Gender Inequality in Pakistan and Its Repercussions on Growth: A Regression Analysis

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Abstract
This study investigates the direct impact of gender inequality on Pakistan's growth using regression analysis. The results confirm that gender inequality negatively influences Pakistan's growth; however, personal spending on education has a small but positive impact. Further, in comparison to inequality in employment, the gender gap in education has a greater negative impact on the country's growth. The study raises important policy implications for Pakistan, as the country was ranked second from the bottom in the gender inequality index in 2013.

I. Introduction

***1. Gender Inequality*:** Global efforts to curb socio-economic disparities among the countries of the world are encountering multiple obstacles to achieving their targets. Consequently, gender inequality figures among the major hurdles that have been recognized and highlighted at many recent global forums. Although the problem of gender inequality is not new, it was first brought up as an issue of great concern in the Global Gender Gap Report (GGGR) presented at the World Economic Forum in 2006. Later, UNESCO included a policy commitment under the Priority Gender Equality Action Plan 2008-2013, which translates UNESCO's support and commitment into the five priority areas of education, social science, natural science, culture, and communication. In 2010, the UNDP published the first Gender Inequality Index (GII), which identifies and ranks countries according to the degree of discrimination faced by women - especially in the areas of education, labor, and health. The GGGR and the GII are key sources that determine the position and degree of global gender inequality of the world economies. The 3rd goal of the World Bank's MGDs also strongly emphasizes the promotion of gender equality and the empowerment of women in order to alleviate poverty by 2015.

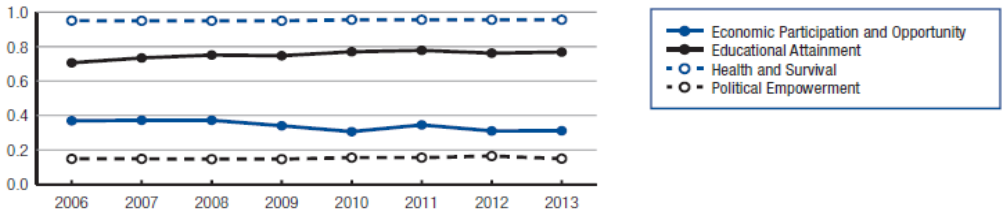
2. Pakistan and Gender Inequality: Unfortunately, Pakistan is one of those countries where gender inequality persists at par. In 2013, both the GII and the GGGR ranked Pakistan as the second worst country in the world in terms of gender discrimination. As mentioned in Table 1. Pakistan's overall ranking is 134 out of 135 countries; the worst aspect is within individual country parameters as it has the lowest score in terms of economic participation. However, in terms of political empowerment Pakistani women show the highest degree of participation. In reality, the so-called political empowerment of women in Pakistan is based on a quota system for entry into the Parliament, in which women hold few ministerial offices; therefore, they are still marginalized in terms of actual political and administrative activities. Looking at the evolution of gender equality since 2006, there has been a slight upward trend in educational participation but a downward trend in economic participation. In a nutshell, the disparity in economic participation has worsened over time, reflecting the concerns of policy makers - both national and international - who are working against socio-economic evils such as poverty, inequality, and gender disparity in Pakistan. This may be considered the largest obstacle for the government and international agencies working in Pakistan to achieving their socio-economic human development goals because the negative repercussions thereof are far wider today and look likely to remain so in the future.

Table 1. Pakistan's Ranking in Gender Inequality Index

Pakistan

	OVERALL		ECONOMIC PARTICIPATION		EDUCATIONAL ATTAINMENT		HEALTH AND SURVIVAL		POLITICAL EMPOWERMENT	
	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score
Gender Gap Index 2013 (out of 136 countries)	135	0.546	135	0.311	129	0.768	124	0.956	64	0.149
Gender Gap Index 2012 (out of 135 countries)	134	0.548	134	0.310	129	0.762	123	0.956	52	0.164
Gender Gap Index 2011 (out of 135 countries)	133	0.558	134	0.345	127	0.778	123	0.956	54	0.155
Gender Gap Index 2010 (out of 134 countries)	132	0.546	133	0.306	127	0.770	122	0.956	52	0.155
Gender Gap Index 2009 (out of 134 countries)	132	0.546	132	0.340	128	0.747	128	0.950	55	0.146
Gender Gap Index 2008 (out of 130 countries)	127	0.555	128	0.372	123	0.751	123	0.950	50	0.146
Gender Gap Index 2007 (out of 128 countries)	126	0.551	126	0.372	123	0.734	121	0.950	43	0.148
Gender Gap Index 2006 (out of 115 countries)	112	0.543	112	0.369	110	0.706	112	0.951	37	0.148

Evolution 2006–2013



Source: World Economic Forum, GGGR 2013.

3. Growth and Gender Inequality: Recently, several studies have examined the relationship between growth and gender inequalities both in qualitative and quantitative terms, with very interesting results. For example, some of the earlier studies by Barro and Lee (1994) and Barro and Xavier (1995) show that gender inequality in education may increase growth; however, recent studies view the matter in the opposite way. For example, the studies by Klasen (2002), Yamarik and Ghost (2003), Klasen (2004), England (2005), Busse and Spielmann (2006), Baliamoune (2007), Autor et al. (2008), Klasen and Lamanna (2009), Cooray and Potrafke (2011), Cuberes and Teignier-Baque (2012), and Agenor and Canuto (2013) all identified a negative relationship between gender inequality and growth. The reason for the differences in the results of the earlier and more recent studies is also addressed in recent literature, the key argument of which is that the empirical methodology used created the difference. Therefore, it is recommended to analyze a single country individually so as to determine more accurately whether gender inequality impacts the growth of the economy or not and, if so, then to what degree.

Therefore, this study also represents an effort to evaluate the impact of gender inequality on the growth of Pakistan through a regression analysis using the least square method. The following sections II-V cover data and methodology (II), model specifications (III), regression results (IV) and, finally, the conclusion and policy implications (V).

II. Data and Methodology and Model Specifications

1. Data: The data utilized in this study are taken from different sources, i.e. Compounded GDP (CGDP) data are taken from the Penn World Table (PWT) 2013; and Personal Spending on Education (PS),

Gender Employment Inequality (GEMI)[1] and Gender Education Inequality (GEDI)[2] data from the World Development Indicators (WDI) 2013. The data comprises twenty observations spanning years from 1991 to 2010, as available.

2. Methodology: The majority of previous studies were conducted cross-country and panel data analysis claiming to have better data set availability advantage; however, the reliability of the results in terms of a single country may only be ensured if the economy is analyzed individually. For this purpose, as per the Table 2.

that mentioned précised but comprehensive key literature on gender inequality and growth with study design, methodology and empirical output overview, this study adopts the linear regression model and uses the OLS estimation technique to investigate gender inequality in education and employment, along with personal spending on education, on Pakistan's growth. The estimation results are quoted both in growth dependant variable terms as well as residual terms. The estimation results are adjusted with Heteroskedasticity using the Breusch-Pagan-Godfrey test. In the end, the sensitivity analysis test was also conducted to validate the stability of the model.

Table 2. Key Literature and Its Summary of Gender Inequality and Growth

Author	Year	Method/Model	Data and Source	Results
Barro and Lee	1994	Panel Data analysis	Various (1965-1985)	+ve
Pritchett and Summers	1996	Regression-Cross Country	PWT 1990	-ve
Klasen	2002	Regression-Cross Country	WDI, PWT, Barro & Lee	-ve
Abu-Ghaida	2004	Regression-Panel/Cross	WDI, PWT Barro & Lee	-ve
Busse and Spielmann	2006	Regression-Panel	Various	Mix
Klasen and Lamanna	2009	Regression-Cross Country	WDI, PWT, Barro & Lee	-ve
Seguino	2011	Regression-OLS- UK	Primary British Couples	-ve
Cooray and Potrafke, 2011	2011	Regression-Panel Data	Primary (Cul+Reg)	+ve/-ve
Cuberes and Teignier-Baque	2012	OLG-Brazil	WDI 2009	-ve
Branisa et al.	2013	Regression- OECD	OECD	-ve

Source: Author's compilation

3. Model Specifications:

This study uses the following variables and their notation to analyze the direct impact of gender inequality on economic growth in the case of Pakistan:

CGDP (Compounded Gross Domestic Production) is a dependent variable representing growth;

PS (Public Spending over education) is an independent variable;

GEMI (Gender Employment Inequality) is one of two major independent variables representing gender inequality in the employment/gender gap in employment participation in Pakistan;

GEDI (Gender Education Inequality) is the second major independent variable representing the gender inequality/gender gap in the education sector of Pakistan.

All four variables are inserted into the linear equation model for empirical examination to determine how gender inequality influences Pakistan's growth. Equations 1a and 1b represent the linear equation model in matrix and algebraic form to facilitate the understanding of the readers. β_1 , β_2 , and β_3 are the parameters of the explanatory variables, which determine its impact with respect to growth (CGDP). β_0 is the coefficient of intercept and μ denotes error term.

$$CGDP = \beta_0 + \beta_1 (PS) + \beta_2 (GEMI) + \beta_3 (GEDI) + \mu \quad \text{..... (1a)}$$

[1] GEMI is computed as the difference in the ratio of male/female participation in total employment; the difference is taken to be the total gender gap in employment.

[2] GEDI is computed as the difference in the ratio of male/female access to education; the difference is taken to be the total gender gap in education.

$$\begin{vmatrix} CGDP_1 \\ CGDP_2 \\ CGDP_2 \\ \vdots \\ \vdots \\ CGDP_n \end{vmatrix} = \begin{vmatrix} 1 & PS_1 & GEMI_1 & GEDI_1 \\ 1 & PS_2 & GEMI_2 & GEDI_2 \\ 1 & PS_3 & GEMI_3 & GEDI_3 \\ \vdots & \vdots & \vdots & \vdots \\ 1 & PS_n & GEMI_n & GEDI_n \end{vmatrix} \begin{vmatrix} \beta_0 \\ \beta_1 \\ \beta_2 \\ \beta_3 \end{vmatrix} + \begin{vmatrix} \mu_1 \\ \mu_2 \\ \mu_3 \\ \vdots \\ \mu_n \end{vmatrix} \quad \text{.....(1b)}$$

Similarly, as this study intends to utilize the least square method to estimate the model, we transform the above classical linear regression model in to the multivariate regression model, which is represented by Equations 2a and 2b in algebraic and matrix forms, respectively.

$$(CGDP)_i = \beta_0 + \beta_1 \ln(PS)_{i1} + \beta_2 (GEMI)_{i2} + \beta_3 (GEDI)_{i3} + \mu_i \text{.....(2a)}$$

$$\begin{vmatrix} CGDP_1 \\ CGDP_2 \\ CGDP_2 \\ \vdots \\ \vdots \\ CGDP_n \end{vmatrix} = \begin{vmatrix} 1 & PS_{11} & GEMI_{12} & GEDI_{13} \\ 1 & PS_{21} & GEMI_{22} & GEDI_{23} \\ 1 & PS_{31} & GEMI_{32} & GEDI_{33} \\ \vdots & \vdots & \vdots & \vdots \\ 1 & PS_{n1} & GEMI_{n2} & GEDI_{n3} \end{vmatrix} \begin{vmatrix} \beta_0 \\ \beta_1 \\ \beta_2 \\ \beta_3 \end{vmatrix} + \begin{vmatrix} \mu_1 \\ \mu_2 \\ \mu_3 \\ \vdots \\ \mu_n \end{vmatrix} \quad \text{.....(2b)}$$

This model was estimated using e-views version 6 and, after conducting the regression analysis, the Heteroskedasticity adjustment test and residual were checked using the Breusch-Pagan-Godfrey test, taking the residual as the dependent variable, respectively. Both tests were used to determine the impact of the omitted variables and the level of error adjustment in the model. Finally, sensitivity and diagnostic tests were also conducted to determine the cumulative and cumulative sum of the square of the recursive residual for the overall model; and the diagnostic for recursive residual and residual fitted graph were also acquired to determine the residual fitness of the model.

IV. Results and Interpretation

1. Descriptive statistics. Table 3 shows the descriptive statistics of the variables where the compounded GDP has increased by almost 7.4%; however, personal spending on education is very low, i.e. equivalent to only 1% of GDP. The gender gap in employment is very high, with any change remaining very slight over the model period.

Table 3. Descriptive Statistics

	CGDP*	PS	GEMI	GEDI
Mean	7.412366	0.854209	4.173000	4.235500
Median	7.385529	0.950230	4.180000	4.245000
Maximum	7.785827	1.152599	4.240000	4.290000
Minimum	7.076308	0.062176	4.090000	4.150000
Std. Dev.	0.210987	0.272097	0.052425	0.042855
Skewness	0.317291	-1.586003	-0.268527	-0.793165
Kurtosis	2.146512	5.002523	1.703725	2.535884
Jarque-Bera	0.942613	11.72643	1.640631	2.276541
Probability	0.624186	0.002842	0.440293	0.320373
Sum	148.2473	17.08418	83.46000	84.71000
Sum Sq. Dev.	0.845795	1.406700	0.052220	0.034895

*CGDP here refers to the compounded GDP data taken from the Penn World Table (PWT) index.

2. Regression Results Table 4 below shows the regression results model illustrated in Equations 1a and 1b, where gender inequality in education and in employment are found to negatively impact the growth of Pakistan. However, the impact of personal spending on education has a small but positive influence on growth. If the levels of gender inequality in education and in employment are compared with each other, the gender gap in education shows a higher rate of negative impact than employment. This suggests that the decreased gender gap in education further minimizes the employment gap's impact on growth. Now, as far as personal spending on education is concerned, there is a very slight but positive impact on growth. This notion suggests that Pakistanis invest a very small proportion of their income in education, which further deteriorates gender equality and harms growth in manifolds.

Table 4. Regression Results

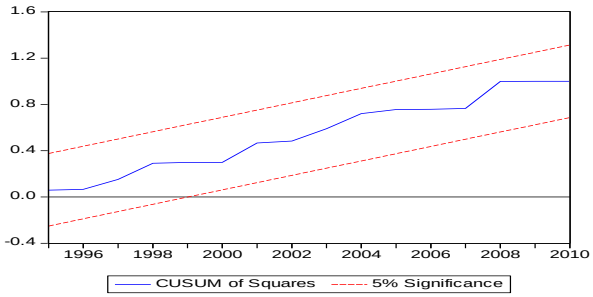
	Coefficient	Std. Error	t-Statistic	Prob.
PS	0.143411	0.530201	0.270483	0.7902
	(0.408416)	(0.374473)	(1.090642)	(0.2916)
GEMI	-1.957912	0.753393	2.598793	0.0194
	(-0.885459)	(6.395450)	(-0.138451)	(0.8916)
GEDI	-2.471326	0.919418	2.687924	0.0162
	(3.270186)	(7.804816)	(0.418996)	(0.6808)
C	26.02161	1.271020	20.47302	0.0000
	(-10.22303)	(10.78952)	(-0.947496)	(0.3575)
R-squared	0.953888	Mean dependent var		7.412366
	(0.119824)			(0.281699)
Adjusted R-squared	0.945243	S.D. dependent var		0.210987
	(-0.045209)			(0.409945)
S.E. of regression	0.049372	Akaike info criterion		-3.002025
	(0.419109)			(1.275486)
Sum squared resid	0.039001	Schwarz criterion		-2.802879
	(2.810439)			(1.474632)
Log likelihood	34.02025	Hannan-Quinn criter.		-2.963150
	(-8.754856)			(1.314361)
F-statistic	110.3281	Durbin-Watson stat		0.676935
	(0.726063)			(2.588728)
Prob(F-statistic)	0.000000			
	(0.551171)			

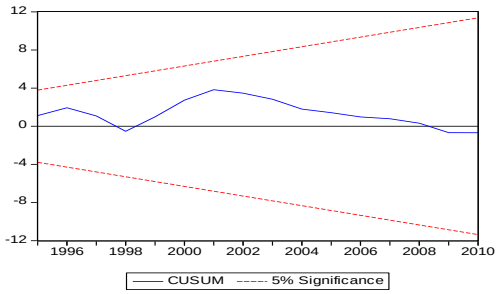
The values in brackets are Heteroskedastic adjusted and shown in the residual term.

3. Sensitivity Analysis. The model used in this research has also been checked and diagnosed for its sensitivity and stability. Figures 1 and 2 show the overall stability of the model, with the plots showing that our model is stable because the blue line lies within the two bordering red lines.

Fig. 1 Cumulative sum of square of recursive residual

Fig.2 Cumulative sum of square of recursive residual

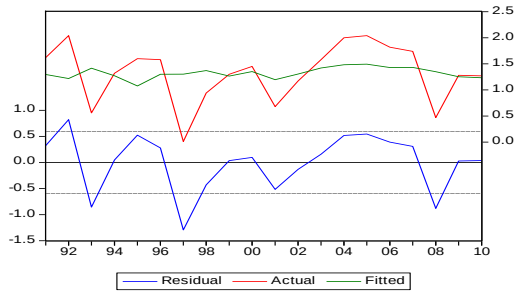




Similarly, Figures 3 and 4 below illustrate the recursive residual plot, which is also stable, and the fitted residual or error (μ), which is also finely fitted, as shown in the plot.

Fig.3 Recursive residual Plot

Fig.4 Actual and fitted residual Plot



V. Conclusion and Policy Implications

This study has been conducted to analyze the direct impact of personal spending on education and gender inequality in education and employment on the growth of Pakistan using a regression analysis. The estimation results conclude that the gender gap in education and employment negatively influences the country's growth. However, personal spending on education has a small but positive impact. The impact on economic growth of educational gender inequality is higher than employment gender inequality. The results imply that lowering the gender gap in education would increase gender equality in employment, thereby decreasing the overall negative impact on growth. Personal spending on education also works two-dimensionally: first, it adds to growth, and second, it diminishes educational inequality.

As regards the policy implications, this study suggests much better results than previous studies (Klasen, 2002; Klasen and Lamann, 2009; and Branisa et al., 2013) because they used panel and cross-country analysis and suggested that gender inequality influences growth by approximately 0.3% in the South Asian region; however, there are huge fluctuations in gender equality, its causes, and its repercussions on growth across the various South Asian nations. Our study of an individual country in this regard provides better policy options for government and international and national agencies with regard to the designing of an effective policy framework. In the case of Pakistan, the government should take drastic steps towards resolving gender inequality as it has very negative economic and social consequences for Pakistan. The government first needs to encourage the population to increase spending on education, and then needs to carry out reforms to strengthen women's standing in society, as they could participate in the socio-economic development of the country. There are strong social, cultural, and so-called religious hindrances which also heighten gender discrimination. The education sector is the key sector to focus on in order to reduce gender inequality in Pakistan.

Furthermore, this study could open the way to investigating other social, cultural and religious factors that hinder gender equality.

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