Does gender inequality affect economic development? An evidence based on
analysis of cross-national panel data of 158 countries

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Abstract:

The gender-inequality is a critical economic challenge which has a significant negative impact on the global economic prospects. In this context, this study aims to investigate the association between gender-inequality and growth-outcomes in the form of gross domestic product (GDP hereafter) per-capita across 158 countries in the world during 2000-15. Our findings suggest that GII has a significant inverse correlation with GDP per-capita ($r=-0.7886$); While gender development index (GDI hereafter) shows a positive correlation with GDP per-capita ($r=0.574$). Results from the multivariate log-linear model show that country with high level of gender inequality index (GII hereafter) is having significantly lower levels of GDP per-capita even after controlling for other covariates. This study evidentially suggests that the economic policy of the countries should prioritize autonomy, agency and empowerment of women to improve their participation in the national economy. Unless countries reduce gender inequalities, achieving full economic potential is not possible.

Key Words: Gender inequality, Gender development, Economic growth, World countries

Introduction

Gender is a multidimensional social construct, with specific roles attributed to men and women in society. In different societies in the world, there are different sets of rules, customs, norms, and practices by which differences between males and females are translated into socially constructed differences between women and men. These gender-based roles and views are often also purported by various religious and cultural postulates. Gender norms in many societies and fundamentalist views across the spectrum of religions threaten or deny women's rights to mobility and employment ([Bradshaw, Castellino & Diop, 2013](#)). Historically classical economic and development theories and concepts have also always placed women in an inferior role and one that is majorly confined within the unpaid domestic sector ([Durkheim, 1884](#); [De](#)

Beauvoir & Parshley, 1962; Wollstonecraft, 1978). Even the classical human capital theory considered women as inferior to men in the labor market. Becker (1985), said that women tend to withdraw from labor market owing to their domestic and reproductive roles and therefore, the incentive to invest in women's education and training that leads to better earning and job skills are much lower.

Moreover, the ascension of capitalism and globalization of markets have further exacerbated the side-lining of women from the growth process. Gender-based stereotypes lead to inequalities in access to fundamental human rights including nutrition, education, employment, health care, autonomy and freedom (Jacobs, 1996; Kenworthy & Malami, 1999; Okojie, 1994; Osmani & Sen, 2003; Tzannatos, 1999; Fikree & Pasha, 2004). Increase in female morbidity and mortality through feticide, infanticide, genital mutilation, physical as well as sexual violence, contribute to millions of missing women around the globe (Sen, 1990).

Gender inequality is thus, a critical social and economic challenge where women who account for half of the world's working age population fail to achieve their full economic potential. Women have been reduced to "passive receivers" than agents of change in the development process of the countries. It is mainly due to gender-based stereotypes that hinder them from both contributing and receiving the returns of economic growth and development. Notwithstanding the role of gender empowerment in economic growth, gender equality is a development goal in its own right. Therefore, achieving gender equality and empowerment of all girls and women is one of the most important goals (Goal 5) of the Sustainable Development goals to enhance overall welfare and development.

The debate regarding development and the role of women in the process is not new in its conception. The discussion regarding different mechanisms to bring gender equality in countries at various levels (domestic as well as global platforms) and consequent conceptualization of Gender and Development (GAD), Gender in Development (GID) &

Women in Development (WID) approaches have garnered a lot of attention at the global level. Despite this, there has been no unanimous consensus on the issue with some viewing the persistent gender inequality as an indicator or a consequence of the development process itself, whereas others view it as a barrier to achieving human capabilities and well-being. The following section discusses as to how other contemporary works have viewed the relationship between gender inequalities and development.

Existing Literature

Ever since their conception, the composite measures of gender inequality have been used in numerous multi-disciplinary studies to assess both the quantitative impact of gender inequality on economic growth and assistance in acute political assessment and action for addressing gender inequality globally. The study by [Hakura et al. in 2016](#) found that growth is negatively associated with a multidimensional index of gender inequality in low-income countries and gender-related legal restrictions for all countries. The study by [Löfström \(2009\)](#) suggested that the skewed distribution of power between women and men (lower participation by women) is not encouraging long-term gender equality which in turn also affects sustainable development. The study by [Mitra, Bang, & Biswas \(2015\)](#) reported that greater presence of women in legislative bodies might alter the composition of public expenditure in favor of health and education, which can raise potential growth over the medium to long-run period. The gender-based difference in individuals' social and political involvement (participation) also affects the nation's growth ([Stotsky, 2006](#)). The study by [Dollar et al. \(2001\)](#) shown that women tend to be less corrupt than men, there is a considerable risk that institutions will function less effectively and investments will fewer as long as women are absent from the political administration arena. Many more studies which range from cross-country evaluations to comparative region-based analyses have confirmed a negative relation between gender inequality indicators and economic development ([Alesina & Rodrik, 1994](#); [Larraín & Vergarra,](#)

1998; Persson & Tabellini, 1994; Goodwin, Hall & Raymond, 2017; Ramanayake & Ghosh, 2017).

However, the direction of the relationship between the gender inequality and economic growth is debatable and unsettled. For instance, Blecker & Senguino (2002) found that GDP growth is positively related to gender wage inequality in contrast to other works which suggests that income inequality slows growth. Furthermore, Seguino (1997) found that gender–wage inequality (gender-based wage difference) positively affects the output and export growth of South Korea. Zahidi (2013) also believes that gender inequality fuels growth in the short term. This paper is a renewed attempt to investigate whether gender gap affects growth per-capita and also the effect of other socio-economic variables.

World's Bank report “Gender Mainstreaming Strategy” launched in 2001 has been one of the most influential works in establishing a global consensus on the importance of women in economic development (Moser & Moser, 2005). This research confirmed the hypothesis that societies that discriminate by gender tend to experience less rapid economic growth and poverty reduction than more egalitarian societies and that social gender disparities are a major contributor towards producing economically inefficient outcomes. For example, it is shown that if the gender gap in schooling in the African countries between 1960 and 1992 had been at par with their East Asian counterparts, this would have been produced close to a doubling of per-capita income growth in the region (Carlsson, Ehrenpreis & Hughes, 2005). Keeping girls in school for a longer period of time is often associated with greater economic development because girls with a secondary education wait longer to marry, have a higher probability of joining the labor force, have fewer and healthier children, and have higher incomes (Population Bulletin, 2005). More recent studies assert that the global GDP could increase by up to \$12 trillion in 2025 by bringing gender parity across the countries (Woetzel, 2015). The gender gap in economic participation has been shown to result in larger GDP losses across countries of all

income levels ([Elborgh-Woytek et al. 2013](#); [Gonzales et al. 2015](#)), and a higher number of females in the labor force have been associated with a positive impact on the economy ([Cuberes & Teignier, 2015](#)).

Since the direction of the relationship between gender inequality and economic development remains debatable, this work presents a fresh evidence on the issue and investigates the association between gender inequality and growth outcomes in the form of GDP per-capita across 158 countries in the world during 2000-2015.

Data and Methods:

This study used multiple data sources for the panel years 2000, 2005, 2010 and 2015. Panel data for 158 countries is compiled from United Nations Development Programme (UNDP) on GII, demographic, socio-economic and healthcare status: total fertility rate (TFR), life expectancy at birth (LEB), sanitation, the total population of the country, and percentage of the urban. Information on GII values vary from 0 to 1; higher values indicate more gender inequality in the country. GDP per-capita, Agriculture share in GDP (%), Gross fixed capital formation (%), FDI net inflows of GDP (%), Remittances inflows of GDP (%), Net migration rate (%), employment to population ratio of 15 and above is also used for the purpose of analysis. All the data used in this study are openly available in the public domain. Details of the data sources are mentioned in [Appendix Table 1](#).

Composite measures of Gender Inequality

Realizing the importance of gender equality in achieving overall development, a global consensus was reached to promote gender equality and empowerment of women. To achieve the goal, researchers realized the need for efficient gender indicators for two main reasons. First, appropriate indicators were needed to compare the relative situation of women in developing countries. Second, the indicators would greatly assist in studying the relationship

between gender inequality and economic growth ([Jütting, Morrisson, Johnson & Drechsler, 2006](#)). In the following section, we discuss some of the widely used composite indicators for measuring gender equality.

The United Nations Development Program (UNDP) initiated a Human Development Report (HDR) in year 1995. “The Report analyses the progress made in reducing gender disparities in the past few decades, highlighting the wide and persistent gap between women's expanding capabilities and limited opportunities” (UNDP, 1995). In that report, two new measures the Gender Empowerment Measure (GEM) and Gender Development Index (GDI) has been introduced for ranking countries at world level by their performance in gender equality. The impact of these two measures which effectively captured gender discrimination and could be used for further research has been enormous both in academic and non-academic circles, and they have been widely utilised for the purpose of assessing disparities between women and men all over the world ([Schüler, 2006](#)). Moreover, these indices were particularly useful and provided the much-needed thrust to raise awareness on gender-related issues in the context of human development and not merely economic development.

In an attempt to overcome some of the problems identified by different researchers during the past fifteen years, the 2010 HDR presented a new measure: The Gender Inequality Index (GII). GII is a composite measure, including three dimensions, reproductive health, empowerment, and labor participation of women. These dimensions are derived from five major indicators, including percentage of higher (secondary level and above) education attainment by women, parliamentary representation of women, labor force participation by women, maternal mortality rate, and adolescent fertility rate. Overall, the GII is designed to reveal the extent to which national achievements in these aspects of human development are eroded by gender inequality (see [Technical Notes, UNDP, 2016](#)). The further development of quantifying gender inequality had two broad advantages. Firstly, the GII serves as a more efficient and robust

substitute over GDI and GEM which, despite their significance, have been criticized on many fronts. On the other hand, it further contributes to the debate on gender inequality measurement by conceptualising and incorporating novel measures and dimensions at the global level.

This paper measures gender inequalities in three important aspects of human development—reproductive health, empowerment, and economic status by taking proxy indicators for which data is readily available even for most of the developing countries. Reproductive health is measured by maternal mortality ratio and adolescent birth rates, while empowerment is measured by the proportion of parliamentary seats occupied by females and proportion of adult females and males aged 25 years and older with at least some secondary education. Economic status is expressed as labor market participation and measured by the labor force participation rate of female and male populations aged 15 years and older (see [Technical Notes, UNDP, 2016](#)).

In the analyses, initially, we have assessed the correlation between GDP per-capita and the GII. The ‘Hausman specification test’ has been applied to specify the random effects or fixed effects for panel data regression analyses. The Hausman test sets the null hypothesis that the preferred model for the given data is a random effect model whereas the alternative hypothesis states that the preferred model is a fixed effect model. The specification test is devised by [Hausman \(1978\)](#) and the equation is:

$$H = (\hat{\beta}_{RE} - \hat{\beta}_{FE})' (V(\hat{\beta}_{RE}) - V(\hat{\beta}_{FE})) (\hat{\beta}_{RE} - \hat{\beta}_{FE})$$

For our study, the results of the Hausman test (Chi-square=189.064) assert that we may reject the null hypothesis set by the test and thus a fixed effect model has been used. Three separate models were estimated to analyze the association of GDP per-capita with GII across the countries. We have controlled for relevant demographic, socio-economic and health care predictors to estimate the net effect of GII on GDP per-capita.

While using the fixed effects model, we assume that something within the individual may impact outcome variables or bias the predictors and we need to control this. The fixed effects remove the effect of those time-invariant characteristics so we can assess the net effect of the predictors on the outcome variable. The equation for the fixed effects model (Torres-Reyna, 2007) is:

$$Y_{it} = \beta_1 X_{it} + \alpha_i + u_{it}$$

Where: α_i ($i=1, \dots, n$) is the unknown intercept for each entity (n entity-specific intercepts); Y_{it} is the dependent variable where i = entity and t = time; X_{it} represents one independent variable, β_1 is the coefficient, u_{it} is the error term.

Results:

The data was compiled for the 158 countries, that included low income, low-middle, upper middle, and high-income countries for the year 2000, 2005, 2010, and 2015 (Table 1). The mean value of GII for 158 countries was 0.361 (S.D. =0.189) in 2015 but ranges from 0.040 in Switzerland to 0.767 in the Yemen Republic. Whereas the mean value for 119 countries in the year 2000 was 0.447 (S.D. =0.196). At the global level, the gender indicator (mean value of GII) has been improved from the year 2000 to 2015. The GDP of the countries has also increased within the observed time period. The mean value of GDP per-capita was 7.710 (S.D. =1.606) in 2000, and it reached 8.620 (S.D. =1.444) in 2015. It ranges from a minimum value of 5.620 and a maximum value of 11.527. Figure 1 shows that there was a significant inverse correlation between GII and GDP per-capita ($r=-0.7886$).

We observe from Table 1 that the GDI value for the year 2015 ranges from 0.609 in Afghanistan to 1.032 in Lithuania and Estonia, while the mean value of GDI for 158 countries was 0.935 (S.D.=0.071). Figure 2 indicates a significant positive correlation between GDI and GDP per-capita ($r=0.574$). The results imply that at the world level, those countries who are

having better GDI have higher GDP. The improvements in the Gender Development Index (GDI) will thus, increase and boost the world economy.

To understand the association of Gender Inequality Index (GII) and other covariates with the Gross Domestic Products (GDP) per-capita, multivariate analysis has been used. Before multivariate analysis, we have tested for multicollinearity from simple bivariate correlation analyses of the Gender Inequality Index and other covariates with the GDP per-capita for all countries. Results from the multivariate log-linear model in Table 2 shows that the GII had a significant negative correlation with log GDP per-capita.

In Model 1 GII is taken as the only controlling variable, and it is observed that GII had a significant negative association with log GDP per-capita ($\beta = -4.243$, $p < .001$). In Model 2, even after controlling for the background variables that have been known to have a significant effect on GDP, the relationship of GII with GDP per-capita is still significantly negative ($\beta = -4.00$, $p < .01$). Apart from GII, LEB (0.025, $p < .001$), Sanitation (0.019, $p < .001$) and TFR (0.018, $p < .001$) have a significantly positive association to the log of GDP per-capita. It shows that if LEB and sanitation will increase, the GDP per-capita would increase.

In Model 3, Even after controlling for other economic variables known to predict GDP, along with LEB, sanitation and TFR, the association of GII with GDP per-capita is still negative (-0.083 , $p < .05$) and statistically significant. While the agriculture shares in GDP ($\beta = -0.036$, $p < .001$), Log of population ($\beta = -0.723$, $p < .001$) and remittances ($\beta = -0.006$, $p < .05$) are showing negative association, but variables such as employment to population (ratio of 15 years and older) and Gross fixed capital formation (%) show a significantly positive association with GDP per-capita.

Discussion

This study by using robust empirical analysis supports the hypothesis that there is a significant negative association between the gender inequality index and GDP per-capita income after adjusting for the effect of other major factors particularly related to economic and human capital growth. The finding of this study also shows that socio-demographic variables like Life Expectancy at Birth (LEB), sanitation, TFR, urbanization and population positively affect GDP per-capita income. With respect to economic variables, certain variables under study such as Agriculture share in GDP and Remittances inflows GDP show a negative association whereas variables such as Gross fixed capital formation and Employment to population (Ratio of 15ys and older) show a positive association with GDP per-capita income. Our results affirm that as an economy transforms from a subsistence to a more modern one (less dependency on agriculture and remittances) and the government is successful in providing a healthier, cleaner and safe environment to all; its effects are clearly visible on the overall economic achievement of the country.

The principal pathways through which gender discrimination affect growth are by influencing the productivity of labor and an inefficient allocation of resources where gender priorities are side-lined ([World Bank, 2001](#)). Notably, the current evidence suggest that although women are working for more number of hours per day than men in both paid and unpaid job, the economic cost of their services is much less. For instance, according to [ILO \(2016\)](#), women are doing at least two and a half times more unpaid domestic and care work than men, but worldwide, the chances for women to participate in the labor market remain almost 27% points lower than those for men. It implies that the majority of the services provided by women are still concentrated in the domestic sphere that is also unpaid. According to United Nations reports if the economic value of the unpaid care is included in the national account, it will represent 15% to over 50% of GDP in an economy ([UN Women Viet Nam, 2016](#)).

It is now widely agreed that significant economic, social and political progress can be achieved if countries invest appropriately in their women through access to education, greater decision-making power and more extended access to resources of all types (Klasen, 2002; Klasen & Lamanna, 2009; Boserup, Tan, Toulmin & Kanji, 2007). The study by Kabeer & Natali (2013) also reveals similar results that the gender equality (in education and employment) leads to the economic growth and is far more reliable and robust than the relationship that economic growth contributes to gender equality regarding health, well-being, and rights. The studies evidentially suggest that the economic policy of the countries should focus beyond the financial interventions and must prioritize holistic empowerment of women.

However, despite the involvement of national governments and numerous private and public stakeholders, gender inequality, especially in middle-income and lower-income countries, is still pervasive (World Bank, 2001; Balamoune, Lutz & McGillivray, 2009; Jayachandran, 2015; Dormekpor, 2015). For example, Sub-Saharan Africa remains one of the regions with the highest gender inequality, just behind the Middle East and North Africa (Blackden, Canagarajah, Klasen & Lawson, 2007). According to the recent Global Gender Gap Report 2016 of the World Economic Forum (Leopold, Ratcheva, & Zahidi, 2016), the gender gap is tremendously larger than any other previous point of time. On the average, women around the world earn half of what men earn but work longer hours. The labor force participation of women is 54%, and that for men is 84%. The gap is not only limited to wages, it extends to any other aspects such as employment, education, and political and legal representation. Critics suggest that the earlier approaches were instrumentalist in nature where the major argument of engendering development has been an efficiency argument, with concerns of equity being somewhat secondary. They argue that these mechanisms while bringing economic growth gains, will not fundamentally change the position and situation of women. Thus, it becomes imperative to bring new dimensions and solutions to the gender inequality-economic

development debate that encompasses a nexus of social, cultural, demographic and economic issues regarding women empowerment and reduction of gender inequality.

Conclusion

The present study provides significant empirical evidence that gender inequality is a major barrier to the economic development of a country. A synthesis of evidence of this study in the context of existing literature on the subject advances some suggestions for policy. There is a need for developing new mechanisms and strengthening the existing intervention and monitoring tools which tackle the problem of gender inequality from its roots. Several studies which have analysed the pathways through which more egalitarian societies can be established have suggested numerous effective interventions such as greater investment in the human capital, health and education, of women and girls, tackling issues in access to quality health and education services, ensuring equal allocation of household resources, eliminating early and forced marriages, global efforts to respect and defend women's sexual and reproductive health rights, elimination of sexual, emotional and physical violence against women and strengthening women's access to both formal and informal institutions ([King & Mason, 2001](#); [World Bank, 2011](#); [Leach, Mehta & Prabhakran, 2014](#); [Women UN, 2018](#)). Lastly, contemporary conflicts between males and females regarding their changing economic as well as domestic roles have indicated the need for men to engage and focus on gender equality in order to bring transformative progress towards any national GDP.

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Tables

Table 1: Descriptive statistics of the variable of 158 Countries

Year	Observation			Mean			Std. Dev.			Range					
										Min			Max		
	GII	Log GDP Per capita	GDI	GII	Log GDP Per capita	GDI	GII	Log GDP Per capita	GDI	GII	Log GDP Per capita	GDI	GII	Log GDP Per capita	GDI
2000	119	155	140	0.447	7.710	0.905	0.196	1.606	0.103	0.062	4.821	0.282	0.818	10.799	1.036
2005	143	158	148	0.420	8.117	0.914	0.191	1.618	0.089	0.053	4.947	0.481	0.791	11.283	1.041
2010	149	158	153	0.385	8.547	0.927	0.189	1.504	0.078	0.051	5.367	0.580	0.779	11.545	1.042
2015	158	158	157	0.361	8.620	0.935	0.189	1.444	0.071	0.040	5.620	0.609	0.767	11.527	1.032

Table 2: Association of GDP per-capita with GII and other variables, estimated from fixed effect panel regression model for year 2000, 2005, 2010 and 2015.

<i>Log GDP per-capita</i>	Model 1		Model 2		Model 3	
	<i>Coefficient</i>	<i>Std. Error</i>	<i>Coefficient</i>	<i>Std. Error</i>	<i>Coefficient</i>	<i>Std. Error</i>
constant	10.006***	0.208	11.061***	2.230	12.306***	2.624
Gender Inequality Index	-4.243***	0.514	-0.400*	0.210	-0.083*	0.222
Life expectancy at birth	-	-	0.025***	0.010	0.010	0.011
Sanitation (%)	-	-	0.019***	0.010	0.016***	0.006
TFR	-	-	0.018***	0.090	0.053	0.084
Log Population	-	-	-0.691	0.200	-0.723***	0.253
Agriculture share in GDP (%)	-	-	-	-	-0.036***	0.006
Gross fixed capital formation (%)	-	-	-	-	0.009***	0.003
FDI net inflows of GDP (%)	-	-	-	-	0.000	0.000
Remittances inflows GDP (%)	-	-	-	-	-0.006*	0.003
Net migration rate (%)	-	-	-	-	0.004	0.003
Employment to population (Ratio of 15ys and older) (%)	-	-	-	-	0.015***	0.005
Urbanization (%)	-	-	-	-	0.000	0.008
Median age (years)	-	-	-	-	-0.014	0.017
Year dummy 2005	-	-	0.370***	0.030	0.401***	0.044
Year dummy 2010	-	-	0.754***	0.050	0.818***	0.076
Year dummy 2015	-	-	0.799***	0.070	0.896***	0.105
n	158		158		139	
Sum squared residual	65.286		20.840		11.935	
LSDV R-squared	0.955		0.985		0.989	
Log-likelihood	-189.204		139.365		206.463	
Schwarz criterion	1397.043		776.671		544.334	
rho	0.113		0.070		-0.0568	
S.E. of regression	0.393		0.225		0.191	
Within R-squared	0.329		0.784		0.855	
Akaike criterion	698.408		53.269		-102.925	
Welch F	91.063***		159.431***		91.063***	
Asymptotic test statistic: Chi-square			273.324***		189.064***	

Note: ***p<.001, **p<.01, *p<.05, LL: Lower Limit, UL: Upper Limit

Figures

Figure 1: The association of GDP per-capita and gender inequality index (GII), 2015

Figure 2: The association of GDP per-capita and gender development index (GDI), 2015
Note: GDI: Gender Development Index, GDP: Gross Domestic Product

Figure 3: Correlation matrix of study variables, 2015.

Appendix:

Appendix Table 1: Variable and data Sources

<i>Indicator</i>	<i>Data Source</i>
GDP Per capita (US\$)	The World Bank
Gender Inequality Index	Human Development Reports, United Nations Development Program
Gender Development Index	Human Development Reports, United Nations Development Program
Life Expectancy at Birth (Year)	United Nations Population Division, World Population Prospects
Improved water source (%)	WHO/UNICEF Joint Monitoring Programme (JMP) Water Supply and Sanitation
Improved sanitation facilities (%)	WHO/UNICEF Joint Monitoring Programme (JMP) for Water Supply and Sanitation
TFR	United Nations Population Division, World Population Prospects
Total Population (Number)	United Nations Population Division, World Population Prospects
Agriculture share in GDP (%)	The World Bank
Gross fixed capital formation (%)	Human Development Reports Data, United Nations Development Program.
FDI net inflows of GDP (%)	Human Development Reports Data, United Nations Development Program
Remittances inflows GDP (%)	Human Development Reports Data, United Nations Development Program
Net migration rate (%)	Human Development Reports Data, United Nations Development Program
Employment to population (Ratio of 15ys and older) (%)	Human Development Reports Data, United Nations Development Program
Urban population (%)	United Nations Population Division