Gender Inequality, Economic Performance & Human Development in India: An Application of Bound Test Approach to Co- Integration

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Abstract

This paper attempts to analyze short term and long term effects of gender inequality on economic growth and human development of India using annual time series data for the period of 2000-2017. The study employed Auto-Regressive Distributed Lag (ARDL) model with GDP per Capita and Human Development Index (HDI) as dependent variable and composite Gender Inequality Index, investment and trade openness as independent variables. The empirical results show that the gender inequality has significant and negative impact on economic growth and human well-being of India in the short run as well as long run. Thus gender equality is not merely an issue of social relevance but also an economic necessity.

Keywords: *Economic Performance, Human Development Index, Auto Regressive Distributed Lag, Gender Inequality.*

1. INTRODUCTION

Gender equality refers to the equality of power and opportunities for independence, education and personal development that men and women have equal power and equal opportunities for financial independence, education, and personal development. Gender equality stimulates economic growth, which is crucial for the developing nations like India. Gender equality essentially requires the women's empowerment. It involves the improvement of woman's self-worth, decision-making power and access to opportunities and resources. There exists a considerable degree of gender inequality in education, employment, and health outcomes. Gender inequality has adverse impacts on a number of valuable development goals. Gender equality is not merely an issue of human rights, but an economic necessity. Worldwide, productivity growth and the pace of human development are slowing (ILO, 2017). Blackden et al. (2006) states that the gender inequality will have a direct impact on growth through its impact on development of institutional, physical, human and technological assets.

Gender inequality in employment also produces gaps in human asset development; therefore, has a negative impact on economic growth. The impact of gender inequality on economic growth can work through several channels including demographic factors, education, and access to jobs and productive resources. Gender gaps in education imply that society`s human capital is below its potential. Reducing these gaps and addressing exclusion would thus potentially enhance growth.

Klasen (2016) found that gender equality in education had a significant and positive impact, in a sample of 109 countries with data between 1960 and 1992. The studies have shown that women equality in the level of education, health, economic resources, political representation is positively associated with higher economic growth. The education's impact on growth can be through reduced fertility (and vice versa), as this can impact women labour force participation, and dependency ratios. The World Bank's Role of Education Quality and Economic Growth, finds that for every year of schooling, economic growth is boosted by 0.58 percent. Improved health and nutrition can positively impact the quality of the labour force (as well as reducing fertility). Women's increased bargaining power within the household has been associated with a range of positive development outcomes, which in turn can have a positive impact on growth (Roncolato et al. 2017). The decision-making include control of income and assets, age at marriage and level of education. A woman's

empowerment within the household increases the likelihood of education for the children particularly girls and reduction of underweight children.
Mitra, Bang, and Biswas (2015) report that that greater presence of women in legislative bodies may alter the composition of public expenditure in favor of health and education, which can raise growth over the medium to long run. The gender inequality in labor force participation with exclusion of women from the labor market can reduce the productivity levels of total labor force of an economy especially if the productive female workers are substituted male of relatively lower productivity levels. The occupational discrimination of women in the managerial position and labor market in general results in lower entrepreneurial talent and so has negative impact on the innovation and technological development. Thus, the inclusive growth policies with emphasis on gender equality can promote greater innovative and entrepreneurial activities and thus offers potential gain for economic growth and human well being. IFC report (2013) finds that is makes good business sense to allow gender diversity in the company. It improves team performance, decision making processes and reduce staff turnover. It provides better consumers preferences insights as women influence most buying decisions.

The present study aims to provide empirical evidence to the gendered effects on economic growth and human well-being of the country. Specifically, the paper analyzes the impact of gender inequality on economic growth and human development of India. The paper is organized as follows. Section 2 provides literature survey Section 3 describes the theoretical model and data and methodology; Section 4 presents the empirical results and, finally, Section 5 concludes.

2. LITERATURE SURVEY

The relationship between gender inequality, human development and economic growth has been a topic of increasing interest in the academic and policy literature in recent decades. A number of theoretical and empirical studies have examined the relationship between gender inequality and economic growth. Bloom & Williamson (1998), Dollar & Gatti (1999), Galor & Weil (1996), King, Klasen & Porter (2008), Knowles et al (2002), Lagerlof (2003) and World Bank (2001) have found negative relationship between gender inequality in education and economic growth, largely due to the positive impact of female education on fertility and human capital of the next generation. Gender inequality in education adversely affects economic growth, as it reduces the average quota of human capital in a society by excluding qualified girls and including less qualified boys (Dollar & Gatti 1999). Education inequality affects the average quality of human capital and reduces growth (Klasen 1999). Klasen and Lamanna investigates the effect of gender wage gap on economic growth in a cross country analysis for the time period 1960-2000. The results indicate that gender employment gap is one of the major determinants of growth differentials across countries. Mitra, Bang, and Biswas (2015) study explores the impact of gender equality on economic growth. The study focused on the multidimensional nature of gender equality with the object of identifying the relative predominance of different aspects of equality. Two distinct dimensions: equality of economic opportunities and equality in economic and political outcomes are identified. Unbalanced Panel regression analysis shows improvement in equality on economic opportunity and political participation has positive and significant impact economic growth. However, this impact is contingent on a country's stage of development: while developing economies experience significant improvements in growth from greater equality in opportunity, developed societies see significant improvements resulting from greater equality in political participation. Zahid Pervaiz, etal. 2011 attempt to analyze the impact of gender inequality on economic growth of Pakistan using annual time series data for the period of 1972-2009 has been used. The results reveal that labour force growth, investment and trade openness have statistically significant and positive impact whereas gender inequality has a significant and negative effect on economic growth of Pakistan. Female education contributes to improvements in children's health, reductions in fertility rates and increases in labor force participation rates, and better quality of human capital of future generations. Kingdon (1998) found that due to overall labour market discrimination, girls face poorer economic incentives to invest in schooling than boys, Esteve-Volart (2004) found that the ratio of female-to-male managers and the ratio of female-to-male workers are positively and significantly related to per capita output in 16 major states of India. Arora (2012) reported that, by and large, per capita income is inversely associated with gender inequality in education and health at the sub-national level in India. Rammohan & Vu (2017) found that economic development is an important factor in narrowing gender gaps in education, with richer districts more likely to educate girls than poorer districts. Most of the studies in the Indian context are primarily concerned with explaining gender inequalities in various dimensions prevalent in the society. These are mostly carried out from a sociological perspective. Barro and Lee (2013) find a positive correlation between growth of per capita income and initial level of female school attainment Baliamoune-Lutz and McGillivray (2007) used data for 41 SSA and Arab countries to examine the impact on economic growth of two measures of gender inequality in education: Their results suggested that while overall human capital had a positive impact on growth, gender inequality in literacy

had a statistically significant negative effect which was robust to changes in specification. Galor and Weil (1996) describe that gender gap in education and earnings results in high fertility and low economic growth.

3. THEORETICAL MODEL FOR EMPIRICAL ANALYSIS

Though there are several studies investigating the relationship between gender inequalities and growth/ development in the context of developed economies, there are few studies available in the scholarly literature examining this aspect of gender inequality in India. This study contributes significantly to existing literature by evaluating the trends in the magnitude of gender inequalities in health , empowerment, and labour participation. This paper aims to determine the relationship between gender inequality and inclusive growth in India in order to determine the effects of reduction of women's inequality on inclusive sustainable growth for the sample period 2000-2017. Human well –being is an important indicator of the inclusive growth of any country. The traditional measure of well being is the economic well-being generally measured by GDP per capita (GDPPC) and as alternative measures Human Development Index (HDI) created by the United Nations (UN) Development are taken as dependent variables to proxy the inclusive growth. The Gender inequality is captured by composite **Gender Inequality Index** (GII) for which the estimates are sourced from UN Human Development Report.

The long run and short run relationship between inclusive growth and GII are estimated using the specification given by Klasen and Lamanna as follows:

$$\ln GDPPC_t = \alpha_0 + \alpha_1 \ln GCF_t + \alpha_2 \ln GII_t + \alpha_3 Trade + \varepsilon_t \quad \text{(Model 1)}$$

$$\ln HDI_t = \alpha_0 + \alpha_1 \ln GCF_t + \alpha_2 \ln GII_t + \alpha_3 Trade + \varepsilon_t \quad \text{(Model 2)} \qquad (1)$$

Where GDPPCt is real GDP per capita for the period t. GFCt is gross capital formation for period t; Trade denotes the trade to GDP ratio; GII is the Gender Inequality Index and HDI is the Human development Index of India in Model 2. Growth of gross capital formation at constant price (GCF) is used as a proxy for physical capital, Trade as a measure of openness in the economy is measured by total trade, exports plus imports, as a percentage of GDP. GII is the gender inequality index.

3.1 Definition of Variables and Data Sources

The GII estimates reflect the gender-based disadvantage in three dimensions—reproductive health, empowerment and the labor market (Figure 1) The value ranges from 0 where women and men fare equally to 1, where one gender fares as poorly as possible in all measured dimensions. The GII is 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 (UN HDI, 2017).The measures of reproductive health are Maternal mortality ratio (MMR), and adolescent birth rate (ABR). The share of parliamentary seats held by male and female (PR) measure the empowerment and labor market conditions are measured by population with at least some secondary education (SE) and Labor force Participation rate (LFPR). The MMR estimates are maternal mortality per100, 000 live births, ABR shows the births per 1000 women in the age group of 15-19. PR is the proportion of seats held by men and women in national parliaments. ILO estimates of LFPR for ages of 15-24 years are used. SE shows the gross enrolment ratio at secondary level for males and females.

The Gender Inequality Index (GII) (Figure1) reflects gender-based disadvantage in three dimensions-reproductive health, empowerment, 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 (UNDP- HDI indices,2015).

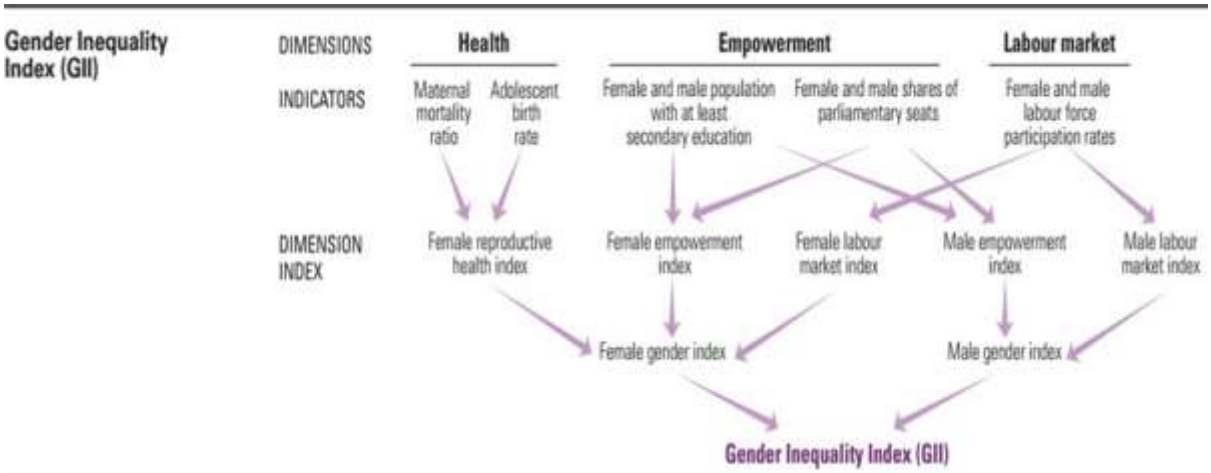


Figure 1: Gender Inequality Index Dimensions & Indicators—Graphical Presentation

Source: UNDP-HDI Indices and Indicators: 2017 Statistical Updates

This paper is based on secondary sources which were accumulated from the data base of World Development Indicators provided by World Bank, from a number of research papers, articles, books, NGO reports, regional organization brief reports, and government reports. The research tool and technique used in this study is secondary data analysis.

3.2 Estimation Procedure

The study estimates the relationship between GII and economic growth and Human Development using the sample period of 2000-2017. The ARDL model is used to estimate the given specification of equations of Model 1 and Model 2 stated earlier. There are several advantages in employing an ARDL model of estimation The first advantage is the variables could be integrated of order zero, one or a combination of both, and the results yield remains valid. In other words, an ARDL model can be used to determine the presence of a long-run relationship among variables despite having a different order of integration of variables, unlike other co integration tests which require that all the variables are of the same order of integration. Second, the ARDL model is suitable for this research as it performs better when estimating small sample sizes compared to other co integration tests (Pesaran, M.H.; Shin, Y,1999). As the first step the unit root test using Augmented Dickey-Fuller (ADF) (1981**)** is conducted to evaluate the stationarity of the time-series data. Since the ARDL model assumes no serial correlation in errors, an appropriate lag level (m) should be chosen according to a model based on information criteria such as AIC (Akaike Information Criterion), SC (Schwarz Information Criterion), HQ (Hannan-Quinn Information Criterion), FPE (Final Prediction Error) and LR (Sequential Modified LR Test Statistic).The bound test for co-integration within ARDL modeling approach to determine the lon-run relationship between the variables is performed. For this purpose the following equations for two models are estimated.

$$\Delta \ln GDPPC_t = \alpha_0 + \sum_{i=1}^{n} b_i \Delta \ln GDPPC_{t-i} \sum_{i=0}^{n} c_i \Delta GCF_{t-i} + \sum_{i=0}^{n} d_i \Delta \ln GII_{t-i} + \sum_{i=0}^{n} e_i \Delta Trade_{t-i} + \lambda_1 \Delta \ln GDPPC_{t-1} + \lambda_2 \Delta GCF_{t-1} + \lambda_3 \Delta \ln GII_{t-1} + \lambda_4 \Delta Trade_{t-1} + \mu_t \quad (2)$$

where Δ is first difference operator and μt is the serially independent random error with zero mean and finite covariance matrix, and the deterministic term, constant, is denoted by α0. In order to examine the long-run relationship (presence of co-integration) between the dependent variable and its determinants, an F-test procedure is followed to estimate the combined significance of the coefficients of the lagged levels of the variables. If the null hypothesis is rejected, it indicates the existence of a long-run relationship or cointegration. Pesaran et al. (2001) provided a set of asymptotic critical values where the critical bounds can be applied irrespective of the order of integration of the regressors. The critical values are composed of two sets: lower bounds I(0) and upper bounds I(1). The first set gives the lower bound, applicable when all regressors are I(0). The second one gives the upper bound, applicable when all regressors are I(1). If the calculated F-statistic exceeds the upper bound, the null hypothesis of no relationship between dependent variable and independent

variables can be rejected. Conversely, if the F-statistic falls below the lower bound, the null hypothesis of no long-run relationship cannot be rejected. However, if the F-statistic falls within the critical bounds, the result of cointegration will be inconclusive.

If the test confirms the existence of long run conitegration, the long-run and short-run coefficients using associated ARDL and error correction models (ECMs) are estimated. The long run relationship amongst variables is estimated using the following equation.

$$\Delta \ln GDPPC_t = \alpha_0 + \sum_{i=1}^{p} \alpha_1 \ln GDPPC_{t-i} + \sum_{i=0}^{q} \alpha_2 \ln GCF_{t-i} + \sum_{i=0}^{r} \alpha_3 \ln GII_{t-i} + \sum_{i=0}^{s} \alpha_4 \ln Trade_{t-i} + \mu_t \quad (3)$$

The above equation is transformed to accommodate the one period lagged error correction term (ECTt–1) and the short term coefficients are estimated.

$$\Delta \ln GDPPC_t = \alpha_0 + \sum_{t=1}^{n-1} \alpha_1 \Delta \ln GDPPC_{t-i} + \sum_{t=0}^{n-1} \alpha_2 \Delta \ln GCF_{t-i} + \sum_{t=0}^{n-1} \alpha_3 \Delta \ln GII_{t-i} + \sum_{t=0}^{n-1} \alpha_4 \Delta \ln Trade_{t-i} + \alpha_5 EC_{t-1} + \mu_t \quad (4)$$

Where are α_1 α_2 α_3 and α_4 are short run dynamic coefficients, while EC is the speed of adjustment coefficient towards achieving long run equilibrium after a short run shock i.e. convergence towards equilibrium position in case of any disequilibrium situation.

The diagnostic test examined serial correlation, normality and heteroscedasticity. The stability of the model is tested using the cumulative residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMSQ) to the residuals of the error-correction model.

4. EMPIRICAL RESULTS

Descriptive statistics give Mean, Median, Maximum, Minimum, Standard Deviation, Skewness, Kurtosis, Jarque-Bera and Probability values of the estimated model. Skewness and Kurtosis help analyze the volatilities of data. Descriptive statistics also help checking the normality of the selected data set. The results of the descriptive statistics are presented in Table-1.

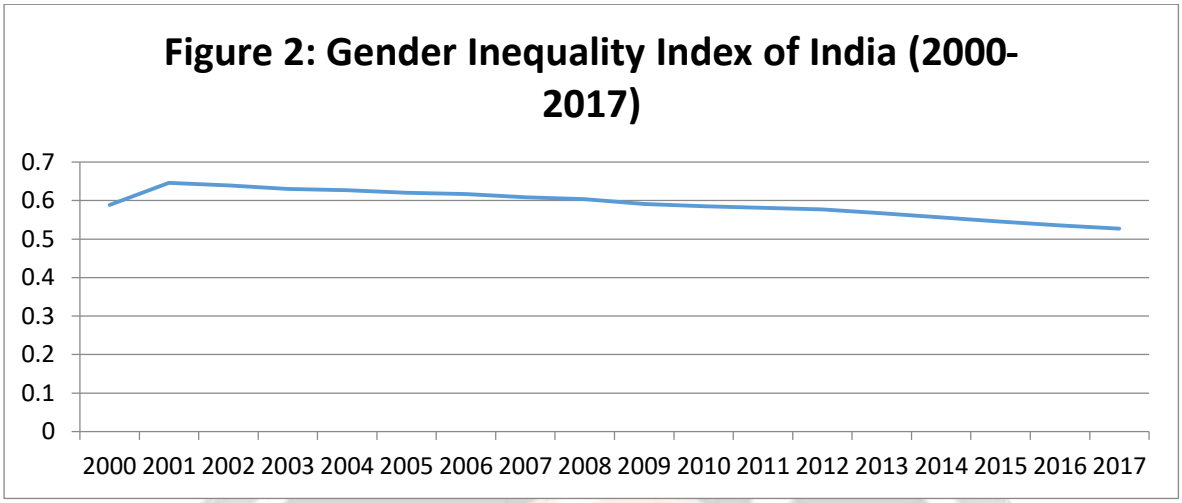
Table 1: Descriptive Statistics for the Variables Used (2000-2017)

	InGDPPC	InGCF	InGII	InTRADE	InHDI
Mean	11.03064	3.204201	-0.52694	3.729108	-0.56711
Median	11.01741	3.224572	-0.52824	3.779754	-0.56565
Maximum	11.49736	3.856275	-0.43699	4.021661	-0.44161
Minimum	10.62012	2.484087	-0.64028	3.257837	-0.69917
Std. Dev.	0.278241	0.376978	0.060758	0.244851	0.082942
Skewness	0.074433	-0.51776	-0.32854	-0.6854	-0.08543
Kurtosis	1.835168	2.635071	2.090675	2.309192	1.80816
Jarque-Bera	1.034246	0.904112	0.94396	1.767227	1.087256
Probability	0.596233	0.636319	0.623766	0.413287	0.580638
Sum	198.5515	57.67562	-9.48499	67.12394	-10.2081
Sum Sq. Dev.	1.316108	2.415909	0.062757	1.019181	0.11695
N	18	18	18	18	18

Source: Author's own Compilation

The estimated Jarque-Bera shows that selected variables have finite covariance and zero mean, this also confirms that selected data is normally distributed. Figure 2 shows the trends of GII of India for the sample

period 2000-2017. The GII estimates are based on three dimensions viz. reproductive health, empowerment and the labor market. There is a consistent improvement of status of gender equality in India. The Government of India, along with various states, initiated a number of policies, programmes and schemes intended to reduce the gender gap and to boost women's empowerment. However, a considerable gender gap still exits. In fact, according to the Global Gender Gap Report (2017) India ranks 108 amongst 144 countries.



Source: *Author's Own Compilation based on UN HDI Reports of different years.*

Table-2 presents the correlation matrix among variables. HDI as a measure of inclusive growth is significantly positively correlated with trade and GDP per capita. There is a negative and significant correlation between gender inequality and GDP per capita and HDI. Overall the correlation matrix shows the gender inequality has a strong correlation with economic growth and human well being.

Table 2: Correlation Matrix (2000-2017)

	InGDPPC	**InHDI**	**InGII**	**InTrade**	**InGCF**
InGDPC	**1**				
InHDI	0.9973*	**1**			
InGII	-0.9172*	-0.8980*	**1**		
InTrade	0.6468*	0.6895*	-0.4304	**1**	
InGCF	-0.0894	-0.0832	0.2797	-0.035	**1**

Source: Author's own Compilation ** significant at 5% level of significance.*

Table 3 shows the results of unit test based on the Augmented Dickey-Fuller (ADF) Test conducted. The results indicate that most variables, Gross Domestic percapita Product at constant price (GDPCC)are not stationary at their level. However, all variables are stationary at their first difference at 5% level of significance. The variables in the study are not of the same order of integration rather combination of the order of I(0) and I(1). Thus it justifies the ARDL model for estimation purposes.

Table 3: Results of the Stationarity Test: The ADF Test (2000-2017)

Variables	**Level**	**First Difference**
InGDPPC	1.439942	-3.36348**
InGCF	-3.93585***	-3.95936***
InGII	0.207127	-18.1965***
InTrade	-1.93329	-3.16768**
InHDI	-0.80726	-3.95329***

Note: The asterisk (***, **, *) indicates the rejection of the null hypothesis of non-stationary at 1%, 5% and 10% significance level. These values are generated by E-VIEWS output. Source: Author's Own compilation.

The calculated ARDL results are reported in Table-4. F-statistic are used for testing the null hypothesis of the no co-integration among the variables of the models. The optimal lag length based on various test is one.

Table 4: Results of the Bounds Test for Cointegration Analysis (2000-2017)

Critical value bounds of the F-statistic: intercept and no trend							
	k	**90% level**		**95% level**		**99% level**	
		I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
	3	*2.37*	*3.2*	*2.79*	*3.67*	*3.65*	*4.66*
Model	**Optimal Length**		**F-Statistics**			**Results**	
Model 1	1		163.98***			Cointegrated	
Model 2	1		49.54919***			Cointegrated	

Note: The asterisk. *, ** and *** shows the F-statistics value at the upper bound at 90%, 95% dan 99% level of significance.. These values are generated by E-VIEWS output. Source: Author's own compilation.

F-statistic for all the models are greater than the upper bound value of Pesaran, Shin and Smith (2001) at 1 percent. So null hypothesis of no co-integration is rejected and alternative hypothesis is accepted which confirms the co-integration among the variables of both the models. The long run results of the model are presented in Table-5.

Table 5: Results of the long-run ARDL Model Estimation (2000-2017)

ARDL Model 1 (1, 1, 1, 1)		**ARDL Model 2 (1, 0, 0, 0)**	
Dependent Variable: $InGDP_t$		**Dependent Variable: $\Delta InHDI_t$**	
$InGCF_t$	0.134724* (2.093297)	**$InGCF_t$**	0.007417 (0.643523)
$InGII_t$	-4.21251*** (-25.920717)	**$InGII_t$**	-1.100816*** (-22.110181)
$InTrade_t$	0.170221*** (5.999055)	**$InTrade_t$**	0.07124*** (4.9441)
C	7.862729*** (32.337111)	C	-1.405915*** (-23.961443)

Note: Figures in parentheses are t-ratios, while *, **, *** indicate significance level at 10%, 5%, 1%, respectively. Source: Author's own compilation.

The results show that gender inequality has a negative and significant impact on economic growth as measure by GDPPC and human well being as measure by HDI of India. The coefficient of GII is negative and significant in both the models. The results are consistent with study of Ward et al. (2010) that show that by improving gender equality, countries can improve economic performance. Seguino (2000) concludes that gender inequality has a positive relationship with economic growth; the more inequality there is, the better growth outcomes arise. Klasen found that gender equality in education had a significant and positive impact, in a sample of 109 countries with data between 1960 and 1992.

A 1% increase in the gender equality will increases the economic growth by 4.1% (model 1) and human well being or inclusive growth by 1.1% (Model 2).Significance of error correction term (ECT) as shown in Table 6 is a further proof of the existence of stable long run relationship among variables of our interest.

Table 6: Error correction representations for ARDL Model According to AIC (2000-2017)

ARDL Model 1 (1, 1, 1, 1)		**ARDL Model 2 (1, 0, 0, 0)**	
Dependent Variable: Δ InGDP$_{t-1}$		**Dependent Variable: Δ InHDI$_{t-1}$**	
Δ **InGCF$_{t-1}$**	0.026929*** (4.180843)	Δ **InGCF$_{t-1}$**	0.00281 (0.00322)
Δ In**GII$_{t-1}$**	-1.312329** (-2.713713)	Δ In**GII$_{t-1}$**	-0.417111 (0.287872)
Δ In**TRADE$_{t-1}$**	-0.027774 (-0.685887)	Δ In**TRADE$_{t-1}$**	0.026994 (0.01624)
ECMt-$_1$	-0.363373** (-2.580539)	**ECMt-$_1$**	-0.378911 (0.254212)

Note: Figures in parentheses are t-ratios, while *, **, *** indicate significance level at 10%, 5%, 1%, respectively. Source: Author's own compilation

In model 1 it means that it will take (1/ -0.36337) =2.75 years to reach to equilibrium again following a shock in the regressors. In model 2 it will take (1/ -0.37891)= 2.6 years to reach to equilibrium. The short run results are not much different from the long-run estimates. The short run coefficient of GII is also negative and significant. Thus, the gender inequality has an adverse impact on economic and social well being of the country in the short run also.

The long run and short run results support the positive impact of gender equality on economic growth and overall human well being. The Sustainable Development Goals adopted in 2015 include the ambitious aim to 'achieve gender equality and empower all women and girls'. Promoting gender equality is now generally recognized as an integral part of poverty reduction and development, and even for development effectiveness.

The test results of diagnostic test (Table 7&8) shows that there is no serial correlation among the variables of both the models.

Table 7: ARDL Model Diagnostic Tests (Model 1)

Test Statistics	**LM Version**	**F Version**
A: Serial Correlation	CHSQ(1)= 2.373953(0.1234)	F(1,8)= 1.298479(0.2875)
B: Normality	Jarque-Bera = 1.377974(0.502085)	
C: Heteroscedasticity	CHSQ(7) = 3.472097(0.8382)	F(7,9)= 0.329994(0.9211)

Note: Figures in parentheses are t-ratios, while *, **, *** indicate significance level at 10%, 5%, 1%, respectively. Note:. Serial Correlation: LM Test, Normality based on Jarque-Bera and heteroscedasticity: LM Test & F-test. Source: own compilation Source: Author's Own Compilation

Table 8: ARDL Model Diagnostic Test (Model 2)

Test Statistics	**LM Version**	**F Version**
A: Serial Correlation	CHSQ(2)= 1.581029(0.4536)	F(2,10))= 0.512689(0.6138)
B: :Normality	Jarque-Bera = 0.068511(0.966324)	
C: Heteroscedasticity	CHSQ(4) = 5.734624(0.2199)	F(4,12)= 1.527146(0.2561)

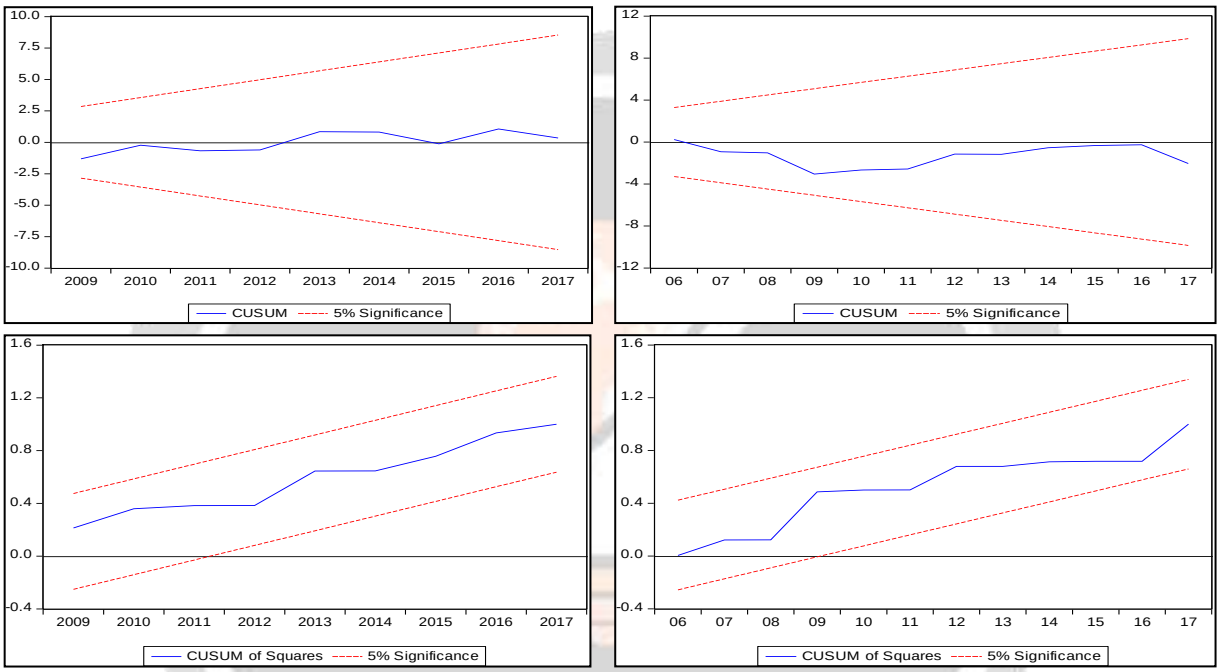
Note: Figures in parentheses are t-ratios, while *, **, *** indicate significance level at 10%, 5%, 1%, respectively. Note:. Serial Correlation: LM Test, Normality based on Jarque-Bera and heteroscedasticity: LM Test & F-test. Source: Author's own compilation

The Jarque-Bera test suggests the presence of normality amongst the variables. The results show that there is no heteroscedasticity in data for both the models. The Cumulative Sum (CUSUM) and the Cumulative Sum of the Squares (CUSUM sq) tests are used to examine the stability of short run and long run coefficients of the model. The results of Cumulative Sum (CUSUM) and the Cumulative Sum of the Squares (CUSUM sq) tests are reported in figure 3 .

The figures shows that Cumulative Sum (CUSUM) and the Cumulative Sum of the Squares (CUSUM sq) are between the two critical lines and do not go outside the critical boundaries and thus both the models are correctly specified.

Figure 3: Results of the Stability Test for all Models

Model 1 **Model 2**



Source: Author's own compilation

5. CONCLUSIONS AND POLICY SUGGESTIONS

The study aims to identify the long run and short run impact of gender equality on economic growth and human development of India for the period of 2000-2017 using ARDL model. The study used the comprehensive gender inequality index as a proxy to measure gender inequality. The empirical results provide strong evidence that gender inequality has negative impact on economic growth and human well being. Women empowerment plays an important role to bring inclusive growth in the country. Thus the issue of gender inequality should be addressed not just for equity reason but it also has significant economic relevance. There is a need of providing equal opportunities to women in access to services, resources and infrastructure such as healthcare, education, banking, water, electricity, sanitation and communication tools, etc. Policy and legislation can go a long way to creating enabling environments for women to eliminate gender discrimination The public private participation is needed to close the gender gap through widening of access to public services without gender discrimination. Societal attitudinal transformation can improve the women's access to opportunities and resources and swiftly bring progress towards gender equality.

REFERENCES

- **Arora (2012).** "Gender inequality, economic development, and globalization: A state level analysis of India". *The Journal of Developing Areas*. 46 (1): 147–164.
- **Baliamoune-Lutz, M. and McGillivray, M. (2007)** Gender Inequality and Growth in SubSaharan Africa and Arab Countries, ICER Working Papers 25-2007, Turin: International Centre for Economic Research (ICER).

- **Barro, R.J. and J.W. Lee, 2001**, International Data on Educational Attainment: Updates and Implications Oxford Economic Papers, 53(3): 541-563.
- **Blackden, M; Canagarajah, S; Klasen, S. & Lawson, D. (2006).** Gender and Growth in SubSaharan Africa: Issues and evidence. Research Paper, UNU-WIDER, United Nations University (UNU), No 2006/37. http://hdl.handle.net/10419/63512
- **Bloom, David E. and Jeffrey G. Williamson. (1998).** ''Demographic Transition and Economic Miracles in Emerging Asia.'' World Bank Economic Review 12(3): 419–55.
- **Chani, M. I., Pervaiz, Z & Chaudhary, A. R., 2011**. Determination of Import Demand in Pakistan: The Role of Expenditure Components, Theoretical and Applied Economics, 18(8), 93-110.
- **Dollar, David and Roberta Gatti. 1999. ''**Gender Inequality, Income and Growth: Are Good Times Good for Women?'' Mimeograph, World Bank, Washington, DC.
- **Esteve-Volart, B.** "Gender Discrimination and Growth: Theory and Evidence from India", 2004,London, London School of Economics and Political Science.
- Frisch Centennial Symposium; Strøm, S.,Ed.; Cambridge University Press: Cambridge, UK, 1999; pp. 371–413.
- **Galor, Oded and David N. Weil**. 1996. ''The Gender Gap, Fertility, and Growth.'' American Economic Review 86(3): 374–87.
- **International Labour Organization. 2014**. "Does Investing in Education Pay Off for African Youth?" Accessed on May 5, 2017. http://www.ilo.org/global/about-theilo/newsroom/news/WCMS_237457/lang--en/index.htm.
- **Knowles, Stephen, Paula Lorgelly, and Dorian Owen. 2002.** ''Are Educational Gender Gaps a Brake on Economic Development? Some Cross-Country Empirical Evidence.'' Oxford Economic Papers 54(1): 118–49.
- **Klasen, S., 1999.** Does Gender Inequality Reduce Growth and Development? Evidence from CrossCountry Regressions. Policy Research Report, Engendering Development, Working Paper No. 7. World Bank, Washington, D.C.
- **Klasen, S. 2016**. "Gender, institutions, and economic development: Findings and open research and policy issues." Courant Research Centre, Poverty, Equity and Growth Discussion Paper No. 211.
- **King, Elizabeth M., Stephan Klasen, and Maria Porter. 2008.** ''Gender and Development Challenge Paper.'' Paper prepared for 2008 round of Copenhagen Consensus Project. Mimeographed, Copenhagen Consensus Center.
- **Kingdon, G. G. (1998)** Does the labour market explain lower female schooling in India?, Journal of Development Studies, 35 (1), pp. 39±65.
- **Kingdon, G. G., Unni, J. (2001).** Education and Women's Labour Market Outcomes in India. Education Economics, 9(2), 173-95.
- **Klasen, S. and F. Lamanna, 2009**. The Impact of Gender Inequality in Education and Employment on Gender Inequality in Education and Employment on Gender Inequality and Trade, Review of International Economic Growth: New Evidence for a Panel of Economics, 14(3): 362-379.
- **Lagerlo¨f Nils-Petter. 2003. ''**Gender Equality and Long-Run Growth.'' Journal of Economic Growth 8(4): 403–26.
- **Mitra, A., Bang, J. T., Biswas A**., 'Gender equality and economic growth: is it equality of opportunity or equality of outcomes?', Feminist Economics, Vol. 21(1), 2015, pp. 110-135.
- **Pervaiz, Z. and A.R. Chaudhary, 2010**.. Gender Equality, Poverty and Social Cohesion and Economic Growth: An Empirical Economic Growth, World Bank Policy Research Investigation. Saarbrücken, Germany: LAP- Lambert Working Paper, pp: 4349. Academic Publishing.
- **Pervaiz, Z. and Chaudhary, A.R., 2010**. Class Division, Social Cohesion and Economic Growth: An Empirical Investigation. Saarbrücken, Germany: LAP LAMBERT Academic Publishing.
- **Pesaran, M.H.; Shin, Y.** An Autoregressive Distributed-Lag Modelling Approach to Cointegration Analysis. In Econometrics and Economic Theory in the 20th Century: The Ragnar
- **Pesaran, M.H., Shin, Y. and Smith, R.J. 2001.** "Bounds testing approaches to the analysis of level relationship." Journal of Applied Economics 16: 289-326.
- **Rammohan, A., & Vu, P. (2017).** Gender Inequality in Education and Kinship Norms in India. *FeministEconomics*, *24*(1),142167. https://doi.org/10.1080/13545701.2017.1364399
- **Roncolato, L., Reksten, N. and C. Grown. 2017**. "Engendering growth diagnostics: examining constraints to private investment and entrepreneurship." Development Policy Review 35(2): 263- 87.
- **S. Seguino 2000**Gender inequality and economic growth: A cross-country analysis World Development, 28 (7) (2000), pp. 1211-1230
- "**SDG 5:** Achieve Gender Equality and Empower All Women and Girls," UN Women, accessed 20 February, 2017.

- **Seth, S. (2009).** Inequality, Interactions and Human Development. Journal of Human Development and Capabilities, Vol 10 , 375-396.
- **Ukhova,** Gender inequality and inter-household economic inequality in emerging economies: exploring the relationship, May 2015, Gender & Development, 23:2, 241-259, ISSN: 1355-2074 (Print) 1364-9221 (Online) Journal homepage: http://www.tandfonline.com/loi/cgde20
- **United Nations Development Programme, 2010.** Human Development Report 2010 -20 Anniversary th Edition: The Real Wealth of Nations: Pathways to Human Development. New York, USA: United Nations Development Programme
- **World Bank. 2001.** Engendering Development. Washington, DC: World Bank.