Contradictions in Human Development Indices' Portrayal of Gender Inequality

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ABSTRACT
This paper attempts to analyze the contradictions in the ways different human development indices depict gender inequality in a country and find the reasons for the same. The approach includes case studies and trend analyses of selected countries from different regions. Four sub-Saharan countries were chosen for the case study. Three countries, based on their sex ratio, from each region were selected for trend analysis based on the ranks of the countries in all the indices. Case studies revealed the vulnerabilities of each index and how other indices compensate. The results of trend analysis slightly suggested the contradictions were region-specific. This work emphasizes that a combined analysis of all the indices is the optimal method to depict and understand the scenario of gender inequality in a country. Isolated analysis, especially when comparing countries, would be futile and may lead to incorrect depictions.

KEYWORDS
Gender Inequality, Gender Development Index (GDI), Gender Inequality Index (GII), Global Gender Gap Index (GGGI), Sub-Saharan countries, Trend analysis

1. Introduction

The Gender Development Index (GDI), Gender Inequality Index (GII), and Global Gender Gap (GGGI) Index are three indices used worldwide in determining gender inequality in one way or another. This naturally raises the question of why there is a need for multiple indices and not a single complex index. It is observed that each index shares some common indicators while differing from others. GGGI consists of indicators greater in number than both GDI and GII. It is, therefore, significant to see whether GGGI is better than others because of the inclusion of more indicators. The case of India and Namibia sparked our research. They are very close to each other in the GII rankings, but they do very differently in the GDI and GGGI. This means that the two indices show very different situations of gender inequality. Nearby countries to India and Namibia in GII rankings were chosen - Rwanda, Lesotho, and Ethiopia. We did case studies for Rwanda, Lesotho, Ethiopia, and Namibia. These countries are categorized in the Sub-Saharan region by UNDP. This further raised questions about

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contradictions being region specific; hence, we did a trend analysis of selected countries based on their sex ratio from all the regions. The case studies showed the weaknesses of the indices and how another index makes up for them. This suggests that a combined analysis of the indices is the best way to find out what the real situation is in a country when it comes to gender inequality. The whole paper tries to solve the questions listed below

- Is it true that a country with a higher rank in one indicator performs better in all kinds of inequality than other countries? Can we say that a country with a higher GGGI rating performs better in all types of inequality than other countries?
- Why is there a contrast in the ranks of GII, GGGI, and GDI for countries like Namibia, and Rwanda?
- Is there a particular region-wise pattern in the rise or fall of Index rank?

The results of our trend analysis also showed some trends that positively assert our region-specific assumption.

1.1. Methodology

We observed that India and Namibia had very close ranks in GII, but their performances differed significantly in GDI and GGGI. We wanted to find out about some other countries that showed such deviations. As a first trial, we decided to see the countries nearby in GII rankings; Rwanda showed similar contradictions. As a result, the Sub-Saharan region was chosen for an in-depth examination of the gender inequality scenario. Four countries from the Sub-Saharan region were selected based on some contradiction in the ranks of a country for different indices and were analyzed in depth to find reasons for each.
The following are the major contradictions considered in this paper (according to the rankings):

- Any one of the indices improve or drop, while all others decline or improve, or vice versa.
- Two countries rank similarly in one index, while one country performs particularly well in another index/indices.

This was followed by trend analysis for all the indices for different regions. The regions were classified according to the one followed in the Global Gender Gap Report. From each region three countries were chosen based on their sex ratio [1]- highest, closest to unity, lowest. A trend analysis is done based on the ranks for all the indices over the decade 2010–2019[2] of each selected country. The ranks of the countries, for each index, were calculated by arranging the values of a particular index appropriately. Countries that had no data for a particular year for an index were not considered for the rankings. For GDI, 165 countries were considered; for GGGI, a minimum of 130 (for the year 2010) countries; and for GII, 140 countries. The trend ratio was expressed as a percentage, with 2010 serving as the base year. All the data for the indices was taken from the official databases[3].

[1]Sex ratio (2021) is taken as the number of female population over the same of male population. source
[2]GGGI of 2020 is considered as the 2019 value for analysis purposes.
[3]GDI and GII: UNDP; GGGI: GGG Report

1.2. Limitations of the study

The following are the limitations of the study which we could not address due to time and data constraints.

- The trend analysis was done based on the ranks of the countries. While doing this we removed the countries which had no data for a particular year. Hence the total number of countries every year varied.
- We restricted our trend analysis to 3 countries per region. The results obtained may not reveal the real picture of gender inequality in a particular region.
- The idea of sex ratio as a selection criterion was not considered very strictly. Some countries had to be omitted due to data unavailability or the country's significance in the world.

2. Literature review

To understand the gender inequality scenario of the world, the most appropriate method is to analyze based on the regions. This is because, "unlike most other types of inequality, gender inequality is not additively decomposable, that is, total gender inequality is not the sum of within-region and between-region gender inequalities. This is because regional gender inequalities can offset one another" (Dorius & Firebaugh, 2010).

Despite progress towards gender equality, gender inequalities remain pervasive in many dimensions of life worldwide. Gender gaps in education hinder economic growth, which highlights the need for decisive policy action regarding female equality in education to put an end to the gender-based discrimination existing in many countries in the world, especially among developing countries (Altuzarra, Gálvez-Gálvez, & González-Flores, 2021).

Many countries in Africa have some of the highest percentages of women in parliament, yet score very low on gender equality measures (Dimitrova-Grajzl & Obasanjo, 2019). The paper further suggests that "legislative candidate quotas as compared to reserved seat quotas are associated with lower maternal mortality and higher labor force participation for women, and are negatively and statistically significantly associated with the gender inequality index". They offer two explanations for this result. "First, the lack of substantive representation in the reserved seat quota system could be driven by a lower perceived legitimacy of women appointed through the reserved seat system; the lower legitimacy, in turn, causes lower effectiveness in steering policy agendas and policy outcomes toward issues that improve the lives of women. Second, majoritarian electoral systems can only legislate reserved seat quotas due to the nature of single-member district voting."

In GII, the inclusion of indicators that compare the relative performance of women versus men together with absolute women-specific indicators obscures even more the interpretation of an already complicated index that turns out to penalize the performance of low-income countries (Permanyer, 2013). The research further states the issues such an index produces:

- Penalizing low-income countries for poor reproductive health metrics not fully explained by gender-related norms or discriminatory practices against women.
- Allows deterioration in women's education and economic engagement to be compensated by equal deterioration in men, but randomly forbids the compensation

for decline in women's reproductive health.
- Completely ignores the average health status of males, which is an equally important data that should be included in a thorough evaluation in a comprehensive assessment of gender inequality.

In the Issue Paper prepared for the Expert Group Meeting on "Gender Equality in Human Development – Measurement Revisited", Human Development Report Office, UNDP June 2015 , pairwise correlation analysis of values and ranks based on 8 indices, GII, nGDI, SIGI, GGGI, GEI, EU-GEI, GDI and GEM across countries were provided. The report states that "The GDI and GII seem to be highly correlated pointing out that the design of both indicators was aimed at capturing inequality through the use of general means of higher order." The report further highlights an important drawback of GDI, "The low correlation of the nGDI[4] with EU-GEI might indicate the limited suitability of the GDI in capturing gender disparities in developed countries." They conclude "A simple empirical analysis identifies that while these measures are interrelated, they are also distinct". This indicates that all the measures of gender inequality are interrelated yet differ in some aspects which may be exploited for better analysis.

3. Analysis

This study uses two analysis tools - In-depth Analysis and Trend Analysis to observe the index rank trends of selected countries.

3.1. In-depth analysis

The in-depth analysis of indices of four countries - Rwanda, Lesotho, Ethiopia, Namibia; that are found to have contradictory meanings as observed in our initial analysis are done in this section. The possible reasons for these contradictions were found after going through social, demographic, economic, and political details of each of these four countries.

3.1.1. Rwanda

3.1.1.1. Time-series analysis.

[4]the HDRs introduced an alternative pair of gender indices in 2010, the Gender Inequality Index (GII) and the new Gender Development Index (nGDI)

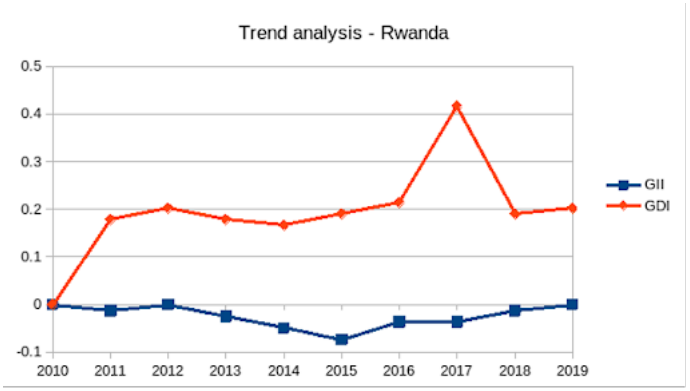

Figure 1. Timeseries of GDI and GII of Rwanda; % change in rank from 2010 in y-axis

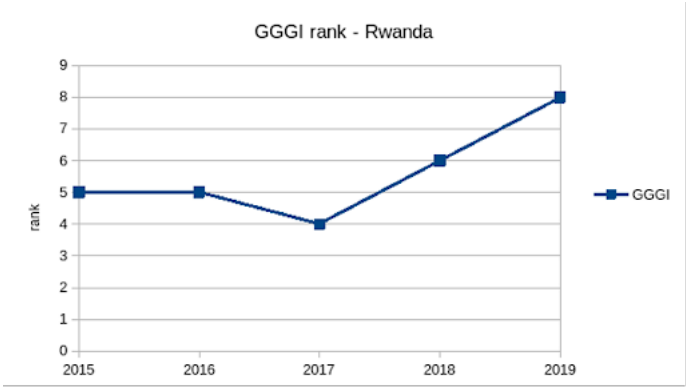

Figure 2. GGGI values were limited to 2015-2020

The trends in GII remain almost constant indicating the constancy in ranks. GDI shows a similar trend with a peak in 2017. GDI shows a deteriorating trend with one unusual spike in 2017.

3.1.1.2. GDI. For the year 2019,
HDI: Valued 0.543 (thus placed in low human development category) and ranked 160/189.
Female HDI: 0.528
Male HDI: 0.558
GDI:0.945(thus placed in group 3)
Detailed values along with those of some African countries are provided below:

Table D: Rwanda's GDI for 2019 relative to selected countries and groups

	F-M ratio	HDI values		Life expectancy at birth		Expected years of schooling		Mean years of schooling		GNI per capita	
	GDI value	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Rwanda	0.945	0.528	0.558	71.1	66.8	11.2	11.2	4.0	4.9	1,876	2,444
Guinea	0.817	0.428	0.524	62.1	60.9	8.0	10.8	1.5	4.2	2,266	2,554
Togo	0.822	0.464	0.565	61.9	60.2	11.5	13.8	3.5	6.7	1,220	1,989
Sub-Saharan Africa	0.894	0.516	0.577	63.3	59.8	9.5	10.6	4.9	6.7	2,937	4,434
Low HDI	0.861	0.474	0.551	63.0	59.9	8.7	10.1	3.9	6.0	2,043	3,446

Figure 3. Gender Development Index — Human Development, 2019

3.1.1.2.1. Reason for poor performance in GDI. Observe in figure 3 that males dominate females in mean years of schooling and significantly in GNI per capita (2 indicators). Females dominate males in life expectancy at birth (1 indicator). A significant amount of inequality comes from GNI per capita distribution.

3.1.1.3. GII. For the year 2019,
GII value of 0.402, thus ranked 92 /162.
Detailed values along with those of some African countries are provided below:

Table E: Rwanda's GII for 2019 relative to selected countries and groups

	GII value	GII Rank	Maternal mortality ratio	Adolescent birth rate	Female seats in parliament (%)	Population with at least some secondary education (%)		Labour force participation rate (%)	
						Female	Male	Female	Male
Rwanda	0.402	92	248.0	39.1	55.7	10.9	15.8	83.9	83.4
Togo	0.573	145	396.0	89.1	16.5	27.6	54.4	76.3	78.9
Sub-Saharan Africa	0.570	—	535.2	104.9	24.0	28.8	39.8	63.3	72.7
Low HDI	0.592	—	571.8	102.8	22.2	17.2	30.1	57.7	72.3

Maternal mortality ratio is expressed in number of deaths per 100,000 live births and adolescent birth rate is expressed in number of births per 1,000 women ages 15-19.

Figure 4. Gender Inequality Index (GII), 2019

3.1.1.3.1. Reason for poor performance in GII. Observe in figure 4 that here the major source of inequality comes from the share of parliamentary seats held by women and % of adult women having at least secondary education. But education being male-dominant and parliamentary seats being female-dominant almost cancels the inequality when combined. But the index depicts the inequality aspect from MMR and adolescent birth ratio, showing males being more advantageous in the country.

3.1.1.3.2. LFPR and GNI per capita of females. We observe that even though the LFPR of females and males are almost equal (slightly greater for females), the GNI per capita of females is significantly less than males. One reason for this may be as the GGGR states: "while there are many women in the labor force in most countries, senior roles are predominantly still held by men." But the report further says: "While in most countries the share of women among senior officials varies between 30% and 14%, income and wage gender gaps are also large in most countries". The gaps in income and wages in Rwanda are 23.7% and 38.9%.This indicates there is a good portion left to fill. This may be largely attributable to cultural biases, but the skill gaps between women and men in the labor force also contribute to this. Consequently, a relatively small percentage of Rwandan women (38.7%) are employed in skilled professions, and an even lower percentage (14%) are senior officials. In the past, women's access to education was limited. This still continues to hinder their ability to compete in the present workplace.

3.1.1.4. GGGI. Rwanda was ranked 9/153 countries in the 2020 report. Interestingly its performance in this index is much better than GDI and GII. Specified below are its component scores:
Economic participation and opportunity: Ranked 79/153 with a score of 0.672
Educational attainment: Ranked 114/153 with a score of 0.957

Health and Survival: Ranked 90/153 with a score of 0.973
Political Empowerment: Ranked 4/153 with a score of 0.563

3.1.1.4.1. Educational Attainment. Educational attainment shows an expected trend consistent with GDI and GII. Even though Rwanda scores a perfect 1 in primary and secondary education enrollment (GGGR 2020: 299), there is some gap in its male-to-female literacy rate and tertiary education enrollment. This may itself lead to a decline in the score of economic participation and opportunity. Still, the situation has improved a lot after the infamous genocide. Under the Ministry of Education, the Girls' Education Task Force (GETF) was established in 2004 to promote education for young girls. Programs have been developed to help educate women who would have previously been prevented from attending school. Rwandan girls are now more likely than boys to attend school, even at the secondary level (Stavropoulou, Gupta-Archer, & Marcus, 2022). Other initiatives have been established that permit boys and girls to discuss women's education.

3.1.1.4.2. Political Empowerment. Political empowerment is the area where Rwanda outshines almost all countries in the globe which we consider the reason for its good GGGI rank. Rwanda is the only country with more than 60% share of women in parliament in the Sub-Saharan region; it has more than 48% of women among their ministers (GGGR 2020: 299). This is largely due to the quota imposed after the genocide which ensures that 30% of the parliamentarians should be women.

3.1.1.4.3. Economic Participation and Opportunity. Economic participation and opportunity as expected follow GNI per capita performance indicating the gap is significant. Inequality in education is a significant factor responsible for this significant gap. The rank drops when we see high-paid and skilled jobs. A mixed-methods study by (Bigler, Amacker, Ingabire, & Birachi, 2017) on the rural labor market finds that access to land and gender shapes inequalities within the rural Rwandan labor market. The empirical findings indicate that wage employment is produced nearly exclusively in the informal sector, typically for casual on-field agricultural laborers. A wage disparity was observed in this area, indicating that women received around 20% less than men for the same work. Their methodology reveals that women are self-employed farmers. However, while participating in the paid labor market, they perform the vast majority of child care and household chores. Reproductive labor impedes women's ability to find suitable employment. Women have limited options to transfer care-giving duties to other institutions or family members, particularly before their children begin school. This decreases their power to bargain and mobility, and forces them to accept lower wages.This (unpaid) care job acted as an impediment to their paid employment (*The Year in Review, 2012 — World Food Programme*, 2013).
(*African Development Report 2014*, 2015) analysis of EICV3 data (2010/11) (*EICV 3 - Main indicators Report | National Institute of Statistics Rwanda*, 2012) indicates that despite the fact that women make up more than half of Rwanda's labor force, men are more likely to hold waged employment. Importantly, many Rwandan women work unpaid in the household or informal sector. According to the ADB, males and females have roughly identical pay incomes among youth, but males perform better in every other wage category. Cultural limitations (related to women's reproductive roles) result in unequal employment opportunities. It is commonly seen that women and girls in Rwanda continue to face substantial social, economic and political inequalities

(Abbott & Malunda, 2016) ; (Stavropoulou et al., 2022). The GGGR further reveals that firms with female majority ownership and firms with female top managers are just 12.90% and 19.70% respectively (GGGR 2020: 300). However, Rwanda is the only African country that has given women equal rights as men on land inheritance. This also contributes to economic growth and the participation of women.

3.1.1.5. Health. The health conditions among women have improved much after the genocide with women having more access to health facilities. The MMR decreased by a record 59.5% from 2000 to 2011 and by 36.52% from 2010 to 2020 (UNDP). Women in Rwanda receive three months of paid maternity leave, which makes it much simpler for them to return to the workplace after starting a family .Reforms in the health policy expanded women's access to voluntary family planning services, reducing fertility rates, strengthening families, and expanding economic opportunities for women. On the other side, an examination of the evidence of girls' capabilities in Rwanda, reveals that despite the fact that 71.5 percent of girls aged 15 to 19 have health insurance, 55 percent still have difficulty obtaining healthcare (Stavropoulou et al., 2022). Because they are responsible for household chores, their performance has not improved. Despite the rarity of child marriage in Rwanda, adolescent girls are especially susceptible to sexual assault and increasingly involved in exploitative relationships with older sugar daddies. Rwanda is one of the few countries in the region where adolescent pregnancy rates are increasing, as the majority of teenage girls do not utilize contraception. This is further proved by the adolescent birth rates of girls in Rwanda which from 2010 to 2020 has just dropped a mere 5%, still high at 40 births per 1000 women aged 15-19 (UNDP). Despite the fact that Rwanda prohibited marital rape in 2009, there is still work to be done to end the country's gender-based violence.

3.1.1.5.1. Intimate Partner Violence in Rwanda. - Another reason for gender inequality not directly included in any of the 3 indices

According to BioMed Central (Thomson, Bah, Rubanzana, & Mutesa, 2015), 34 percent of Rwandan women claimed to have been in a partnered relationship and survived intimate partner violence in 2005. This reached 56 percent in 2010. This increase is due to the lessening of stigma regarding intimate partner violence throughout Rwanda. Women now feel more comfortable to share their experiences. This increase may be due to the "visible" amounts of powerful women in Rwandan society. Another study Umubyeyi, Persson, Mogren, & Krantz (2016) investigated the stigma of intimate partner violence throughout Rwanda. The data shows that even though the state of Rwanda took an active stance against intimate partner violence, the societal standards for women were still in line with traditional gender roles. Non-alliance between policies and societal values led to the majority of abused women not benefiting from the available health and support services. This study also proves that to fully eradicate gender-based violence, change must come from Rwandan society as well as implemented policy. 50% of women and 18% of men concur, according to the Rwanda demographic health survey 2019-20 (*Rwanda DHS, 2019-20 - Final Report (English)*, n.d.), that a husband is justified in beating his wife in at least one of five defined scenarios. 65% of women and 39% of men justify wife beating in at least one of seven identified situations. Over time, support for wife beating has decreased dramatically. 37% of women aged 15-49 had encountered physical abuse since age 15 and 23% have ever experienced sexual violence, according to the same survey. Among men, the cor-

responding proportions are 30% and 6%. 46% of ever-married women and 18% of ever-married men had experienced physical, emotional or sexual abuse at the hands of their spouse. The prevalence of intimate partner violence among women who have ever been married grew from 40% in 2014-2015 to 46% in 2019-2020, whereas it decreased somewhat among men, from 20% to 18% over the same time period. High risk of spousal violence indicates such acts are considered as a socially-accepted norm (Jewkes, 2002).

3.1.1.6. Conclusions.

- All indices suggest that inequality in education is still a prevalent area of inequality in Rwanda, relative to the world. Economic participation and opportunity show a gap that needs to be closed directly by GGGI and indirectly by GNI per capita of GDI.
- Political empowerment is the area where Rwanda outshines almost all countries in the globe. This itself is powerful for women's empowerment and gender inequality since, when women work in politics, research suggests they put important but otherwise neglected issues on the table (Asiedu, Branstette, Babula, & Malokele, 2018) that can significantly trickle down, benefiting women from all walks of life. The study by BioMed Central serves as a good example. Despite outshining in political empowerment, Rwanda performs least in political empowerment with a score of just 0.563 (GGGR 2020: 299). This indicates a major region where the gaps need to be filled. This may be because the world as a whole has a larger gap to fill in the political empowerment of women. Thus Rwanda has to focus on closing this gap as much as it focuses on closing gaps in other indicators. One reason for poor performance is the embedded cultural values and practices that construct women as 'naturally inferior'. We feel that education is the only way to change this thought. Schools can contribute to this with students being taught the concept of equality right from primary and secondary levels.
- The adolescent birth rate is a real cause of concern in Rwanda with no significant improvement found. This is the one factor that GII correctly captures and is missed directly by the other 2 indices. Violence, physical or sexual intimate partner violence or any other form is a key factor that needs reform. Improving the status of women and reducing norms of violence, poverty, and alcohol consumption must be the initial steps to tackle this issue.

3.1.2. Lesotho

3.1.2.1. Contradiction. In GGGI, Lesotho's performance deteriorated over the decade (2010-2019/20) with over a 1000% increase in rank (from 8th to 88th). This may seem like a contradiction (as a group 1 country in GDI). But looking at the HDI values of Lesotho reveals how misleading GDI can be if relied solely on its value. Lesotho's HDI (female) is 0.524 and its HDI (male) is 0.528 in 2019 compared to 0.721 and 0.754, respectively, of the world (UNDP). This unfortunately covers many critical problems in Lesotho, like life expectancy (at birth) of females and males is 57.1 and 51.4 years, whereas the average of the same in the world is 75.5 and 70.6 years; GNI per capita is $2,411$ and $3,523$, world's GNI per capita is 6 and 7 times these values, respectively (UNDP).
In GGGI, the exceptional rank in 2010 was because it had closed around 88%

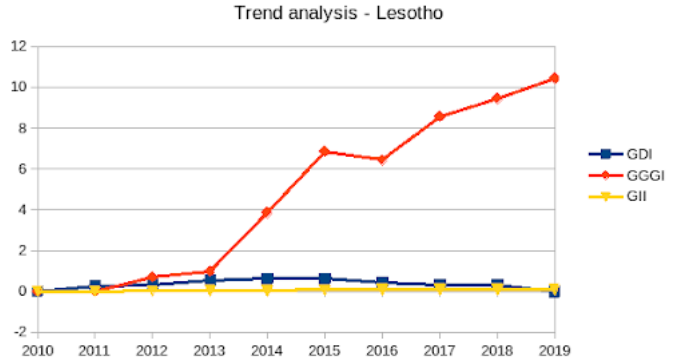

Figure 5. Time-series analysis of Lesotho; % change in rank from 2010 in y-axis

(inequality)-EPO[5], 100%-EA, 98%-HS, i.e., Lesotho has almost closed the gap in EA and HS, topping in all these sub-indices. In EPO, as opportunities for men in South African mines dwindled, the establishment of Chinese textile factories in Lesotho provided new avenues for formal employment in urban areas. According to (Marie-Nelly & Baskaran, 2023) the textile and apparel industry grew from a handful of factories in the 1990s to become the largest private-sector employer, providing over 50,000 jobs (mostly to women) and benefiting 13% of Lesotho's population. Because women made up 72% of the formal labour force in Lesotho, employment enabled them to supplement or compensate for the loss of family income (GGGI 2010: 193). The continuous decline in GGGI rankings after 2010 is primarily due to the widening of the gender gap in EPO (widened by 22% in 2019/20). This was due to a significant drop in LFPR in women (72% to 62%), increasing wage inequality (5.95 to 3.43[6]), and the replacement of women by men in jobs.

Figure 6. Source: Global Gender Gap Report 2010

Figure 7. Source: Global Gender Gap Report 2013

[5]EPO- Economic Participation and Occupation, EA- Educational Attainment, HS- Health and Survival, PE-Political Empowerment.

[6]This indicator is mentioned in the form of scale 1-7 (parity).

3.1.2.1.1. Reasons for the drop in LFPR of women and wage equality. In 2010 (calculated using 2009 LFPR data from ILO), a 92% gap in labor force participation was filled. The gap widened thereafter, in 2013 (calculated using 2010 LFPR data from ILO[7])The sudden changes in the EPO sub-index can be better explained when we observe the scenario of the manufacturing industry of Lesotho, especially the Textile and Clothing industry. In May of 2000, the U.S. Congress passed the African Growth and Opportunity Act (AGOA). The stated objective of this act is to strengthen economic links between the United States and the economies of sub-Saharan Africa. According to a report of the Central Bank of Lesotho, "after enactment of AGOA, the setting changed quite drastically. The manufacturing sector's contribution to the overall gross domestic product increased sharply, from less than 10.0 percent to more than 20.0 percent; and this was propelled by the manufacturing of textiles and clothing... That saw employment increasing to more than 50,000 employees as of 2004... mostly women". But due to the end of MFA[8], the 2008 global financial crisis, and the end of DCC[9], the textile industry of Lesotho could not sustain itself with the foreign industries. According to the Central Bank of Lesotho, in 2010, employment in LNDC[10]-assisted companies fell by 1.7% from 2009, "owing to sustained strain in the US labor market and slow global economic recovery, which curtailed export orders and led to reduced production activity". This downfall in textile industry led to a decrease in the LFPR of women and increased wage inequality.

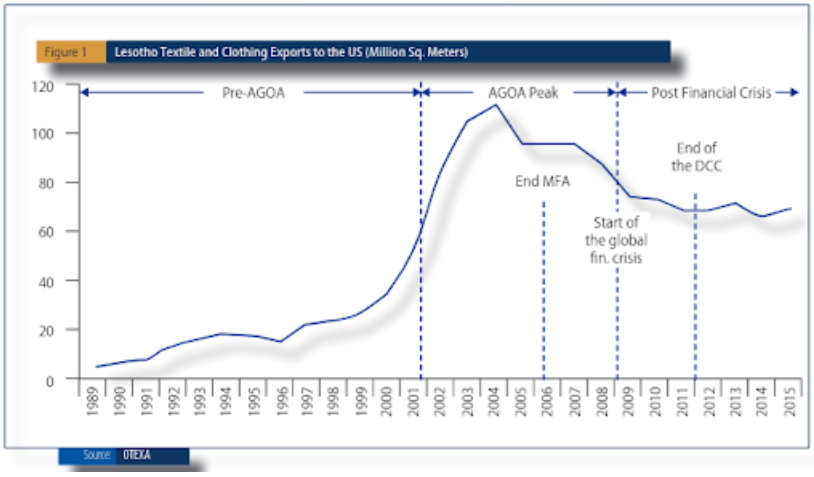

Figure 8. Firm Size Distribution in Lesotho Manufacturing Sector: Implications for Job Creation By Rethabile Masenyetse, Mookameli Fuma, and Malefu Manamathela

3.1.2.1.2. Educational attainment. As per the 2021 Global Gender Gap report, it was able to close 99% of the gap in terms of Educational Attainment- maintained the same over the decade. This was due to the expansion of primary schooling which included providing free primary education until the age of 12.

[7]International Labour Organization, key indicators of the labour market, 2009

[8]Multi-Fibre Agreement - An international trade agreement involving clothing and textiles, active from 1974-1994. The Agreement on Textiles and Clothing was phased out on Jan. 1, 2005

[9]Duty Credit Certificate (DCC) facility is a product specific rebate facility. It is currently limited to textile producers' only (e.g. clothing and clothing accessories, household textiles, yarn, fabrics and other textiles).

[10]Lesotho National Development Corporation

3.1.2.1.3. Political empowerment. In the case of representation of women in political positions, two factors undermine the same in top political structures: poor participation of women during public gatherings where their voices are muted causes women to lack self-esteem and discourages them from aspiring to leadership roles; gender stereotypes perpetuated through the courtyard gathering and initiation force men to view women as minors, unfit for high political positions (Kali, 2018a). The quotas and placements used by the political parties of Lesotho to counteract the under-representation of women do not empower women or alter the patriarchal framework; at best, they are intended to mitigate the most severe effects of the under-representation of women (Kali, 2018b). They can give minimum required representation for women but their voices are undervalued due to stereotypes ingrained in men and women.

3.1.2.1.4. Health and survival. In the health and survival subindex, despite significant efforts in the health sector like the prevalence of many nurse-staffed primary health centers operated by the government and CHAL (Christian Health Association of Lesotho), and growth of investments in the health sector by the government (10.5% of GDP[11]), the health outcomes are still extremely poor. From a report by the World Bank, the reasons are a dearth of qualified and uneven deployment of front-line health workers; 30% of deliveries still take place at home; lack of data systems essential for decision making; wide differences in the budget allocation to different parts of the health system; extremely weak control system at all levels (center, district, facility level) (*Lesotho's Health Sector*, 2018).

3.1.2.2. Conclusions.

- Considering only the position of a country in GDI groups can lead to many contradictions concerning GGGI and GII.
- This group-based division in GDI is highly misleading. Being an export-rich and migration-dominated country, gender inequality was highly influenced by other nations' law implementations.
- Countries with patriarchal societies have to realize that it is necessary to have equal participation of both genders for the country to prosper. This not only requires the inclusion of or changes in policies but also changes in the perception and values of men towards women.
- The health of women is crucial for gender equality as they have multiple responsibilities along with professional work, especially in countries like Lesotho which are highly dependent on women being a cloth manufacturing hub.

3.1.3. Ethiopia

3.1.3.1. Inferences from the trend analysis. Ethiopia declined in GDI, but showed improvement in GII and GGGI, significantly in the latter.

3.1.3.2. Contradictions. Ethiopia saw a decline in GDI world rankings but improved significantly in GGGI. The major reason for this contradiction is the significant increase in women's share in political participation (ranked 16th in 2020). Almost half (47.6%) of ministers are women, and a woman[12] was elected president in 2018.

[11]Higher than many countries in the SADC (Southern African Development Community) region and around double the level for the Sub-Saharan region.
[12]Sahle-Work Zewde took office on 25 October 2018.

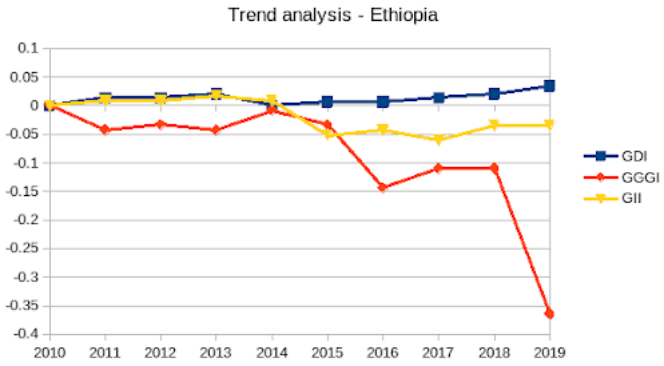

Figure 9. Time-series of Ethiopia; % change in rank from 2010 in y-axis

In addition, 38.8% of parliament seats are occupied by women, as per GGG Report 2020. Both GII (% share in parliamentary seats) and GGGI (political empowerment) contain a corresponding indicator that considers women's share in political participation. But GDI does not have an index corresponding to political participation. Hence, the significant increase in women's share in political representation is reflected in the improvement of GII and GGGI, not in GDI.

3.1.3.2.1. Reason for GGGI's big jump in 2018-2019. We can see a huge increase in the score of the indicator, Women in ministerial positions from 2018 to 2019. This was done under the National Action Plan; the representation of women in parliament and the appointment of a number of women to formerly male-dominated high public positions have increased the visibility of women in the public sphere. These sectors of women's representation include female legislators, female ministers, female bureau chiefs, and female department directors, among others[13].

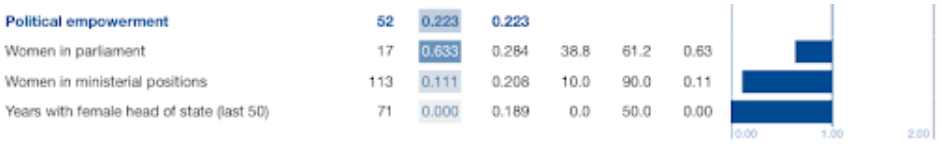

Figure 10. Source: GGG Report 2018

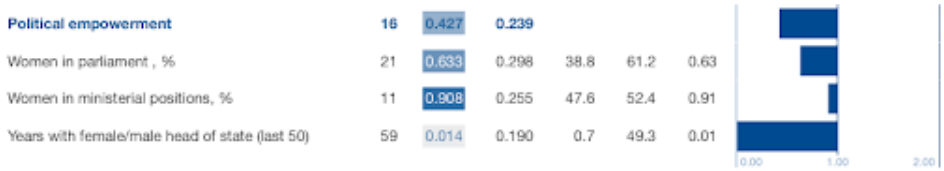

Figure 11. Source: GGG Report 2020

3.1.3.2.2. Gender parity problem in Ethiopia. GGGI's significant improvement over the decade should not cover up Ethiopia's struggle to progress in gender parity in

[13]https://www.un.org/womenwatch/confer/beijing/national/ethiopia.htm

economic opportunities (56% gap was filled, 125th in 2020), education (85%, 140th in 2020) even though the gender gap in LFPR is 12%, the gender gap in wages is 50%. Similarly, for educational attainment, the gender gap in enrolment in primary and secondary education is less than 10%, and the gap in enrollment in tertiary education and literacy rate are 52% and 25%, respectively. Hence, in EPO and EA, Ethiopia's performance declined. This misaligned progress in political empowerment of women and educational attainment is stalling the progress in gender parity, as for Dr. Sehin Teferra, Founder of the Setaweet Movement[14] bringing women to politics by itself is not the only thing that matter, but "the policies these women bring" and the actual implementations of these policies is (*News: Ethiopian women participation in politics up but a lot needs to be done*, 2019). For active participation in politics, one needs to be financially sound but as women are underprivileged in this aspect, they are restricted to working under male leaders and are mostly indulged in taking bureaucratic decisions, not important decisions. Women's participation in elections as a voter is nearly equal to men's. However, their participation in political parties and thinking of running for election is low due to various reasons, like online/offline attacks on women politicians-discouraging them to participate, stereotypes about women, being busy in bearing and raising children (Yimenu, 2016).

3.1.3.3. Conclusions. Uneven progress in the political representation of women (showing improvement) and educational attainment (not showing significant improvement) is stalling Ethiopia's journey toward equality.

3.1.4. Namibia

Namibia has got 6th rank in the Global Gender Gap Index 2021 and a rank of 140 in the Gender inequality index in 2019. Both indices seem to depict different images of the actual situation of the country. We know that these two indices follow two different approaches to measuring or capturing gender inequality, but we still expect them to depict a similar image. One of the reasons can be due to MMR and ABR which are included in GII but not in GGGI.

- **Maternal mortality rate(MMR)**
  The maternal mortality rate is the number of maternal deaths per 100,000 live births. Namibia has been ranked 140 in the maternal mortality rate with 195 per 100,000 live births. The performance of the country in this indicator is low, and the performance of Namibia in this indicator of the gender inequality index is low. Hence has less index value in the Health dimension which leads to an increase in its ranking in GII [15].
- **Adolescence birth rate (ABR)**
  The adolescent fertility rate is the number of births per 1,000 women ages 15-19. The adolescent fertility rate (births per 1,000 women ages 15-19) in Namibia was reported at 57.64% in 2020, according to the World Bank collection of development indicators, compiled from officially recognized sources. Namibia has been ranked 63rd in this. The country's low performance in this indicator also led to an increase in GII ranking.

[14] a movement working to create "a space for dialogue, research and activism by Ethiopian women and men."
[15] https://data.worldbank.org/indicator/SH.STA.MMRT?locations=NA

3.1.4.1. Health condition of Namibia. Namibia is an African country and comes in upper middle income country. It has healthcare system which works on dual system (Christians, 2020)

- Public healthcare provider:- This system serves 82% of the total population of the country.
- Private Healthcare providers:- This system accounts for serving 18% of the total population of the country.

In the financial year of 2013-2014 the total expenditure including the Government as well as private health expenditures was 8.9% of the country's GDP , whereas the world average is 9.9% of GDP in 2014 The Human Rights Measurement Initiative [16]reveals that Namibia can meet 74.8% of its expected health needs based on its revenue. In the area of the right to health for children, Namibia satisfies 88% of what it is expected to meet based on its income. Also, Namibia has been able to address only 66.2% of the planned health facility. Namibia has been placed in the "very poor" category during the evaluation for the right to reproductive health. The reason for this is that Namibia can only achieve 70% of its desired objectives with its current resources (income) (Erastus, 2020). Moreover, inequality remains a significant problem for Namibia as a whole. In 2010, Namibia had one of the highest income equality in the world, which is reflected in the lingering disparities in health access and outcomes seen across income groups, races, and geographic locations. For example, in 2013, 18 percent of women in the lowest wealth quintile had an unmet need for family planning, compared to only 7 percent of women in the wealthiest quintile. Similarly, infant and under-five mortality rates in the wealthiest quintile in Namibia (22 deaths per 1,000 live births and 31 deaths per 1,000 live births, respectively) are less than half of that of the poorest wealth quintile (51 deaths per 1,000 live births and 67 deaths per 1,000 live births, respectively) [17].

3.1.4.1.1. Health dimension captured by GGGI and GII. Namibia has got rank 1 in the health and survival dimension (GGGR 2020: 259). But we can observe that the health condition in Namibia is much poorer than what is expected from its rank. Also, the aspect of health services is not considered in the health dimension of GGGI directly. The two indicators MMR and ABR are not considered by GGGI but are considered in GII. This is the reason why the country has a low ranking in GII but a much better ranking in GGGI. even with lack of proper health facilities for all. We can say that in this context, GII is giving a better view of the healthcare system in Namibia than GGGI.

3.1.4.2. The education dimension captured by GGGI and GII . In the Education dimension captured by GII, we do not have any sub-indices like that in GGGI. In GGGI we have "Educational Attainment", this indicator has 4 indicators, Literacy rate, Enrolment in primary education, Enrolment in secondary education, and Enrolment in tertiary education. Therefore, GGGI examines many perspectives within the Education dimension, whereas GII depicts a single viewpoint of the same considering only the "Population with at least some secondary education".

[16]https://humanrightsmeasurement.org/
[17]https://improvingphc.org/promising-practices/namibia/

3.1.4.3. Labour Force Participation Rate (LFPR). This factor is common in both indices, but the way it is used in the calculation of the respective indices is different. In GII this factor is the only indicator to calculate the Labour Market subindex, hence having a higher weightage. However, in GGGI, it is one of the indicators to calculate the Economic Participation and Opportunity subindex, hence having a lower weightage in the overall index. Consequently, this parameter will influence both indices unequally. In the GGGI the LPFR has a weightage of 0.199 out of 1 for one subindex (Economic participation and Opportunity) (GGGR 2020: 48), whereas in GII it has been given full weightage being the lone indicator for the Labour Market subindex. Namibia has a ranking of 55 in LFPR (GGGR 2020: 259). Due to less weightage of LFPR, its effect on the Economic Participation and Opportunity dimension is less, therefore Namibia ranked well in it. But due to higher weightage in GII, its effect was significant. This is another reason for Namibia's poor GII rank. Similarly as discussed above, if we observe the other indicators of GGGI then we can observe that Namibia has performed very well in those indicators. If we look at the worst-case scenario or the dimension in which Namibia has the worst rank, then we can observe that the maximum rank has gone to 32 (in Education attainment). However, in GII we can observe that the rank of Namibia has gone to a maximum of 140 (in MMR). This is also a reason for skewed portrayal of gender inequality in Namibia.

3.1.4.4. Conclusions. We conclude the following for the reasons for the huge difference in rank of Namibia in GII and GGGI

- GII contains the MMR and AFR as direct indicators in which Namibia's performance is very poor whereas those indicators are not present in GGGI, hence a very low performance in these factors resulted in a poor rank in GII and but a good rank in GGGI.
- The GGGI also has some indices in which Namibia's performance is average, like in LFPR (rank 55) and literacy rate (rank 61) but these being as subindices their effect is weighed down. These factors have been overshadowed by the other factors (with higher weightage) in which the country performed well.

3.1.5. Inferences of In-depth analysis

From the in-depth analysis, we found that a country needs significant improvement in gender equality if it performs poorly in all the indicators of any index. Similarly, if it performs well in all indicators, we can say the inequality is low (it may still have inequality in some areas but the equality in some other areas covers up this, like in Rwanda). However, no conclusion can be made on intermediate cases (when some of the indicators improve) as was evident throughout the analysis. Group-based division in GDI is not appropriate if one tries to compare different countries solely based on that. It is just an indicator of how much more women are developed than men in a country. The performance of a country in GGGI seems to be highly susceptible (than other indices) to abrupt changes in one sub-index (overshadowing gender gaps in other areas), like the Political Empowerment sub-index of Ethiopia. Hence, it is better to avoid analyzing the GGGI of a country solely based on its rank in the same. One of the major reasons for different depictions of gender inequality by the indices is the unequal weightage of a particular indicator in different indices. Better/poor performance in a high-weightage indicator improves/deteriorates the overall index value, hence improves/worsens the rank. In every analysis, it was observed that to get a

correct understanding of the inequality of a country, looking at each sub-index individually is the optimal way. The anomalies observed in the ranks of a particular country were primarily due to different component indicators in each index analyzed. There was no contradiction when we observed the individual indicators as such.

3.2. Trend analysis

Trend analysis of the ranks of all three indices for each selected country is given below. Values for a particular year represent the % change in rank of the year with respect to the base year (2010). The values plotted (see Appendix) are scaled down by 100 from the actual value.

3.2.0.1. Western Europe. : *Portugal, Cyprus, Luxembourg* Graph
In GDI, Portugal saw a continuous decline but showed some improvement after 2017, still in a worse position than in 2010. Luxembourg performed the worst in this region. Cyprus performed extremely well till 2016 but declined significantly thereafter. In GGGI, Portugal saw multiple big jumps and drops, eventually coming close to the initial position. Cyprus almost maintained its rank. Luxembourg's rank deteriorated severely after 2012. In GII, Portugal and Luxembourg showed a similar trend of improving their rank. Cyprus, initially declined, improved in the middle, and again dropped at the end of the decade.

3.2.0.2. Sub-Saharan. : *Lesotho, Ethiopia, Ghana* Graph
In GDI, Lesotho declined for the first half of the decade but improved thereafter and at the end of the decade, it was placed in a better position. Ethiopia and Ghana almost maintained their position in the world rankings. In GGGI, Lesotho showed a continuous and huge downfall. Ethiopia performed better in the latter half of the decade. Ghana also showed a big downfall but at a less rate than Lesotho. In GII, all the countries almost maintained their ranks.

3.2.0.3. Latin America and Carribean. : *Nicaragua, Costa Rica, Paraguay* Graph
In GDI, all the countries showed an overall improvement, but Nicaragua stands out with significant improvement. Costa Rica has been a little inconsistent over the decade. Paraguay, slowly but consistently, improved. In GGGI, Nicaragua improved consistently, and Costa Rica declined consistently at an even faster rate. Paraguay also declined but, at less rate, than Costa Rica. In GII, Nicaragua performed well initially but could not maintain the progress but saw overall improvement. Costa Rica has been inconsistent but maintained its rank. Paraguay improved initially but showed a declining trend in the second half.

3.2.0.4. Eastern Asia. : *Thailand, Republic of Korea, Singapore* Graph
In GDI, Thailand improved in the first half but declined significantly in the second. ROK and Singapore fell and improved consistently, respectively. In GGGI, Thailand and Singapore were inconsistent but the former declined and the latter improved over the decade. ROK declined until 2017, after which it improved slightly. In GII, Thailand showed a declining trend but improved in the second half. ROK was very inconsistent

but showed an overall decline. Singapore declined consistently and significantly.

3.2.0.5. Middle East and North Africa. : *Turkey, Syria, Qatar* Graph
In GDI, all the countries showed a declining trend differing only in the rate of decline. Qatar stands out with around 40%, Syria 12%, and Turkey 3%, a decline from 2010. In GGGI, Turkey improved consistently. Qatar until 2016 improved but saw an overall decline. Syria exceptionally showed a declining trend. In GII, except Syria, other countries showed improvement. Turkey saw around 20% improvement but Qatar, which maintained its rank till 2016 showed a big jump in 2017 with a 60% improvement.

3.2.0.6. North America. : *USA, Canada* Graph
In GDI, the USA showed a declining trend and Canada showed an improving trend till 2018 and declined in 2019. In GGGI, the USA showed a declining trend, but Canada performed well initially, but declined during 2015-2016, and showed some improvement after that. In GII, both countries were inconsistent but over the decade the USA maintained its rank and Canada improved its rank.

3.2.0.7. South Asia. : *India, Bangladesh, Singapore*Graph
In GDI, India showed almost no change in rankings. Bangladesh improved significantly and showed an improving trend mostly. Sri Lanka improved till 2015, after which it declined slightly but bettered its position in 2019 from 2010. In GGGI, India improved slightly. Bangladesh showed significant improvement, consistently. Sri Lanka drastically declined, from 14 in 2010 to 93 in 2019. In GII, India after the initial decline improved slightly. Bangladesh showed some small changes but maintained its rank. Sri Lanka showed a consistent decline.

3.2.0.8. Central Asia and Eastern Europe. : *Latvia, Azerbaijan, Albania* Graph
In GDI, Latvia improved positively in the first half but declined soon after, staying 3 ranks below its 2010 rank in 2019. Azerbaijan showed a continuous decline. Albania was highly inconsistent but declined over the years. In GGGI, all the countries improved their ranks. Albania showed significant improvement over the others. Latvia was inconsistent but improved significantly. Azerbaijan showed small improvement over the years. In GII, Latvia improved initially, but dropped in the middle of the decade, eventually improving at the end of the decade. Azerbaijan consistently declined. Albania was slightly inconsistent but improved over the years.

3.2.1. Inferences from Trend analyses

In 4 out of 7 regions (excluding North America), the country with least sex ratio showed a peculiar trend in any one of the indices. Luxembourg (GGGI) in Western Europe, Singapore (GII) in Eastern Asia, Qatar (GII) in the Middle East and North Africa, and Sri Lanka (GGGI and GII) in South Asia. In 3 regions, the country with the highest sex ratio showed sudden jumps and drops in any one of the indices. Lesotho (GDI, GGGI), Nicaragua (GDI, GGGI), Thailand (GDI). In 6 out of 7 regions, at least one country witnessed a big jump/drop in ranks (total 7 countries and 9 jumps/drops). 6 of 7 countries were either of high or low sex ratio. 5 out of 9 jumps/drops were in GGGI, out of which 4 were drops.

4. Conclusions and Discussions

Since the overall health of African countries is poor compared to the other regions, having high MMR and ABR is resulting in higher ranks in GII. With no influence on GGGI due to these pitfalls, they have a good rank in GGGI. Since GGGI has many of the indicators calculated in GII and GDI as one of the many indicators, with different weightage, better performance in the indicator with the highest weightage, is depicting a false image of the exact situation of a country. It is necessary to consider each indicator score along with the particular sub-index score. As for each country, contradiction (of some form) of indices helped in unearthing crucial problems. It is wise to consider and analyze all three indices to understand the situation of gender equality in a country and eventually make well-targeted policies to bridge the gap. Countries with higher gender imbalance experienced a considerable number of drops in ranks in most of the indices. Hence, the sex ratio is playing a role in the trend shown by countries in the indices (directly or indirectly). Every region has at least one country which improved/declined significantly in a particular index in a brief period which means the country's progress toward gender equality is not influenced by its region. Most of the sudden jumps/drops in ranks were shown by GGGI, hence (also from an in-depth analysis of sub-Saharan countries) it can be concluded, it is more susceptible to the actual condition of gender equality in a country. The trend analysis indicates that the region in which the country is located, in obvious contradiction of indices, appears to be insignificant because we identified inconsistencies (of some kind) in every region. However, we cannot completely rule out the possibility that some regions always lag behind others in terms of gender disparity or overall human development. An approach to strongly argue the likelihood of contradictions specific to a region is through analysis of a bigger set of countries.

5. Data Availability Statement

The data (of GDI, GII) that support the findings of this study are openly available in UNDP databases here. The data of GGGI are openly available in the reports of World Economic Forum at WEF reports.

6. Acknowledgments

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7. Declarations and Statements

We certify that there is no conflict of interest with any financial organization regarding the material discussed in the manuscript and not sent to publication in any other journals.

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Appendix A. Region-wise Trend Analyses of GDI, GII, GGGI

The y-axis is % change in ranks of corresponding index of a particular country.

A.1. Western Europe

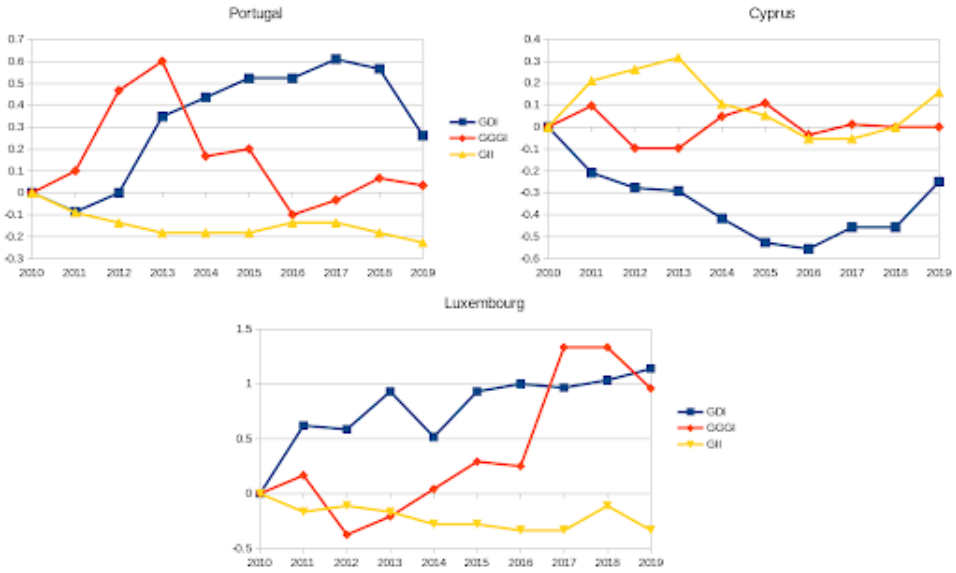

Figure A1. Western Europe: Portugal, Cyprus, Luxembourg. Go to Analysis

A.2. Sub-Saharan

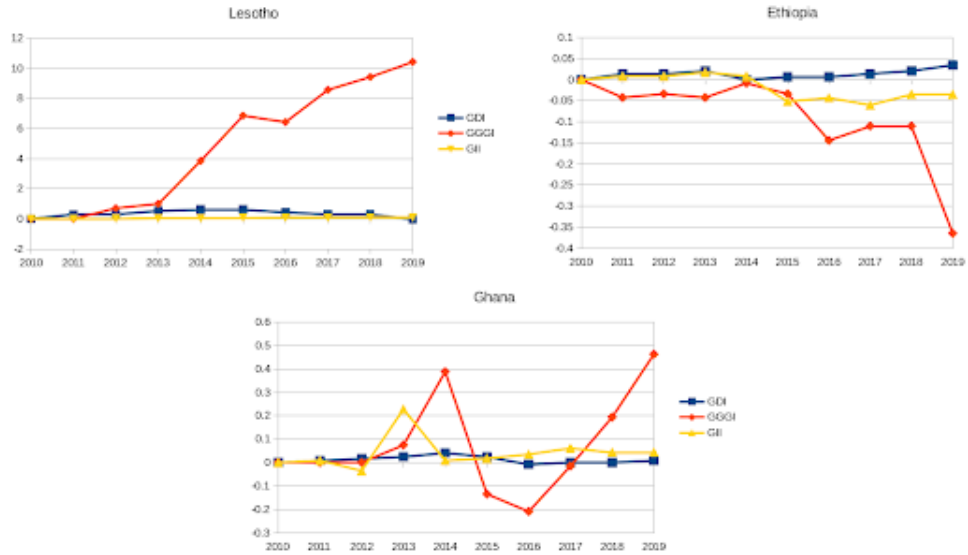

Figure A2. Sub-Saharan: Lesotho, Ethiopia, Ghana. Go to Analysis

A.3. Latin America and Carribean

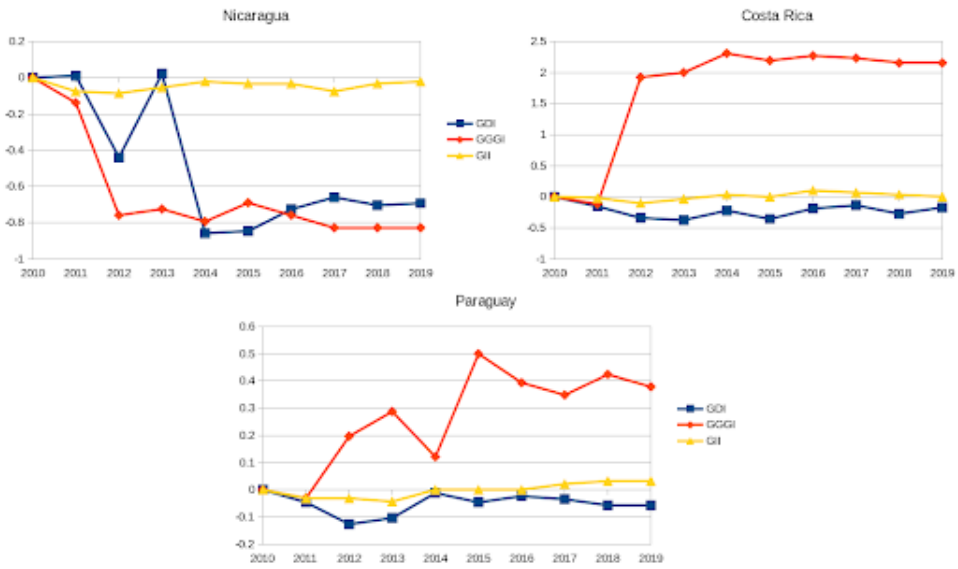

Figure A3. Latin America and Carribean: Nicaragua, Costa Rica, Paraguay. Go to Analysis

A.4. Eastern Asia

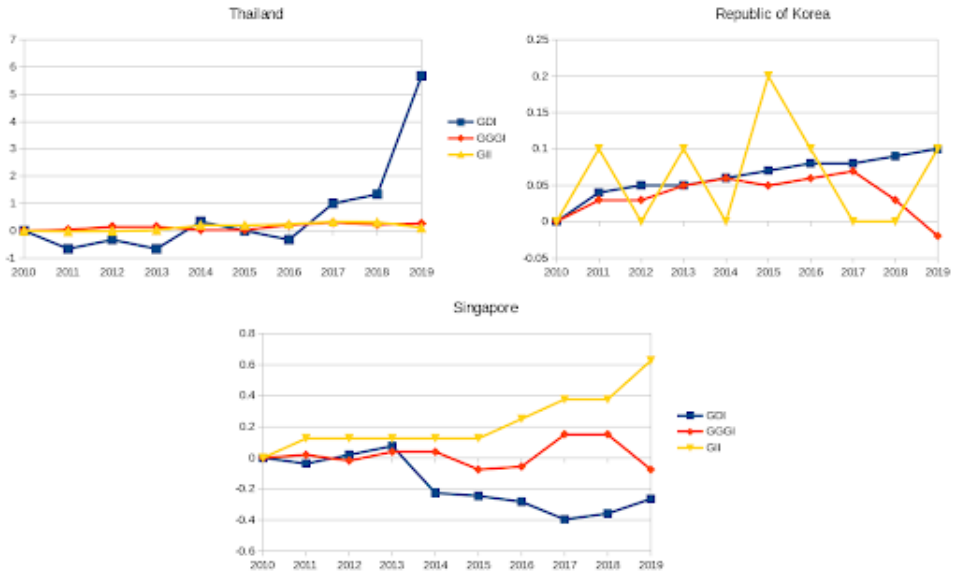

Figure A4. Eastern Asia: Thailand, Republic of Korea, Singapore. Go to Analysis

A.5. Middle East and North Africa

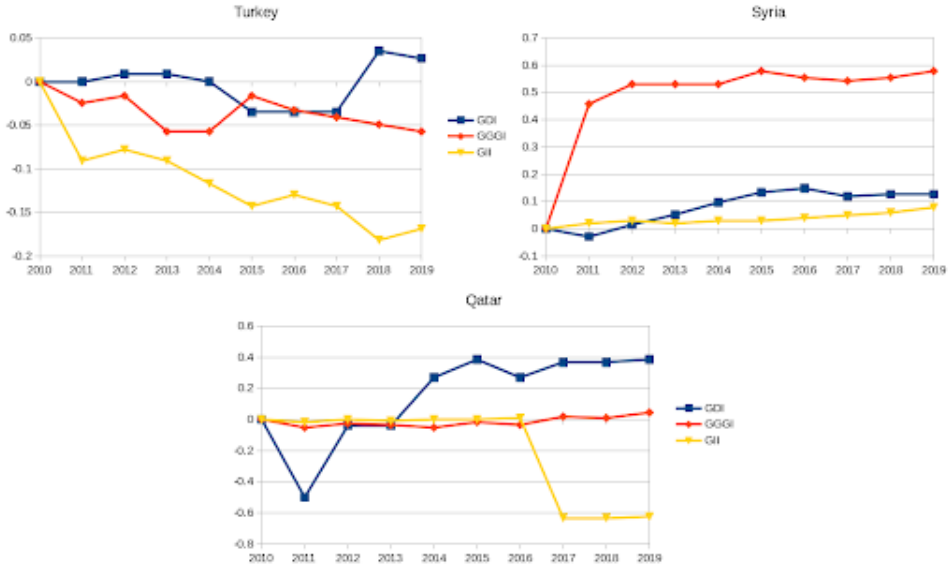

Figure A5. Middle East and North Africa: Turkey, Syria, Qatar. Go to Analysis

A.6. North America

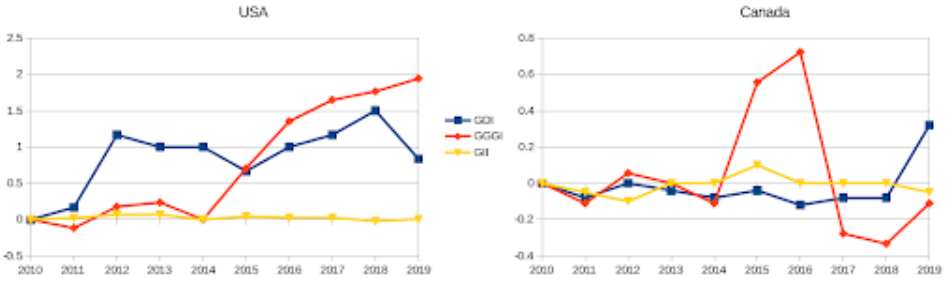

Figure A6. North America: USA, Canada. Go to Analysis

A.7. South Asia

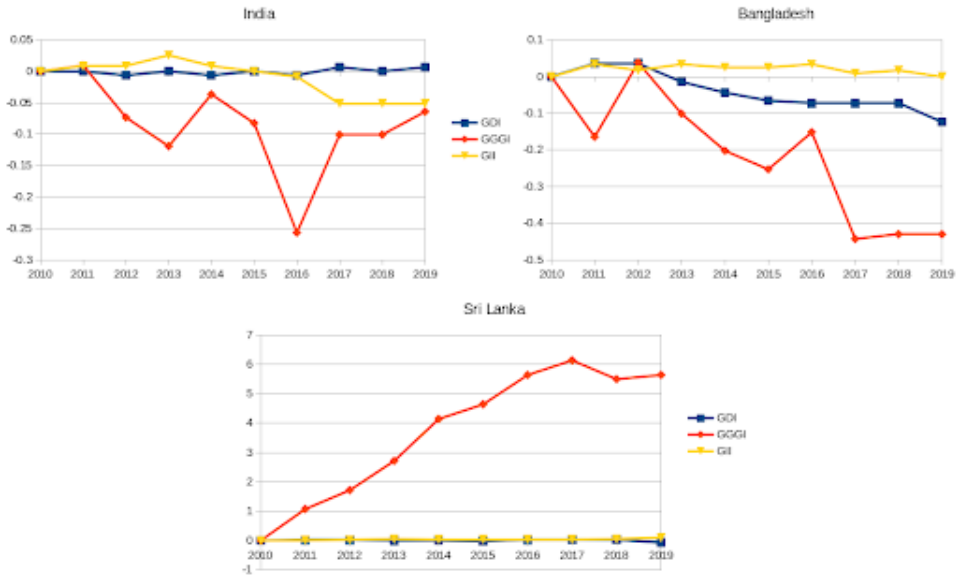

Figure A7. South Asia: India, Bangladesh, Sri Lanka. Go to Analysis

A.8. Central Asia and Eastern Europe

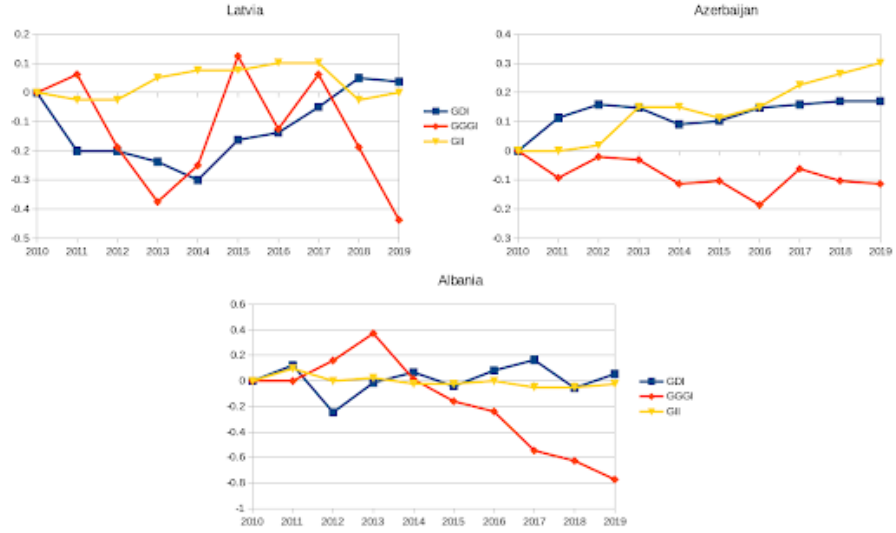

Figure A8. Central Asia and Eastern Europe: Latvia, Azerbaijan, Albania. Go to Analysis