for and in relation to animals, plants, and the world of nature" (2003, p. 42). The Beijing Platform for Action articulated women and the environment as a critical area of concern, calling on States to reduce gender inequalities in the management of natural resources and ensuring the health of the environment. The 2030 Agenda incorporates environmental sustainability as a key imperative in the broader definition of sustainable development as well as to counter the climate crisis and to preserve biodiversity and the natural resources on which people depend, now and for future generations. Several SDGs reflect this imperative. Climate change has wide-reaching consequences on people's provisioning activities and capabilities. A growing body of research examines the gender-differentiated effects of environmental disasters and degradation of biodiversity that undermine this and other capabilities.

5.7

Play/leisure activities

Both Nussbaum and Robeyns include the capability 'to laugh, to play, to enjoy recreational activities' and to enjoy 'leisure activities' on their lists. The ability to enjoy leisure is highly gender-differentiated in both the availability of leisure time and its nature. Leisure is linked with other uses of time, notably paid and unpaid work. None of the strategic international documents refers to this capability, albeit it is the implicit counterpart of forms of work.

5.8

Control over one's environment

Nussbaum refers to 'control over one's environment' as both the ability to make political choices that affect one's life and the ability to secure one's livelihood through employment and asset ownership (2003, p. 42).

In economic terms, the capability to earn a living is important for ensuring the livelihoods of individuals and their dependents. Unpaid care work is a necessary complement of paid work in order to generate livelihoods. While caregiving contributes to the well-being of those who receive it, it is ambiguous in terms of its implications for women's well-being. This ambiguity stems from women's disproportionate responsibility for unpaid care work in the household, shaped by gender norms and labour market inequalities. Unpaid work is a well-known constraint on women's employment, the types of jobs they hold, their earning potential, their ability to enjoy leisure and their health. Women's ability to secure income is contingent on addressing their unpaid workload through public policy that recognizes its value and promotes the sharing of unpaid care work (as articulated in SDG target 5.4). CEDAW, the Beijing Platform for Action and the SDGs emphasize gender equality in employment and earnings.

In political terms, international policy documents view women's participation in political decisions that govern their lives as a right. CEDAW articles 7 and 8 entrust States with ensuring equality between women and men in political and public life and in representation in governments. The Beijing Platform for Action spells out the imperative for governments to promote representation of women in power and decision-making at various levels and branches of government and in leadership positions in economic decision-making bodies. SDG target 5.5 calls for States to ensure women's full and equal participation in leadership positions in political, economic and public life. Political life is also a domain where women's representation can be increased in a relatively short time through targeted measures such as quotas,⁸¹ albeit there can also be reversals such as through a subsequent election.

In addition to public, political, and economic life, the household is a site for the exercise of agency. As feminists have long argued, private lives have political (power) dimensions. Nussbaum's definition of 'practical reason' suggests that intrahousehold relations is a domain where power is exercised. Since intrahousehold

81 EIGE 2013.

bargaining and decision-making are not observable, however, the process aspects of agency in the household have been difficult to measure, and agency is measured in terms of outcomes.

5.9

Agency and empowerment

The concepts of women's agency and empowerment are often conflated, and studies differ in the ways they conceptualize and measure women's agency.⁸² Agency refers to the ability to identify goals and pursue them.⁸³ It is a core dimension of human development,⁸⁴ and as such it is encompassed by the lists of central capabilities of Nussbaum and Robeyns. Empowerment is a broader concept than agency. It represents processes by which those who have been denied the capacity to make choices gain this capacity.

Moreover, the policy-oriented literature and discussions of gender indexes often conflate access to resources and empowerment, such that women's educational achievement, labour force participation or representation in elected office are often interpreted as indicators of empowerment or as shorthand for empowerment.

This shorthand approach may overlook the fact that empowerment is contingent on broad social processes, institutions and resources that enable women to exercise their agency. In addressing the problem of intimate partner violence against women, for example, a woman's agency to seek help or be safe is contingent on a legal and regulatory framework that

makes such violence illegal; enforcement of the law; her fallback position, including her income; the services that are available; her community's awareness that IPV is wrong; and the strength of the social movement that considers violence as a violation of women's human rights.

Moreover, making choices (agency) in and of itself does not constitute or ensure empowerment. Not only can choices be limited but they can conform to and reproduce inequalities, so they may not really reflect an empowered person's actions.⁸⁵ On the latter, Sen (2001), for example, was distressed that the rising educational attainment of women in India was accompanied by a rise in son preference and sex-selective abortions. He argued that women need not only "freedom of action" but also "informed and critical agency" and "freedom of thought" from masculinist values.⁸⁶ His observations highlight that, situated within a gendered social order, educated women may exercise agency to promote gender inequality. The root cause of why women and men may go against their own self-interest is complex but, from a conceptual perspective, agency that reinforces dis-empowerment or harm cannot be considered empowering. These considerations call for differentiating empowerment from agency and underscore that empowerment refers to the *possibility* that achievements such as women's education, employment and representation in parliament will lead to choices that enhance their other capabilities and reduce gender inequalities in the household and the public domain. In this paper, empowerment refers to the *possibility* of exercising agency through expanded choices and opportunities.

82 Donald et al. 2020.

83 Kabeer 2021.

84 Fukuda-Parr 2003.

85 Kabeer 2021.

86 Sen 2001, p. 17.

6.

FROM CONCEPT TO MEASUREMENT: A PROPOSAL FOR IMPROVED GENDER INEQUALITY INDEXES

Based on the conceptual discussion in the previous section, this paper relies on the feminist capabilities approach to identify the dimensions of new gender indexes. Specifically, the lists of capabilities in Nussbaum (2003) and Robeyns (2003) and their overlaps with international feminist policy frameworks provide the conceptual basis for proposing two new measures: A Global Gender Parity Index (GGPI) and a Women's Empowerment Index (WEI). The two-index solution is in keeping with the distinction made between a measure of gender gaps to capture women's relative status and a measure focused on women's potential for empowerment.

Each index incorporates four of the central capabilities on Nussbaum's list. Both indexes are operationalized in terms of capabilities (and outcome indicators), but the WEI focuses solely on women and women's agency levels while the GGPI reflects women's achievements relative to men (option 1 and option 2 respectively in Table 2). Data constraints and the basic criteria for generating composite indexes determine the dimensions incorporated in the indexes. This section fleshes out the indicator options for translating the concepts into measurement. Tables 4 and 5 summarize the proposed indicators for each dimension of the index, many of which are SDG indicators reported in Tables 4 and 5 of the 2020 *Human Development Report* and its dashboards.⁸⁷ These cover 189 countries.

6.1 The Global Gender Parity Index

The GGPI measures gender inequality in four dimensions of human development: health, education, opportunities for paid work and financial inclusion, and

participation in decision-making. Universally relevant in defining well-being, these are concrete expressions of four central capabilities represented in Table 3: life; bodily health; senses, imagination and thought; and control over one's (economic and political) environment. The indicators proposed to measure each of these dimensions are summarized in Table 4. The selection of indicators seeks to avoid double counting while providing a short list for the index to serve as an effective communications tool. Applying a life-cycle lens indicates that the proposed indicators capture well-being in infancy/childhood and late adulthood (health) and in early and middle adulthood (education and opportunities for paid work/financial inclusion).

When constructing the GGPI, each indicator is to be expressed as (or inverted to express) a female-to-male ratio. The ratio measures the relative status of women vis-a-vis men in the relevant indicator. The index may be measured positively, where an average score of 1 represents parity and values less than 1 indicate women's average achievement relative to men (with the distance to reach parity expressing the gender *gap (shortfall)* in achievement).

⁸⁷ UNDP 2020a.

TABLE 4.
The Global Gender Parity Index

Dimensions		Indicators (SDG target/indicator)
Life & bodily health	Life and health	Population sex ratio at birth
		Fraction of life expectancy at birth spent in good health, by sex
Senses, imagination and thought	Education	Mean years of schooling OR population age 25 and older that has at least some secondary education (SDG 4.4)
		Proportion of youth aged 15–24 years who are not in education, employment or training (NEET) (SDG 8.6.1)
Control over one’s environment	Opportunities for paid work/financial inclusion	Labour force participation rate (or employment rate) by presence of children and household type
		Occupational or sectoral crowding in employment (female-male ratio of)
		Account ownership at a financial institution or with a mobile-money service-provider (SDG 8.10.2)
	Participation in decision-making	Women’s share of seats in national legislature (SDG 5.5.1)
		Women’s share of seats in local governing bodies (SDG 5.5.1)
		Women’s share of managerial/administrative positions (SDG 5.5.2)

Life and health

The indicator of life chances disparities by gender can be the relative numbers of females and males born, typically measured by the population sex ratio at birth (male-to-female births) or the ratio of female-to-male children. Conceptually, birth or child sex ratio variables reflect the deprivation of life for girls via sex selection in utero/early infancy (abortion, infanticide or receiving less care) in the context of cultures of son preference. Since at birth more boys than girls are born (107 boys per 100 girls), sex ratios in excess of 107 may be considered evidence of discrimination against girls in utero through sex-selective abortions.⁸⁸ The 2020 *Human Development Report* Life-Course Gender Gap dashboard indicates that sex ratio at birth data are available for 183 countries. Most countries have sex ratios in the 105-107 range; very few have ratios of 109-113. The alternative indicators are the sex ratio for the 0 to 5 age group, as suggested by Hooper (2006) and Dilli et al. (2019), and the sex ratio of the 0 to 5 child mortality rates. However, United Nations Children’s Fund (UNICEF) data for 2019 do not indicate female disadvantage in child mortality, with few

exceptions.⁸⁹ Therefore, despite the limited variation in country values, sex ratio at birth emerges as the option to measure discrimination against girls in the capability of life.

Healthy life expectancy is a suitable indicator of health disparities by gender. Currently, UNDP presents life expectancy at birth as the indicator that measures a long and healthy life as a component of both the HDI and GDI.⁹⁰ There is considerable agreement that a revised gender inequality index should include life expectancy at birth as an indicator of health.⁹¹ However, the indicator only measures a healthy life on the assumption that one would not live a long life unless one is healthy. Specifically, life expectancy tracks mortality, not health or morbidity. Given improvements in health data, it is possible to aspire for a more refined measure of life expectancy and go beyond measuring the basic capability of a long life to instead capture a healthy life. One option is to use an indicator of disability-free or healthy life expectancy to incorporate

88 Orzack et al. 2015.

89 UNICEF 2021. India and Tonga are the exceptions: The female-to-male ratio of under-5 mortality rates were 1.22 in Tonga and 1.03 in India.

90 UNDP 2020a, Tables 1 and 4.

91 Permyer 2013; Klasen 2018.

quality of life.⁹² Healthy life expectancy (HALE) at birth is an estimate of the “average number of years that a person can expect to live in ‘full health’ by taking into account years lived in less than full health due to disease and/or injury”.⁹³ To reflect the broader goal of life and good health, a better choice is “the average number of years individuals at age 60 are expected to live in good health based on current rates of ill-health and mortality”.⁹⁴ A third option is the ratio of HALE at birth to life expectancy at birth (HALE/LE, i.e., proportion of life expected to be lived in good health).

There are good reasons for including either HALE or HALE/LE in the revised gender inequality index. First, women’s longer life expectancy may conceal their poor health in old age. While they live longer than men on average (some of it for biological reasons), a greater share of that time is spent in poor health as the cumulative effect of gender inequalities, such as greater exposure to indoor air pollution from solid fuel use, violence against women and vulnerability to HIV.⁹⁵ Recent studies also suggest that women are more susceptible than men to the adverse health effects of climate change in terms of mortality in climate disasters, climate-driven food insecurity and increased risk of physical, sexual and domestic violence in the aftermath of climate disasters.⁹⁶ Men also face health issues that are related to their gendered behaviour (i.e., aggression associated with toxic masculinity) and are more likely to result in death. They are also biologically more likely to live shorter lives compared to women.

Second, use of HALE or HALE/LE could address a problem raised with the GDI. Female life expectancy advantage currently drives many countries’ GDI ranks, contributing to lower gender inequality when, in many cases, it is male disadvantage that underlies the gender differential in life expectancy that exceeds five years. Using a quality-adjusted life expectancy indicator in the GGPI is likely to narrow this gender gap. For example, in 2019, in the Russian Federation, the gender

difference in life expectancy at birth was 9.8 years while the gap in HALE at birth and at age 60 was 6.8 years and 4.6 years, respectively.⁹⁷ As of 2019, HALE by gender is available for 183 countries. That said, Luy and Minagawa (2014) show that taking the ratio of HALE to LE controls for LE and generates a better picture of share of life lived in good health compared to using HALE alone. It may also be more relevant in capturing the trends by gender. Thus, while exact contributions of biology and social factors to health disparities are difficult to separate, when differences in life expectancy are accounted for, women face poorer health as a percentage of life. The World Health Organization (WHO) indicates that females, irrespective of age, on average live more years in poor health compared to males and that, as life expectancy increases overall, the female-male gap in poor health is widening.⁹⁸

Thus, population sex ratio at birth and the proportion of life expected to be lived in good health are proposed as indicators to measure gender disparities in health in childhood and late adulthood.

Education

In composite gender indexes, this dimension is typically measured in terms of either educational attainment or the potential to achieve it. In recent decades, education gender gaps in many countries have declined, or even reversed, as women have increased their education levels. The education indicators in the GDI (Table 4 of the 2020 *Human Development Report*) show that education gender gaps are narrowing: For a large number of countries, the expected gender gaps in schooling are smaller than the gender gaps in mean years of schooling. The GII expresses the gender gap in educational attainment as the share of women (men) 25 years and older who have at least some secondary education. In the proposed GGPI, either this educational attainment indicator or mean years of schooling can be used to measure disparity in current levels of educational achievement. There is good data coverage for both indicators: 174 countries for mean years of schooling and 167 countries for the attainment of some secondary

92 Hooper 2006.

93 WHO 2020a.

94 Ibid.

95 See, for example, Austin and Mejia 2017; Mocumbi et al. 2018; Stillwaggon 2008.

96 Neumayer and Plümper 2007; Sorensen et al. 2018.

97 WHO 2020b.

98 WHO 2021a.

education. Neither of these indicators captures the content or quality of learning, however. While women's educational attainment is catching up with, and even surpassing, men's, women and men continue to specialize in different fields in tertiary education, which has consequences for labour market inequalities, such as occupational segregation, earnings and career mobility. This proposal favours including an employment segregation indicator to measure the relative ability to earn an income as the outcome of disparity in the fields (content) of education (see indicators of *Opportunities for paid work* below).

A broader learning and skill-building opportunity indicator—such as the proportion of youth aged 15–24 years who are not in education, employment or training (NEET)—can also be considered. The female-to-male ratio of NEET would be a proxy for the relative exclusion of women from broader learning and skills-building opportunities, usually due to engagement in household chores and lack of institutional support, such as inadequate access to affordable childcare. Implicit in the selection of NEET is the recognition that learning and skills-building are lifelong endeavours that can be acquired through various means besides formal education, such as through training or work experience. This indicator would be measured as the 'not NEET' ratio, i.e. $(100 - \text{Female NEET}) / (100 - \text{Male NEET})$ to capture the relative inclusion of women. NEET is an SDG indicator (target 8.6.1) that is available for 180 countries.

Opportunities for paid work/financial inclusion

The GII uses labour force participation rates as a proxy indicator for the capability to earn an income. Other composite indexes, such as the GGGI and EU-GEI, have also incorporated labour force participation as one proxy for the 'economic participation and opportunity' or 'work' dimension (see Annex II, Table A.1). With respect to the UNDP gender indexes, there is agreement that labour force participation is a poor indicator of the capability to achieve a decent level of provisioning. The main concerns are that labour force participation encompasses both the employed and

those who are unemployed (but seeking and available for paid work) and that it underestimates unpaid (contributing) family work on a family farm or business and informal employment. Time-use surveys give a sense of the scale of the underestimation of these forms of paid work in labour force statistics, especially for women, as well as being valuable in measuring the amount of unpaid care and domestic work undertaken. They ask about people's time use, as opposed to labour-force surveys that inquire about their work or occupation, which tends to result in women underreporting their paid work.⁹⁹ Thus, we can assume that, especially for low-income countries, the gender gaps in labour force participation rates are exaggerated. Nonetheless, recent GII reform proposals favour the use of gender gaps in labour force participation.¹⁰⁰ The 'employment-population ratio' or 'non-agricultural employment' rate would be more indicative of opportunities for paid work. Women's share of non-agricultural employment tracks progress on SDG target 8.3. In the Life-Course Gender Gap dashboard of the 2020 *Human Development Report*, data on this indicator are reported for 178 countries.

A potentially useful alternative indicator could draw on the new global dataset produced by the International Labour Organization (ILO) and UN Women, based on the ILO's Harmonized Microdata collection. This dataset, currently available for 84 countries, reports the labour force participation of the prime age working population (aged 25 to 54) with children who live in different household types.¹⁰¹ Depending on household type, the gender ratio of the labour force participation rate could measure either the availability of family support for unpaid household labour (e.g., in extended families) or the constraint of unpaid work on labour force participation (e.g., in nuclear families). In the latter case, for partnered women and men who have young children, this indicator could capture the impact of the unequal division of labour in the household on income-earning opportunities. As such, this variable would be a proxy for gender norms that assign care work to women and breadwinning to

99 Hirway and Jose 2011; Floro and Komatsu 2011.

100 For example, Klasen 2018.

101 Azcona et al. 2020.

men and constrain women's ability to earn a living. While single mothers with young children would be similarly constrained in market work, Azcona et al. (2020) reported evidence that the unpaid workload does not impede their labour force participation, even when they live alone. This suggests that lone mothers engage in distress sales in the labour market and that their labour force participation reflects structural disadvantage based on class, race and gender.

The proposed labour force participation rate indicator would be expressed as a female-to-male ratio in the GGPI. The greater the inequality in unpaid household work, the lower the female-to-male labour force participation rate ratio is expected to be. This indicator would provide a more robust gauge of gender inequality in unpaid household labour than time-use survey data. While there has been substantial progress in the implementation of time-use surveys in the new millennium, the data have shortcomings. Time-use data by gender are currently available for 76 countries for which 133 time-use surveys were conducted, but the data are not yet harmonized.¹⁰² The surveys are not uniform in methods, activity and age classifications. Importantly, time-use surveys underestimate care work because most forms of care work are invisible to women, who dramatically underreport it in these surveys.¹⁰³ Underreporting of care work is linked with overreporting of both leisure time and personal care time, resulting in smaller gender gaps in these uses of time.

While the refined labour force participation dataset is limited in country coverage, it may be possible through modelling to fill data gaps and achieve broader coverage. A drawback is that this variable does not address the shortcomings of the labour force participation variable discussed above. The superior alternative would be the employment counterpart of the constrained labour force participation variable. Over the longer term, it may be feasible to generate data on the employment variant of this variable based on the ILO's Harmonized Microdata collection.

The refined labour force participation rate indicator may support policy that aims to reduce the drudgery of

unpaid care work through investments in basic household infrastructure, social care or physical infrastructure in communities. As such, it could be a useful complement to track alongside the SDG 5.4 indicators. While this indicator is only an indirect measure of unpaid care work and does not reflect caring as a capability, since it acknowledges unpaid care work in the human development measurement framework, it deserves serious consideration for inclusion in the GGPI.

The GGPI also needs an employment segregation variable to further incorporate gender gaps in the capability to earn an income. Studies show that occupational segregation by gender is associated with gender earnings inequalities.¹⁰⁴ Typically, given gender norms that channel women and men into specific occupations, women's employment is concentrated in fewer occupations than men's, which exerts downward pressure on earnings in these occupations as well as the overall gender earnings ratio. One option is to define a relative occupational crowding indicator, such as the share of women who are employed in the top three occupations for women divided by the share of men who are employed in the top three occupations for men. Thus, the higher the female-to-male ratio of occupational crowding, the more constrained women are in their capability to earn a decent level of income. Alternatively, employment segregation could also be measured in economic activity (sectoral) terms, with an interpretation similar to the relative occupational crowding indicator. This variable could be measured at the one-digit occupational or sectoral levels. The ILO reports employment data by sex for nine occupations and employment data by sex for six sectors for a large number of countries, though with uneven year coverage.¹⁰⁵ Examining the female-to-male top three-occupation concentration ratio for several countries shows that it is possible to discern the predicted gender disparities in segregation.¹⁰⁶ Either the occupational or sectoral variant is therefore a viable indicator for inclusion in the GGPI.

102 Charmes 2019.

103 Folbre 2006; Lentz et al. 2019.

104 Hegewisch and Liepmann 2013.

105 For more, see ILO 2020.

106 For example, in 2014, the female-to-male occupational crowding ratios in Afghanistan, Argentina and the United States were 1.33, 1.17 and 1.37, respectively.

An indirect approach to capturing disparate gender effects of employment segregation could be to use the gender ratio in unemployment rates, which would reflect the gender differences in sectoral distributions that predispose women compared to men to greater unemployment risk. The female-male disparity in unemployment rate would provide insights on gender-unequal access to paid work opportunities. This ratio tracks progress on SDG target 8.5 and, according to the Life-Course Gender Gap dashboard in the 2020 *Human Development Report*, data on unemployment rates by gender are reported for 180 countries. There may be difficulties in interpreting gender differences in unemployment, however. First, the unemployment rate for women tends to be underreported as women who are unable to find jobs usually drop out of the labour force rather than declare themselves unemployed, which overestimates the gender disparity in unemployment. Second, in recent decades, susceptibility to unemployment by gender has varied over the cycle (especially the recessionary phase), resulting in variations of the gender ratio that may be difficult to interpret. Third, the unemployment ratio may be difficult to make sense of in a dataset that includes high-income and low-income countries. These difficulties favour the use of occupational or sectoral crowding as the second indicator for gender disparities in opportunities for paid work in the GGPI.

In addition to labour market outcomes, women's rights to financial assets have been long recognized and promoted by gender advocates. CEDAW article 13 makes explicit reference to “the right to bank loans, mortgages and other forms of financial credit”.¹⁰⁷ The Beijing Platform for Action similarly highlights the lack of access to economic resources—including credit, land ownership and inheritance—as areas of gender inequality in urgent need of attention.¹⁰⁸ Account ownership and the ability to control earnings have also been found to directly impact female participation in the labour force,¹⁰⁹ while there is strong evidence of positive association between women's asset ownership and better outcomes for women and

children, which operates via women's greater decision-making.¹¹⁰ Research on women's land rights, for example, points to greater bargaining power when such rights are secured.¹¹¹ In many countries, women are restricted from having a bank account, borrowing money, signing a contract or registering a business under their own name.¹¹² Data on account ownership at a financial institution or with a mobile-money service-provider by sex are available for 156 countries. As an SDG indicator, used to track progress on SDG Target 8.10.2, the data are collected routinely every three years, as opposed to annually or quarterly for some of the labour market indicators.

Participation in decision-making

The ability to participate equally in the decisions in one's community is a key capability in the human development framework and a core right in the human rights approach. Ideally, this dimension would be measured in the GGPI by indicators of collective agency in the public arena and political process, since achievement of women's rights and policies to support gender equality have largely been the result of autonomous women's movements.¹¹³ However, currently there are no suitable global data on indicators that capture collective action/agency.

A widely available, easily verifiable and commonly used indicator for political decision-making is the share of seats held by women in the national legislature. Women's representation in national governments is low in many countries, and there has been slow progress in raising this. According to the Life-Course Gender Gap dashboard in the 2020 *Human Development Report*, data are available for 187 countries.

With improving data availability on women's participation in local governance, this dimension now can be measured at both local and national levels. Data on women's representation in elected local deliberative bodies (government), tracked by SDG indicator 5.5.1, are available for 130 countries in the Life-Course dashboard

107 UN General Assembly 1979.

108 UN General Assembly 1995.

109 Field et al. 2016.

110 Deere and Oduro 2021.

111 Agarwal 2003; Daley et al. 2010.

112 World Bank 2021.

113 Weldon and Htun 2013.

of the 2020 *Human Development Report*. Additional indicators for inclusion might be women's share of executive branch positions, such as ministerial posts. Women's equal opportunity for decision-making in the economic domain can be proxied by the share of women in senior- and middle-management positions. According to the Women's Empowerment dashboard of the 2020 *Human Development Report*, data for this SDG indicator (5.5.2) are available for 110 countries.

Intersecting inequalities

Composite gender indexes typically measure average indicators for women versus men and do not incorporate the unique vulnerabilities experienced by women and girls facing intersecting forms of discrimination in terms of class, age or race/ethnicity and other socially assigned identities. As noted, the capabilities approach, feminist economics and international policy documents all underscore the need to track intersectional inequalities. Since race and ethnicity are country specific, however, there are difficulties in measuring intersections of these particular identities with gender in a gender index that strives to be relevant across countries. Moreover, some countries do not even report data by race/ethnicity, let alone gender data differentiated by race/ethnicity. It is possible, however, to move away from country averages and de facto treatment of women and men in a country as homogenous groups by factoring in social class, proxied by income via a distribution measure (such as the Gini coefficient) prior to aggregating the indicators into the gender inequality index. The proposed GGPI (and WEI) could thus incorporate an inequality adjustment to reflect the effect of class inequality on women's relative status (and women's empowerment).

6.2

The Women's Empowerment Index

The second proposed gender index is the WEI. It aims to capture the means to expand women's and girls' choices and their ability to act on what they value and have reason to value. The WEI incorporates capabilities

in bodily health and integrity, knowledge and control over one's environment (Table 5). Since agency does not guarantee empowerment, as noted earlier, the WEI aims to flag the *process* of women's empowerment rather than measuring it as an outcome per se. Implicit in the WEI is the notion that improvements in outcomes related to agency/empowerment signal reforms to reduce obstacles to women's voice and capacity to make choices.

The indicators proposed to measure the WEI's dimensions reflect women's agency to dismantle structures of disadvantage (through collective demands on the state). Each of these capabilities is intrinsically important for current well-being but is also important to promote capabilities in the future. The WEI comprises both female-male comparative indicators that reflect the zero-sum aspects of empowerment, that is, the more women gain, the less men have (e.g., seats in parliament or managerial positions) and women-specific indicators (e.g., those that measure health and bodily integrity). Women's agency is about expanding opportunities and choices, and strengthening communities, and can be constrained by their position vis-à-vis men. Given these considerations, it is reasonable to measure the potential for empowerment through a mix of absolute and relative measures, yet each indicator is measured in terms of *level* of women's achievement (indicated as option 1 in Table 2).

Nussbaum's and Robeyns' lists of capabilities encompass agency aspects and are helpful to: measure expansion in women's choices vis-à-vis their health and bodily integrity (e.g., avoidance of becoming a mother as a child and access to family planning); capture women's expanded choice and agency in who and when they marry (e.g., avoidance of early marriage); reflect expansion of women's imagination and thought; and capture expansion in women's control (power) over their environment (e.g., access to decision-making in national parliament and local government and to managerial and professional positions). The indicator options proposed for these dimensions are in Table 5. In index construction, some indicators need to be transformed to express relative or absolute empowerment (rather than disempowerment).

TABLE 5.
The Women’s Empowerment Index

Dimensions		Indicators (SDG target/indicator)
Bodily health & Bodily integrity	Freedom from child motherhood	Adolescent birth rate (number of births per woman age 15-19 per 1,000 women) (SDG 3.7.2)
	Reproductive choice	Contraceptive prevalence, any method (% of married or in-union women of reproductive age, 15-49 years) (SDG 3.7) OR Contraceptive demand satisfied by modern methods (the proportion of women of reproductive age (15-49) who have their need for family planning satisfied with modern methods) (SDG 3.7.1)
	Freedom from violence	Violence against women ever experienced, intimate partner (% of female population ages 15 and older) (SDG 5.2.1)
Senses, imagination and thought	Education	Expected years of schooling (SDG 4.3)
		Female share of graduates in STEM fields in tertiary education (SDG 5.5)
		Proportion of youth aged 15–24 years who are not in education, employment or training (NEET) (SDG 8.6.1)
Control over one’s environment	Household	Male and female age difference at marriage OR Prevalence of child marriage (share of women ages 20-24 who were first married or in union before age 18) (SDG 5.3.1)
		Public political domain
	Women’s share of seats held in the national legislature (SDG 5.5.1)	
	Women’s share of seats held in local governing bodies (SDG 5.5.1)	
	Public economic domain	Women’s share of ministerial positions
Women’s share of managerial/administrative positions (SDG 5.5.2)		

Freedom from child motherhood

The adolescent birth rate is an indicator of a lack of choice in when one becomes a mother, with its consequent health risks and responsibilities. The lower the rate, the wider the range of choices young women will have and the higher the WEI value will be. Adolescent birth rate is an SDG target 3.7 indicator and a component of the GII. Table 5 of the 2020 *Human Development Report* shows that it has good data coverage (available for 183 countries).

Reproductive choice

This dimension could be measured by the indicator under SDG target 3.7 on “contraceptive prevalence, any method (percentage of married or in-union women of reproductive age, 15-49 years)”. According to the Women’s Empowerment dashboard in the 2020 *Human Development Report*, the indicator has good country coverage as data are available for 149 countries. Alternatively, SDG indicator 3.7.1 could be used as a proxy for reproductive choice: “contraceptive demand satisfied by modern methods”—that is, the

proportion of women of reproductive age (15-49) who have their need for family planning satisfied with modern methods, which takes into account the unmet need for family planning.

Freedom from violence

While violence against women takes many forms, intimate partner violence (IPV) is the most common form that could be measured in an international gender index. Physical security is not only central to well-being intrinsically and as a means to other capabilities but is also a prerequisite for women’s agency. The potential indicator to measure this dimension is SDG indicator 5.2.1, the “proportion of ever-partnered women and girls aged 15 years and older subjected to physical, sexual or psychological violence by a current or former intimate partner in the previous 12 months, by form of violence and by age”. The lower the incidence of IPV, the higher the WEI value is expected to be.

Data availability on IPV is good and improving. According to the Women’s Empowerment dashboard of the

2020 *Human Development Report*, data are available for 125 countries. Data availability for non-partner sexual violence prevalence (SDG indicator 5.2.2) is more limited (reported for 65 countries in the 2020 *Human Development Report*) and has low comparability. The WHO reports statistics for 2018 based on compilation of data for the 2010-2018 period, indicating lifetime prevalence rate of IPV of 27 per cent (154 countries) and IPV prevalence rate in the last 12 months of 13 per cent (159 countries).¹¹⁴ There is limited time-series data on IPV, however, and where they exist there may be difficulties in interpreting trends. For example, in countries that expand their efforts to combat violence against women, and specifically IPV, it may be difficult to distinguish between an *actual* increase in violence and an increase in *reported* violence because women become more comfortable reporting it. As a component of the WEI, IPV could thus contribute to an initial worsening of country index values based on increased reporting. Nonetheless, inclusion of IPV in the WEI will contribute to improving data generation.

A complementary indicator is whether women who experienced physical or sexual violence sought help from friends and family and/or health, police, justice or social services. To seek help is an indicator of women's awareness that violence is unjust and the desire to exit a violent situation. Data on 'help seeking' measure the proportion of women who sought help as a share of women who experienced violence. The downside is that these are available for only about 50 countries and cover all forms of violence.¹¹⁵ Moreover, the share of women who call in social services for help is expected to be a fraction of those who need help and is contingent on the availability of such services. Given the difficulties in both data availability and interpretation, this indicator cannot currently be incorporated into the proposed WEI.

Education

Education is intrinsically important for well-being and a means to expand other capabilities both currently and over time. Thus, it warrants inclusion in both the

GGPI and the WEI. As an indicator for agency, it could be measured by the forward-looking, female-to-male ratio of expected years of schooling since it reflects the prospect of acquiring knowledge through formal education. This indicator tracks progress on SDG target 4.3. Table 4 of the 2020 *Human Development Report* indicates good data coverage for expected years of schooling (reported for 180 countries).

In addition, a quality-adjusted education indicator, such as share of women among graduates in STEM fields at the tertiary level, would be useful to include as a proxy for agency. Increasing the representation of women in STEM occupations is likely to contribute to better science and better products that support the well-being of women as well as men. This indicator tracks SDG 5.5, and data for it are reported for 125 countries in the Women's Empowerment dashboard of the 2020 *Human Development Report*.

It may also be useful to include in the WEI 'the proportion of youth aged 15-24 years who are not in education, employment or training (NEET)' as well as in the GGPI. As a component of WEI (also measured as 'not NEET'), this indicator would represent a forward-looking indicator of lifelong skill-building and training opportunities. Not NEET emphasizes that young women should have opportunities to learn, grow and expand their knowledge and not be relegated to NEET status, particularly at this important age of 15-24 years.

Decision-making in the household

A potential proxy for relative bargaining power in the household could be the male-female age gap at marriage. The larger the age difference between spouses (i.e., men older than women), the more limited the expected decision-making power of women.¹¹⁶ An alternative indicator is the incidence of child marriage, that is, the percentage of women in the 20-24 age group who were married before 18), which tracks progress on SDG target 5.3.1. The Women's Empowerment dashboard of the 2020 *Human Development Report* reports data for this variable for 124 countries. Since the two marriage indicators might be

¹¹⁴ WHO 2021b.

¹¹⁵ UN DESA 2015, pp. 159-160.

¹¹⁶ Dilli et al. 2019.

measuring similar facets of intrahousehold decision-making, the WEI could incorporate one of these.

There are three considerations relevant to the choice of indicator: First, a drawback with the couple's age difference variable is the assumption that when ages are almost equal, individuals will have harmonious relationships and equitably enjoy a wider range of capabilities (e.g., live lives free of violence and share household tasks equitably). This may not be a realistic assumption. For one, there is evidence that greater spousal age difference is associated with less IPV.¹¹⁷ Second, in measuring decision-making power, age at marriage may need to be considered together with spousal age difference. A large age difference may not impede women's decision-making if, for example, the couple is older. Third, child marriage is likely to be correlated with the adolescent birth rate, which is proposed as a proxy for child motherhood and its reproductive health risks for young women. Including freedom from child motherhood and freedom from child marriage in the WEI may thus amount to double counting. Given the overlaps and interpretation difficulties, relying on adolescent birth rate, instead of a marriage variable, to gauge various facets of women's decision-making in the household might be a solution. This would be consistent with Dijkstra's (2006) criterion for economizing on indicators in a composite gender index.

Decision-making in the public political domain

As discussed earlier, the indicator 'share of women in parliament' is widely available and easily verifiable. This indicator was a component of UNDP's GEM, is an indicator for 'empowerment' in the GII and other gender indexes and is an indicator in the proposed new GEM.¹¹⁸ It is included in the WEI as well as the GGPI because political representation has the potential to contribute to women's greater voice, choice and power to claim other rights, as well as being a core right and capability.

117 e.g., Bueno and Henderson 2017.

118 Klasen 2018.

An early concern with this indicator was whether women's representation in national legislatures reflects opportunities to expand women's well-being. Cueva Beteta (2006) argued that women's share of national legislatures is often the outcome of the electoral system, the implementation of affirmative action measures or women's elite family connections. Thus, she questioned whether women in national parliament have political power, are feminists and exercise power to promote policies that improve the well-being of women and girls.¹¹⁹

These concerns underscore the relevance of intersecting identities in shaping women's agency. Specifically, being a woman elected representative does not guarantee the exercise of power to reduce gender inequalities, since decisions are also shaped by class, race and religious and other socially assigned identities. However, cross-country data indicate that women's parliamentary representation is correlated with greater equality in, for example, workplace policies and laws, and that provision of quotas for women in elections is driven by women's autonomous organizing but also, to some degree, by women politicians in parliament.¹²⁰

There are also likely to be context-specific elements, such as the existence of functioning democratic institutions, which may enhance women representatives' ability to promote policies to reduce gender inequalities. Recent evidence suggests that, at least among academic economists who are likely to become decision-makers in the European Union, there are clear gender differences in choices of appropriate policies to be pursued: Women tend to support policies that directly promote human and environmental well-being.¹²¹ There is also some evidence that local level women elected representatives act to reduce the drudgery of women's work.¹²² Such women may have a greater say in decisions that potentially improve women's well-being than national-level

119 Cueva Beteta 2006.

120 Htun and Weldon 2014.

121 May et al. 2018. Women or men elected representatives may not support such policies in a context of autocracy and misinformation.

122 Chattopadhyay and Duflo 2004.

representatives. Thus, women's representation in both national legislatures (and ministerial positions) and local governing bodies is a reasonable proxy for the potential to exercise political power to reduce at least some dimensions of gender inequality.

Decision-making in the public economic domain

The share of women in economic leadership and professional occupations could gauge women's agency in public economic life. SDG 5.5.2 identifies the share of women in senior- and middle-management positions as an indicator to gauge equal opportunity in decision-making. As with the other public decision-making indicators, women's higher representation in these positions does not guarantee decisions that promote equitable well-being. Yet a higher share of women is likely to promote changes in gender norms and women's empowerment in the long run.

7.

CONCLUSION

This paper proposed replacing UNDP's GII with two new gender indexes: the GGPI and the WEI. The proposal builds on a review of concepts of gender equality in the capabilities approach that underpin UNDP's human development paradigm, feminist scholarship and the international policy frameworks of CEDAW, the Beijing Platform for Action and the 2030 Agenda for Sustainable Development. It also incorporates evaluation of current proposals for reform.

The GGPI measures women's relative status compared to men in health, education, opportunities for paid work/financial inclusion and decision-making. Some of these dimensions overlap with those in the current GII, but they are measured differently and keep the focus on women's well-being relative to men's. The GGPI measures key gender disparities in the extent and nature (quality) of health and education and ability to participate in the labour market, access financial institutions and participate equally in decision-making. The second proposed gender index, the WEI, seeks to capture women's agency, which in turn can lead to greater expansion of women's capabilities more broadly. The WEI incorporates the means for expansion of women's choices over their bodies, their educational choices, opportunities in the labour market, access to financial resources and opportunities to participate in decision-making in the household and political and economic life. It is intended to track changes in level of women's empowerment over time.

The two-index proposal addresses several key challenges and considerations raised in discussions of improved UNDP gender indexes. The GGPI uses relative measures and focuses on assessing the gaps in achievements between women and men, while the WEI combines relative and absolute measures of gender inequality, where this mixing is conceptually justified, and focuses on assessing the level of women's agency. The proposed indexes are innovative: They incorporate new dimensions and/or new indicators to capture both pressing aspects of gender inequality and women's lack of agency and ones that are broadly relevant. The GGPI is measured by sex ratio at birth, fraction of life spent in good health, education attainment, labour force participation constrained

by unpaid care work, employment segregation and decision-making in the political and economic domain of public life. The WEI considers the household as a site of women's agency in decisions over their lives and bodies. Both the GGPI and the WEI broaden the site of political participation and power to include women's representation in local governing bodies. The WEI includes women's freedom from early motherhood, reproductive choice, freedom from IPV, relative capabilities to seek education and pursue STEM degrees, train or gain work experience as a young adult, have voice in national and local governing bodies and hold economic leadership positions as the means to women's empowerment.

The GGPI and the WEI maintain features of the human development paradigm, where well-being is conceptualized in terms of capabilities. They are measured mostly in terms of actual achievements (functionings) as the proxy for capabilities and do not incorporate institutional inputs or resources that enable or constrain these capabilities. As such, they are distinct from other prominent gender inequality indexes. The GGPI and the WEI differ from the GGGI and the EU-GEI, which combine resources, capabilities and empowerment, and the SIGI, which focuses on discriminatory institutions that constrain gender equality. The domains of the GGPI and the WEI differ from the SIGI, however. That said, because the SIGI incorporates some capability deprivations, the indicators proposed for the GGPI and the WEI overlap with the SIGI indicators: in the GGPI, the sex ratio at birth; in the WEI, women with unmet needs for family planning, child marriage incidence and prevalence of domestic violence; and in both, the share of parliamentary seats and managerial positions. They focus on capabilities versus institutional

constraints. Two dimensions of the GGPI overlap with the GGGI (health and educational attainment), and several dimensions overlap with the EU-GEI. The WEI also relies on some of the same economic and political empowerment indicators as the GGGI.

The GGPI and the WEI are both measured in terms of outcome variables, which are slow moving, capturing the cumulative result of different processes. Their adoption does not preclude measuring changes in institutions, which are equally important and complementary to the indexes of outcome variables.

The proposal intends the GGP and the WEI to be universally relevant and to complement the policy efforts of the 2030 Agenda as they incorporate several SDG target indicators. These indexes are better and more explicitly aligned with the 2030 Agenda than the GII, which will strengthen their policy and advocacy relevance. Their adoption could also encourage efforts to close data gaps for some indicators with low coverage.

This paper's discussion on a two-index proposal engaged with index measurement issues in a limited way. It did not propose solutions for debated methodological issues around compensation among dimensions (e.g., to cap or not), determination of a weighting scheme or the form of the aggregation function. As the contributions to the debate indicate, there are different approaches to solving these problems, each with advantages and disadvantages. The technical issues of index construction are taken on by Azcona et al. (forthcoming), who develop this proposal further, generate empirical estimates and examine the robustness and contribution of the two new indexes relative to existing composite indexes.

Three concerns highlighted in the paper involve how to capture (1) indirect manifestations of gender inequality, (2) women's and men's well-being achievement levels and (3) race/ethnicity/social class disadvantage in a composite gender index. First, it is not possible to measure indirect manifestations of gender inequality in well-being—such as maternal mortality ratio—in relative terms. Some of these variables also reflect, at least in part, country income levels rather than the extent of gender inequalities. It is undesirable to incorporate these women-specific

dimensions in a gender gap index. Potential solutions are less than ideal: Either track these indicators of women's absolute well-being on a gender dashboard, where they are likely to be sidelined, or incorporate them in a complicated, difficult to interpret multidimensional gender inequality index, such as the GII.

The second dilemma for gender indexes has been how to reflect low absolute levels of well-being of both women and men. The concern is not to lose sight of the equitably shared adverse situations of women and men in a gender inequality index, which may send a misleading and incomplete message of gender equality. One solution is to introduce a correction during index construction, which ensures that a good index score for a country reflects both low gender gaps and high levels of achieved well-being of women and men; doing this, however, involves a complicated and opaque measurement step as in the EU-GEI. To address these issues, this proposal favours a two-index solution, one index focused exclusively on the gaps in achievements between women and men (the GGPI), complemented by another index that focuses exclusively on female achievement levels (the WEI). Used together, these twin indexes provide a more complete picture of countries' paths to gender equality and women's empowerment.

The third concern is how to capture intersectional disadvantages of different groups of women and men in a composite gender index that typically reports average well-being or agency achievements in a country. The solution proposed in this paper is to incorporate an income-inequality adjustment in each index component before aggregating it in the overall index. Thus, the inequality-adjusted GGPI and WEI would bring attention to class inequalities among women and men. In turn, to amplify awareness of intersectional inequality, the indexes can be complemented by country case studies or dashboard indicators that report race, ethnicity and/or class disadvantages faced by women and girls.

Each of these concerns highlights both the limitations and the possibilities of composite gender indexes and that the effort will always need to be complemented with narratives and descriptive statistics to tell a more complete story of gender equality.

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ANNEX I.

Appendix 1 is based on Klasen (2006a), the Technical Notes for the 2005 *Human Development Report* for the Gender-related Development Index and Gender Empowerment Measure, and the Technical Notes for the 2020 *Human Development Report* for the Gender Inequality Index and the Gender Development Index. The text below includes minor changes to improve the presentation.

Gender-related Development Index

While the HDI measures average achievement, the GDI adjusts the average achievement to reflect the inequalities between men and women in the following dimensions:

- A long and healthy life, as measured by life expectancy at birth.
- Knowledge, as measured by the adult literacy rate and the combined primary, secondary and tertiary gross enrolment ratio.
- A decent standard of living, as measured by estimated earned income (purchasing power parity or PPP, US\$).

The calculation of the GDI involves three steps shown below and illustrated with an example in Box A.1.

Step 1: First, female and male indices in each dimension are calculated according to this general formula:

$$\text{Dimension index} = \frac{\text{actual value} - \text{minimum value}}{\text{maximum value} - \text{minimum value}}$$

The maximum and minimum values are indicated in the Goalposts table at right.

Step 2: The female and male indices in each dimension are combined in a way that penalizes differences in achievement between men and women, which is referred to as “inequality-aversion adjustment” in the paper. The resulting index, referred to as the equally distributed index or the equally distributed equivalent percentage (EDEP) below, is calculated according to this general formula:

Equally distributed index

$$= \{[\text{female population share (female index}^{1-\epsilon})] + [\text{male population share (male index}^{1-\epsilon})]\}^{1/1-\epsilon}$$

ϵ measures the aversion to inequality. In the GDI, $\epsilon=2$. Thus, the general equation becomes:

Equally distributed index

$$= \{[\text{female population share (female index}^{-1})] + [\text{male population share (male index}^{-1})]\}^{-1}$$

Step 3: The GDI is calculated by combining the three equally distributed indices in an unweighted average.

Goalposts for calculating the GDI

Indicator	Maximum value	Minimum value
Female life expectancy at birth (years)	87,5	27,5
Male life expectancy at birth (years)	82,5	22,5
Adult literacy rate (%)	100	0
Combined gross enrolment ratio (%)	100	0
Estimated earned income (PPP \$)	40,000	100

Note: The maximum and minimum values (goalposts) for life expectancy are five years higher for women to take into account their longer life expectancy.

BOX A.1:
Calculating the GDI

This illustration of the calculation of the GDI uses data for Brazil reported in the 2005 *Human Development Report*.

1. Calculating the equally distributed life expectancy index

The first step is to calculate separate indices for female and male achievements in life expectancy, using the general formula for dimension indices.

FEMALE

Life expectancy: 74.6 years

$$\text{Life expectancy index} = \frac{74.6 - 27.5}{87.5 - 27.5} = 0.785$$

MALE

Life expectancy: 66.6 years

$$\text{Life expectancy index} = \frac{66.6 - 22.5}{82.5 - 22.5} = 0.735$$

Next, the female and male indices are combined to create the equally distributed life expectancy index, using the general formula for equally distributed indices.

Variable	FEMALE	MALE
Population share	0.507	0.493
Life expectancy index	0.785	0.735

$$\text{Equally distributed index} = \{[0.507(0.785^{-1})] + [0.493(0.735^{-1})]\}^{-1} = 0.760$$

2. Calculating the equally distributed education index

First, indices for the adult literacy rate and the combined primary, secondary and tertiary gross enrolment ratio are calculated separately for females and males. Calculating these indices is straightforward, since the indicators used are already normalized between 0 and 100.

Variable	FEMALE	MALE
Adult literacy rate	88.6%	88.3%
Adult literacy index	0.886	0.883
Gross enrolment ratio	92.7%	88.5%
Gross enrolment index	0.927	0.9

Second, the education index, which gives two-thirds weight to the adult literacy index and one-third weight to the gross enrolment index, is computed separately for females and males.

$$\text{Education index} = 2/3(\text{adult literacy index}) + 1/3(\text{gross enrolment index})$$

$$\text{Female education index} = 2/3(0.886) + 1/3(0.927) = 0.899$$

$$\text{Male education index} = 2/3(0.883) + 1/3(0.885) = 0.884$$

Finally, the female and male education indices are combined to create the equally distributed education index.

	FEMALE	MALE
Population share	0.507	0.493
Education index	0.899	0.884

$$\text{Equally distributed education index} = \{[0.507 (0.899^{-1})] + [0.493 (0.884^{-1})]\}^{-1} = 0.892$$

3. Calculating the equally distributed income index

First, female and male earned incomes (PPP \$) are estimated.

To calculate estimated earned incomes, the share of the wage bill is calculated for each gender.

Because data on wages in rural areas and in the informal sector are rare, the 2005 *Human Development Report* used non-agricultural wages and assumed that the ratio of female wages to male wages in the non-agricultural sector applies to the rest of the economy. The female share of the wage bill is calculated using the ratio of the female non-agricultural wage to the male non-agricultural wage, and the female and male percentage shares of the economically active population. Where data on the wage ratio are not available, a value of 75 per cent is used.

To calculate estimated earned incomes, first the share of the wage bill is calculated for females.

The female share of the wage bill (S_f) is calculated as follows:

$$S_f = \frac{W_f/W_m(EA_f)}{[W_f/W_m(EA_f)] + EA_m}$$

where W_f/W_m is the ratio of female to male non-agricultural wage, EA_f is the female share of the economically active population, and EA_m is the male share.

An assumption is made that the female share of the wage bill is equal to the female share of GDP. Estimated female earned income is obtained by first multiplying GDP (PPP \$) Y by female share of the wage bill, S_f , and then rescaling it by the female population N_f .

$$\text{Estimated female earned income (PPP \$)} (Y_f) = (Y \cdot S_f) / N_f$$

The male share of the wage bill is calculated as:

$$\text{Estimated male earned income (PPP \$)} (Y_m) = (Y - Y \cdot S_f) / N_m$$

where N_m is the male population.

Then the income index is calculated for each gender. Income is adjusted by taking the logarithm of estimated earned income (PPP \$):

$$\text{Income index} = \frac{\log(\text{actual value}) - \log(\text{minimum value})}{\log(\text{maximum value}) - \log(\text{minimum value})}$$

FEMALE

Estimated earned income (PPP \$): 4,704

$$\text{Income index} = \frac{\log(4,704) - \log(100)}{\log(40,000) - \log(100)} = 0.643$$

MALE

Estimated earned income (PPP \$): 10,963

$$\text{Income index} = \frac{\log(10,963) - \log(100)}{\log(40,000) - \log(100)} = 0.784$$

Second, the female and male income indices are combined to create the equally distributed income index:

Variables	FEMALE	MALE
Population share	0.507	0.493
Income index	0.643	0.784

$$\text{Equally distributed income index} = \{[0.507(0.643^{-1})] + [0.493(0.784^{-1})]\}^{-1} = 0.706$$

4. Calculating the GDI

The GDI is the unweighted average of the three component indices—the equally distributed life expectancy index, the equally distributed education index and the equally distributed income index.

$$\begin{aligned} \text{GDI} &= 1/3 (\text{life expectancy index}) + 1/3 (\text{education index}) + 1/3 (\text{income index}) \\ &= 1/3 (0.760) + 1/3 (0.892) + 1/3 (0.706) = \mathbf{0.786} \end{aligned}$$

Gender Empowerment Measure

The GEM captures gender inequality in three key areas:

- Political participation and decision-making power, as measured by women's and men's percentage shares of parliamentary seats.
- Economic participation and decision-making power, as measured by two indicators—women's and men's percentage shares of positions as legislators, senior officials and managers, and women's and men's percentage shares of professional and technical positions.
- Power over economic resources, as measured by women's and men's estimated earned income (PPP \$).

For each of these three dimensions, an equally distributed equivalent percentage (EDEP) is calculated, as a population-weighted average, according to the following general formula (as in the GDI):

$$\text{EDEP} = \left\{ \left[\text{female population share} (\text{female index}^{1-\epsilon}) \right] + \left[\text{male population share} (\text{male index}^{1-\epsilon}) \right] \right\}^{1/1-\epsilon}$$

ϵ measures the aversion to inequality. In the GEM (as in the GDI) $\epsilon=2$, which places a moderate penalty on inequality. The formula is thus:

$$\text{EDEP} = \left\{ \left[\text{female population share} (\text{female index}^{-1}) \right] + \left[\text{male population share} (\text{male index}^{-1}) \right] \right\}^{-1}$$

For political and economic participation and decision-making, the EDEP is then indexed by dividing it by 50. The rationale for this indexation: In an ideal society, with equal empowerment of the sexes, the GEM variables would equal 50 per cent—that is, women's share would equal men's share for each variable.

Where a male or female index value is zero, the EDEP according to the above formula is not defined. However, the limit of the EDEP, when the index tends towards zero, is zero. Accordingly, in these cases the value of the EDEP is set to zero.

Finally, the GEM is calculated as a simple average of the three indexed EDEPs.

BOX A.2:

Calculating the GEM

This illustration of the calculation of the GEM uses data for Denmark reported in the 2005 *Human Development Report*.

1. Calculating the EDEP for parliamentary representation

The EDEP for parliamentary representation measures the relative empowerment of women in terms of their political participation. The EDEP is calculated using the female and male shares of the population and female and male percentage shares of parliamentary seats according to the general formula.

FEMALE	MALE
Population share: 0.505	Population share: 0.495
Parliamentary share: 36.9%	Parliamentary share: 63.1%

$$\text{EDEP for parliamentary representation} = \{[0.505(36.9^{-1})] + [0.495(63.1^{-1})]\}^{-1} = 46.42$$

Then this initial EDEP is indexed to an ideal value of 50%.

$$\text{Indexed EDEP for parliamentary representation} = \frac{46.42}{50} = 0.928$$

2. Calculating the EDEP for economic participation

Using the general formula, an EDEP is calculated for women's and men's percentage shares of positions as legislators, senior officials and managers, and another for women's and men's percentage shares of professional and technical positions. The simple average of the two measures gives the EDEP for economic participation.

FEMALE

Population share: 0.505

Percentage share of positions as legislators, senior officials and managers: 26.2%

Percentage share of professional and technical positions: 51.0%

MALE

Population share: 0.495

Percentage share of positions as legislators, senior officials and managers: 73.8%

Percentage share of professional and technical positions: 49.0%

$$\text{EDEP for positions as legislators, senior officials and managers} = \{[0.505(26.2^{-1})] + [0.495(73.8^{-1})]\}^{-1} = 38.48$$

$$\text{Indexed EDEP for positions as legislators, senior officials and managers} = \frac{38.48}{50} = 0.770$$

$$\text{Indexed EDEP for professional and technical positions} = \{[0.505(51.0^{-1})] + [0.495(49.0^{-1})]\}^{-1} = 49.99$$

$$\text{Indexed EDEP for professional and technical positions} = \frac{49.99}{50} = 1.00$$

The two indexed EDEPs are averaged to create the EDEP for economic participation:

$$\text{Indexed EDEP for economic participation} = \frac{0.770 + 1.00}{2} = 0.885$$

3. Calculating the EDEP for income

Earned income (PPP \$) is estimated for women and men separately and then indexed to goalposts as for the HDI and the GDI. For the GEM, however, the income index is based on unadjusted values, not the logarithm of estimated earned income.

Because data on wages in rural areas and in the informal sector are rare, the 2005 *Human Development Report* used non-agricultural wages and assumed that the ratio of female wages to male wages in the non-agricultural sector applies to the rest of the economy. The female share of the wage bill is calculated using the ratio of the female non-agricultural wage to the male non-agricultural wage and the female and male percentage shares of the economically active population. Where data on the wage ratio are not available, a value of 75% is used.

To calculate estimated earned incomes, first the share of the wage bill is calculated for females. The female share of the wage bill (S_f) is calculated as follows:

$$S_f = \frac{W_f/W_m(EA_f)}{[W_f/W_m(EA_f)] + EA_m}$$

where W_f/W_m is the ratio of female to male non-agricultural wage, EA_f is the female share of the economically active population and EA_m is the male share.

An assumption is made that the female share of the wage bill is equal to the female share of GDP.

Estimated female earned income (PPP \$) (Y_f) = $(Y \cdot S_f) / N_f$

Estimated female earned income is obtained by first multiplying GDP (PPP \$), Y by female share of the wage bill, S_f , and then rescaling it by the female population N_f .

The male share of the wage bill is calculated as:

Estimated male earned income (PPP \$) (Y_m) = $(Y \cdot S_m) / N_m$

where N_m is the male population.

FEMALE

Population share: 0.505

Estimated earned income (PPP \$): 26,519

$$\text{Income Index} = \frac{26,519-100}{40,000-100} = 0.663$$

MALE

Population share: 0.495

Estimated earned income (PPP \$): 36,390

$$\text{Income Index} = \frac{36,390-100}{40,000-100} = 0.910$$

The female and male indices are then combined to create the equally distributed index:

$$\text{EDEP for Income} = \{[0.505 (0.663^{-1})] + [0.495 (0.910^{-1})]\}^{-1} = 0.766$$

4. Calculating the GEM

Once the EDEP has been calculated for the three dimensions of the GEM, determining the GEM is a simple average of the three EDEP indices.

$$\text{GEM} = \frac{0.928+0.885+0.766}{3} = 0.859$$

Gender Inequality Index

The GII reflects gender-based disadvantage in three dimensions—reproductive health, measured by maternal mortality ratio and adolescent birth rate; empowerment, measured by parliamentary representation and some secondary education; and the labour market—for as many countries as data of reasonable quality allow. It shows the loss in potential human development due to inequality between female and male achievements in these dimensions. It ranges from 0, where women and men fare equally, to 1, where one gender fares as poorly as possible in all measured dimensions.

GII values are computed using the association-sensitive inequality measure suggested by Seth (2009), which implies that the index is based on the general mean of general means of different orders—the first aggregation is by a geometric mean across dimensions; these means, calculated separately for women and men, are then aggregated using a harmonic mean across genders.

Steps to calculate GII values

There are five steps to calculating GII values.

Step 1. Treating zeros and extreme values

Because a geometric mean cannot be computed from zero values, a minimum value of 0.1 per cent is set for all component indicators. Further, as higher maternal mortality suggests poorer maternal health, for the maternal mortality ratio, the maximum value is truncated at 1,000 deaths per 100,000 births and the minimum value at 10. The rationale is that countries where maternal mortality ratios exceed 1,000 do not differ in their inability to create conditions and support for maternal health, and that countries with 10 or fewer deaths per 100,000 births are performing at essentially the same level and that small differences are random. Sensitivity analysis of the GII is given in Gaye et al. (2010).

Step 2. Aggregating across dimensions within each gender group, using geometric means

Aggregating across dimensions for each gender group by the geometric mean makes the GII association sensitive (see Seth 2009).

For women and girls the aggregation formula is:

$$G_f = \sqrt[3]{\left(\frac{10}{MMR} \cdot \frac{1}{ABR}\right)^{1/2} \cdot (PR_f \cdot SE_f)^{1/2} \cdot LFPR_f} \quad (1)$$

and for men and boys the formula is:

$$G_m = \sqrt[3]{1 \cdot (PR_m \cdot SE_m)^{1/2} \cdot LFPR_m}$$

The rescaling by 0.1 of the maternal mortality ratio in equation 1 is needed to account for the truncation of the maternal mortality ratio at 10.

Step 3. Aggregating across gender groups, using a harmonic mean

The female and male indices are aggregated by the harmonic mean to create the equally distributed gender index

$$HARM(G_f, G_m) = \left[\frac{(G_f)^{-1} + (G_m)^{-1}}{2} \right]^{-1}$$

Using the harmonic mean of within-group geometric means captures the inequality between women and men and adjusts for association between dimensions—that is, it accounts for the overlapping inequalities in dimensions.

Step 4. Calculating the geometric mean of the arithmetic means for each indicator

The reference standard for computing inequality is obtained by aggregating female and male indices using equal weights (thus treating the genders equally) and then aggregating the indices across dimensions:

$$G_{F,M} = \sqrt[3]{\overline{Health} \cdot \overline{Empowerment} \cdot \overline{LFPR}}$$

$$\text{where } \overline{Health} = \left(\sqrt{\frac{10}{MMR} \cdot \frac{1}{ABR}} + 1 \right) / 2, \overline{Empowerment} = \left(\sqrt{PR_F \cdot SE_F} + \sqrt{PR_M \cdot SE_M} \right) / 2 \text{ and } \overline{LFPR} = \frac{LFPR_F + LFPR_M}{2}.$$

\overline{Health} should not be interpreted as an average of corresponding female and male indices but rather as half the distance from the norms established for the reproductive health indicators—fewer maternal deaths and fewer adolescent pregnancies.

Step 5. Comparing indices

Comparing the equally distributed gender index to the reference standard yields the GII,

$$I = \frac{HARM(G_F, G_M)}{G_{F,M}}$$

Example: Kenya

	Health		Empowerment		Labour market
	Maternal mortality ratio (deaths per 100,000 live births)	Adolescent birth rate (births per 1,000 women ages 15–19)	Share of seats in parliament (% held by women)	Population with at least some secondary education (%)	Labour force participation rate (%)
Female	342	75.1	23.3	29.8	72.1
Male	N/A	N/A	76.7	37.3	77.3
(F+M)/2	$\frac{\sqrt{\left(\frac{10}{342}\right) \cdot \left(\frac{1}{75.1}\right)} + 1}{2} = 0.5099$		$\frac{\sqrt{0.233 \cdot 0.298} + \sqrt{0.767 \cdot 0.373}}{2} = 0.3992$		$(0.721 + 0.773)/2 = 0.747$

Note: N/A is not applicable.

Using the above formulas, GII is the harmonic mean of G_F and G_M :

$$G_F: \sqrt[3]{\sqrt{\frac{10}{342} \cdot \frac{1}{75.1}} \cdot \sqrt{0.233 \cdot 0.298} \cdot 0.721} = 0.1553$$

$$G_M: \sqrt[3]{1 \cdot \sqrt{0.767 \cdot 0.373} \cdot 0.773} = 0.7450$$

$$HARM(G_F, G_M): \left[\frac{1}{2} \left(\frac{1}{0.1553} + \frac{1}{0.7450} \right) \right]^{-1} = 0.2570$$

$$G_{F,M}: \sqrt[3]{0.5099 \cdot 0.3992 \cdot 0.747} = 0.5337$$

$$GII: 1 - (0.2570/0.5337) = 0.518$$

Sources: Maternal mortality ratio: WHO, UNICEF, UNFPA, World Bank Group and United Nations Population Division (2019).

Adolescent birth rate: UN Department of Economic and Social Affairs (2019).

Share of parliamentary seats held by each sex: IPU (2020). Population with at least some secondary education: UNESCO Institute for Statistics (2020) and Barro and Lee (2018). Labour force participation rate: ILO (2020). See the 2020 *Human Development Report* for the full references.

Gender Development Index

The GDI measures gender inequalities in achievement in three basic dimensions of human development: health, measured by female and male life expectancy at birth; education, measured by female and male expected years of schooling for children and female and male mean years of schooling for adults ages 25 years and older; and command over economic resources, measured by female and male estimated earned income.

Steps to calculate GDI values

There are four steps to calculating GDI values.

Step 1. Estimating female and male earned incomes

To calculate estimated earned incomes, the share of the wage bill is calculated for each gender. The female share of the wage bill (S_f) is calculated as follows:

$$S_f = \frac{W_f/W_m (EA_f)}{[W_f/W_m (EA_f)] + EA_m}$$

where W_f/W_m is the ratio of female to male wage, EA_f is the female share of the economically active population and EA_m is the male share.

The male share of the wage bill is calculated as:

$$S_m = 1 - S_f$$

Estimated female earned income per capita ($GNIpc_f$) is obtained from GNI per capita ($GNIpc$), first by multiplying it by the female share of the wage bill, S_f , and then rescaling it by the female share of the population, $P_f = N_f/N$:

$$GNIpc_f = GNIpc \cdot S_f / P_f$$

Estimated male earned income per capita is obtained in the same way:

$$GNIpc_m = GNIpc \cdot S_m / P_m$$

where $P_m = 1 - P_f$ is the male share of population.

Step 2. Normalizing the indicators

To construct the female and male HDI values, first the indicators, which are in different units, are transformed into indices and then dimension indices for each sex are aggregated by taking the geometric mean.

The indicators are transformed into indices on a scale of 0 to 1 using the same goalposts that are used for the HDI, except life expectancy at birth, which is adjusted for the average five-year biological advantage that women have over men.

Goalposts used for the GDI in the 2020 Human Development Report

Indicator	Minimum	Maximum
Life expectancy at birth (years)		
Female	22.5	87.5
Male	17.5	82.5
Expected years of schooling (years)	0	18
Mean years of schooling (years)	0	15
Estimated earned income (2017 PPP \$)	100	75,000

Note: The minimum and maximum values are used to normalize (i.e., express each indicator as an index between 0 and 1). The minimum and maximum values for life expectancy are five years higher for women to take into account their longer life expectancy.

Having defined the minimum and maximum values, the subindices are calculated as follows:

$$\text{Dimension index} = \frac{\text{actual value} - \text{minimum value}}{\text{maximum value} - \text{minimum value}}$$

For education the dimension index is first obtained for each of the two subcomponents, and then the unweighted arithmetic mean of the two resulting indices is taken.

Step 3. Calculating the female and male HDI values

The female and male HDI values are the geometric means of the three-dimensional indices for each gender:

$$HDI_f = (I_{Health_f} \cdot I_{Education_f} \cdot I_{Income_f})^{1/3}$$

$$HDI_m = (I_{Health_m} \cdot I_{Education_m} \cdot I_{Income_m})^{1/3}$$

Step 4. Comparing female and male HDI values

The GDI is simply the ratio of female HDI value to male HDI value:

$$GDI = \frac{HDI_f}{HDI_m}$$

Example: Mongolia

Indicator	Female value	Male value
Life expectancy at birth (years)	74.1	65.8
Expected years of schooling (years)	14.8	13.7
Mean years of schooling (years)	10.7	9.7
Share of economically active population	0.458	0.542
Share of population	0.507	0.493
Wage ratio (female/male)		0.821
Gross national income per capita (2017 PPP\$)		10,839

Sources: Life expectancy at birth: UN Department of Economic and Social Affairs (2019). Expected years of schooling: UNESCO Institute for Statistics (2020), ICF Macro Demographic and Health Surveys, United Nations Children's Fund (UNICEF) Multiple Indicator Cluster Surveys and OECD (2019). Mean years of schooling for adults ages 25 and older: UNESCO Institute for Statistics (2020), Barro and Lee (2018), ICF Macro Demographic and Health Surveys, UNICEF's Multiple Indicator Cluster Surveys and OECD (2019). See the 2020 *Human Development Report* for full references.

Female wage bill:

$$S_f = (0.821 \cdot 0.458) / [(0.821 \cdot 0.458) + 0.542] = 0.4096$$

Estimated female earned income per capita:

$$GNIPC_f = (10,839 \cdot 0.4096) / 0.507 = 8,757$$

Male wage bill:

$$S_m = 1 - 0.4096 = 0.5904$$

Estimated male earned income per capita:

$$GNIPC_m = (10,839 \cdot 0.5904) / 0.493 = 12,981$$

$$\text{Female health index} = (74.1 - 22.5) / (87.5 - 22.5) = 0.7938$$

$$\text{Male health index} = (65.8 - 17.5) / (82.5 - 17.5) = 0.7431$$

Female education index = $[(14.8 / 18) + (10.7 / 15)] / 2 = 0.7678$

Male education index = $[(13.7 / 18) + (9.7 / 15)] / 2 = 0.7039$

Estimated female earned income index:

$[\ln(8,757) - \ln(100)] / [\ln(75,000) - \ln(100)] = 0.6756$

Estimated male earned income index:

$[\ln(12,981) - \ln(100)] / [\ln(75,000) - \ln(100)] = 0.7350$

Female HDI value = $(0.7938 \cdot 0.7678 \cdot 0.6756)^{1/3} = 0.744$

Male HDI value = $(0.7431 \cdot 0.7039 \cdot 0.7350)^{1/3} = 0.727$

GDI value = $0.744 / 0.727 = 1.023$

Note: Values are rounded.

GDI groups

The GDI groups are based on the absolute deviation of GDI from gender parity, $100 \cdot |GDI - 1|$.

Country group Relative HDI achievements between women and men	Absolute deviation from gender parity
Group 1 High equality	2.5% or less
Group 2 Medium-high equality	2.5–5%
Group 3 Medium equality	5–7.5%
Group 4 Medium-low equality	5–10%
Group 5 Low equality	More than 10%

ANNEX II.

EXAMPLES OF COMPOSITE GENDER INDEXES

This Annex focuses on the GGGI, SIGI and GEI as three examples of composite gender indexes launched in the new millennium. It gives examples of their uses in scholarship and highlights how each compares with the UNDP's GII. These indexes are summarized in Table A.1.

Global Gender Gap Index

The GGGI was introduced in 2006 by the World Economic Forum (WEF) and is published annually. Its coverage increased from 115 countries in 2006 to 153 in the 2020 edition.¹²³ It is designed to measure gaps in outcomes (mostly capabilities) rather than reflect enabling institutions or policies to pursue gender equality. Thus, for example, it measures women's relative representation in national parliaments and not affirmative action or quota measures implemented to ensure higher representation of women. The GGGI encompasses 14 indicators covering four dimensions: economic participation and opportunity, educational attainment, health and survival, and political empowerment, each measured as a female-to-male ratio. Each indicator is expressed in relative terms (either a female-to-male ratio or share of women in total, converted to ratios). As an index of gender ratios, the GGGI rewards countries that have smaller gender gaps with a higher GGGI rank even if both women and men have low levels of well-being.

The GGGI is the average of four subindexes representing the four dimensions. Each subindex is a weighted average of its underlying indicators (the weights being proportional to the inverse of the standard deviation). This method ensures that indicators with large standard deviations do not have a disproportionate

impact on the index value. Index values range between 0 (inequality) and 1 (parity). The index value may be interpreted as the extent to which (in percentage terms) the gender gap in a country has been closed.

The female-to-male ratios are capped at the equality benchmark of 1 (equal numbers of women and men), except for sex ratio at birth and healthy life expectancy.¹²⁴ Capping at 1 means that the index does not reward female advantage in its components. In 2019, the global GGGI score (based on the population-weighted average) stood at 68.6 per cent, indicating that 31.4 per cent of the distance was left to reach parity. The progress in sub-indexes of GGGI is uneven, with the GGGI score in 2019 ranging from 97 per cent and 96 per cent in health/ survival and educational attainment, respectively, to 58 per cent in economic participation/ opportunity and 25 per cent in political empowerment.¹²⁵

The valuable features of the GGGI are that its benchmarks and method have remained fixed over time, which make it useful for tracking individual country progress in relation to the equality standard as well as comparisons with other countries. The unweighted mean GGGI for all countries slightly increased from 0.6617 to 0.7001 between 2006 and 2019. In addition, the GGGI covers key policy areas and has had consistent coverage of 107 countries since 2006, which is useful for cross-country panel data analysis.

¹²⁴ The equality benchmark for sex ratio at birth is 0.944 females per males, since biologically more boys than girls are born, and for healthy life expectancy it is 106 females per 100 males, given the longevity advantage of women.

¹²⁵ World Economic Forum 2020.

¹²³ World Economic Forum 2020.

TABLE A.1:
Gender indexes of other organizations

Indexes	Dimensions	Subdimensions
Global Gender Gap Index (GGGI) WEF, 2006	Economic Participation and Opportunity	Labour force participation
		Wage equality for similar work
		Estimated earned income
	Educational Attainment	Literacy rate
		Net primary level enrolment
		Net secondary level enrolment
	Health and Survival	Healthy life expectancy
		Sex ratio at birth
	Political Empowerment	Seats in parliament
		Ministers
		Number of years as head of state in the last 50 years
	Social Institutions and Gender Index (SIGI) OECD, 2009	Discrimination in the Family
Household responsibilities		
Divorce		
Inheritance		
Restricted Physical Integrity		Violence against women
		Female genital mutilation
		Missing women
		Reproductive autonomy
Restricted Access to Productive and Financial Resources		Secure access to land assets
		Secure access to non-land assets
		Secure access to formal financial services
		Workplace rights
Restricted Civil Liberties		Citizenship rights
		Political voice
		Freedom of movement
		Access to justice
Gender Equality Index (GEI)* EIGE, 2013	Work	Participation
		Segregation
		Quality of work*
	Money	Financial resources
		Economic situation
	Knowledge	Educational attainment
		Segregation
		Lifelong learning*
	Time	Economic activities
		Care activities
		Social activities*
	Power	Political power
		Social power*
		Economic power
	Health	Status
		Behaviour*
		Access

*GEI does not include the indicated subdimensions in the calculation of the index since gender-differentiated data for them are not available for all EU countries for each year. However, EIGE includes these subdimensions to signal their importance.

The GGGI is generally used as an independent variable in cross-country regression analyses on wide-ranging topics. For example, Knight (2019) investigates whether countries with better GGGI scores had lower gender gaps in climate change concerns, and Henry and Wetherell (2017) examine its association with better protection of sexual identities and positive attitudes toward sexual minorities. Chen and He (2020) examine the sources of slowdown in China's GGGI rank and score performance, from rapid improvement over 2006-2009 to a decline after 2013. They identify sex ratio at birth, life expectancy inequality and secondary education gaps as drivers of China's performance.

Mastracci (2017) uses the GGGI as a dependent variable to examine the main contributors to GGGI among its components. She finds that women's representation in public sector management, administration and politics explains a substantial portion of GGGI, underscoring the importance of policy measures to increase women's political representation. Mehdi (2020) conducts a sensitivity analysis of the GGGI to identify which dimensions have contributed most to the closing of gender gaps. He shows that shifting weights toward educational attainment, health and survival shows greater closing of the gender gap (90 per cent closes) than the case that weights political empowerment and economic participation more heavily (34 per cent closes).

Concerns about the GGGI centre on its incorporation of a large number of indicators and a potential duplication in the earnings indicators. Also, the GGGI does not flow from a particular conceptual framework. Another weakness is that as a gap index, by design, it disregards absolute levels of the achievement of women and men. While the WEF reports indicator values for women and men in each country's score card, it does not problematize them, keeping the focus on gender gaps alone.

The GGGI has limited overlap with the GII in its operationalization of dimensions (i.e., the subdimensions in Table A.1): They both include seats in parliament and labour force participation as indicators.

Social Institutions and Gender Index

The SIGI is a composite index that focuses on institutions that constrain women's access to resources and their capabilities, encompassing all stages of a woman's life. It incorporates both formal (rights and laws) and informal (norms and practices) institutions as constraints on women's well-being. The SIGI responds to the need for a societal measure on legal rights, norms and an enabling environment that was articulated in the UNDP stock-taking in 2006.¹²⁶ Launched in 2009, the SIGI was updated in 2012, 2014 and 2019.

The 2019 version reports data on four areas (constraints): (1) discrimination in the family, (2) restricted physical integrity, (3) restricted access to productive and financial resources and (4) restricted civil liberties. Underlying the four dimensions are 16 indicators (identified as 'subdimensions' in Table A.1) and 27 variables (not shown in the table).

Each constraint is measured in terms of two or three types of indicators. For example, political voice (under 'restricted civil liberties') is measured by: (1) whether there is a legal framework to guarantee women's political rights, (2) the share of the population that believes men are better political leaders than women and (3) the male share of members of parliament. Similarly, violence against women under 'restricted physical integrity' is measured by: (1) whether there is a law about violence against women and how much this law covers, (2) to what extent women feel that wife-beating is justified and (3) the percentage of women who have ever suffered physical or sexual intimate partner violence. The third type of indicator—prevalence of an outcome—refers to a capability deprivation for women, which in turn further disadvantages women and girls. Thus, the SIGI is not solely focused on institutions but also encompasses capabilities.

The index is constructed based on an unweighted average of these four dimensions using a non-linear function to reflect a more than proportional increase in women's deprivations with a rise in inequality. A shortcoming of the SIGI is that country scores tend to be inversely correlated with their GDP level due to

¹²⁶ Klasen 2006a; Cueva Beteta 2006.

the index's incorporation of an access to productive and financial resources dimension. In addition, since the SIGI combines different kinds of indicators—legal frameworks, perceptions, capabilities—it is difficult to interpret.

The SIGI ranges between 0 (equal) and 1 (unequal). Coverage has risen from 102 (2009) to 108 (2014) to 120 (2019) countries. Underlying it is a database—the Gender, Institutions and Development Database (GID-DB). The data set builds on the partnership of a number of international organizations and is the official source for monitoring SDG 5.1.1: “Whether or not legal frameworks are in place to promote, enforce and monitor gender equality and women’s empowerment”.¹²⁷

The SIGI is still under development. Since its design changed between 2014 and 2019, it does not yet serve the purpose of tracking country progress, albeit—since institutions are slow to change—frequent updates of the SIGI are not critical. The index has been used as an independent variable in regression analyses to examine the relationship of discriminatory social institutions with a range of development outcomes. For example, high values of SIGI are associated with high maternal mortality¹²⁸ and lower female secondary education, higher fertility rates, higher child mortality and higher perceived level of corruption in a country.¹²⁹ Konte and Klasen (2016) find that women’s support for democracy in Africa is lower where there is high gender inequality in institutions.

There is no overlap between the SIGI and GII. Each index measures substantively different aspects of gender inequality. That said, relating indicators of GII to indicators of SIGI can be insightful. For example, child marriage is expected to constrain the educational outcomes of women and be correlated with a larger gender gap in education and a higher adolescent birth rate. In addition, the SIGI dashboard for

each country is potentially useful to describe and track the constraints on gender equality.

European Union Gender Equality Index

Launched in 2013, the EU-GEI is a synthetic measure of women’s outcomes relative to those of men in the European Union.¹³⁰ As with the GGGI, the EU-GEI focuses on gender equality in resources and capabilities. It incorporates six domains (dimensions): work, money, knowledge, time, power and health. The EU-GEI ranges between 0 and 100 (equality). It has a more comprehensive framework than other gender indexes and is tailored for European Union policy objectives. The six domains encompass 17 subdomains (identified as ‘subdimensions’ in Table A.1), which in turn are measured by 27 indicators (not shown in the table). In addition to the core dimensions in the index, the EU-GEI framework tracks two domains that are relevant to gender inequality but cannot yet be measured in the EU-GEI: violence, which is a manifestation of inequality that affects mostly women; and intersectional inequalities, which generate differing experiences and outcomes for women in different social groups.

The EU-GEI’s construction implements the procedural approach proposed by Robeyns (2003), namely, identification of index dimensions based on conceptualization of gender equality without consideration for data limitations. This approach results in a more comprehensive conceptual framework than is feasible to measure but is valuable in highlighting data gaps, which in turn serves to encourage data collection to fully measure gender equality in the future. The EU-GEI is based on stringent data quality criteria (i.e., gender-differentiated data have to be available for all member countries, for the same year), which has prevented inclusion of a small number of subdomains. A unique feature of the EU-GEI is its incorporation of achievement levels of both women and men in each of its component indexes in order to avoid a positive interpretation of values in cases where gender gaps are low due to the adverse well-being status of both women and men.

127 The SIGI builds on a partnership of UN Women, OECD and the World Bank and draws on the data collection processes of OECD’s SIGI and the World Bank’s Women, Business and the Law index for baselines, but it has its own data collection process where data are validated directly with country counterparts. The index relies on expert assessments for a number of its indicators.

128 Lan and Tavrow 2017.

129 Branisa et al. 2013.

130 EIGE 2013.

EU-GEI results for 2010 indicate the largest gender gaps (longest distance to equality) in the areas of power (38) and time (38.8), followed by knowledge (48.8), work (69), money (68.9) and health (90.1).¹³¹ The EU-GEI has been published every two years (2013, 2015, 2017 and 2019). Its methodology is still evolving (while encompassing the same six domains, the 14 subdomains were measured by 31 indicators in 2019), which does not allow for assessment of changes over time.¹³² It has been used in scholarly articles to benchmark country or European Union progress toward equality and as an independent variable in studies that examine the prevalence of violence against women.¹³³

The GII overlaps with the work, knowledge and power dimensions of the EU-GEI and in the (labour force) participation and parliamentary representation indicators.

¹³¹ Ibid.

¹³² Humbert and Hubert 2021.

¹³³ Humbert et al. 2019.

ANNEX III.

RELATIONSHIP BETWEEN KEY CAPABILITIES AND HUMAN RIGHTS

Dimensions	Capability	Human rights
Life and good health	Ability and freedom of all individuals to enjoy life, good health and bodily integrity	<p>Equal access to, and treatment of, women and men in and by health-care services is recognized in CEDAW (1979) and the Beijing Platform for Action (1995). Moreover, the call for States to take action in this dimension is reaffirmed in Sustainable Development Goal (SDG) 3.</p> <p>The human rights of women include their right to have control over and decide freely and responsibly on matters related to their sexuality, including sexual and reproductive health, free of coercion, discrimination and violence.</p>
Education, skill-building and knowledge	Ability to gain knowledge, use senses, imagine, think and reason	<p>Achieving equality in this domain has long been a priority of global leaders. CEDAW's article 10, for example, calls on States to ensure equal opportunity and treatment in education (UN General Assembly 1979). Similarly, the Beijing Platform for Action refers to reducing inequalities in access to and unequal content of education and training as one of the 12 areas of critical concern (UN General Assembly 1995). These have been further expanded by the agreed conclusions of the UN Commission on the Status of Women.</p>
Labour and financial inclusion	Ability to play, work with dignity, rest and enjoy leisure and receive care and provide care for others	<p>CEDAW's article 11 encourages States to support parents in combining family obligations with work responsibilities, including through provision of child-care facilities, access to maternity leave and protection from workplace discrimination on the basis of marriage or maternity. Women's rights to financial assets have been long recognized and promoted by gender advocates. CEDAW article 13 makes explicit reference to "the right to bank loans, mortgages and other forms of financial credit" (UN General Assembly 1979).</p>

Participation in decision-making	Ability to have a say, exercise control over their environment and shape decisions that affect them and their families and communities	Articles 7 and 8 of CEDAW entrust States with ensuring equality between women and men in political and public life and in representation in governments (UN General Assembly 1979). The Beijing Declaration and Platform for Action spell out the imperative for governments to promote the representation of women in power and decision-making at various levels and branches of government and in leadership positions in economic decision-making bodies (UN General Assembly 1995). More recently, SDG target 5.5 calls on States to ensure women’s full and equal participation in leadership positions in political, economic and public life (UN General Assembly 2015).
Freedom from violence	Being “secure against violent assault, including sexual assault and domestic violence; having opportunities for sexual satisfaction and for choice in matters of reproduction.”	General Recommendation 19 of the Committee on the Elimination of Discrimination against Women (UN CEDAW 1992) advises that States should compile and report information on the prevalence of violence against women and the provision of services for victims, as well as legislative and other measures taken to protect women against violence, including against harassment at the workplace, abuse in the family and sexual violence. See also the more recent General Recommendation 35 (2017) on gender-based violence (UN CEDAW 2017).

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