Gender Inequality and Economic Growth: A Time Series Analysis for Pakistan

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Abstract: This paper attempts to analyze the impact of gender inequality on economic growth of Pakistan. An annual time series data for the period of 1972-2009 has been used in this study. We have regressed growth rate of real gross domestic product (GDP) per capita on labour force growth, investment, trade openness and a composite index of gender inequality. 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.

Key words: Gender Inequality · Economic Growth · Trade Openness

INTRODUCTION

Promoting gender equality and empowering women is one of Millennium Development Goals (MDGs) set by United Nations and it is on public policy agenda of almost every country of the world because inequality on the basis of gender cannot be justified on any ethical or philosophical basis. In spite of this, gender inequality can be observed in almost all developing countries and even in the developed world [1, 2]. In his influential work Sen [3, 4], has pointed out the phenomenon of missing women which confirms the existence of gender inequalities across the globe. Reduction in existing gender inequalities is a matter of concern for social scientists and economist not only due to its well-being related dimensions but also because it has certain economic implications. Apart from intrinsic problems of gender inequality, it may undermine a number of development goals [5]. Gender inequality in education may prevent reduction in fertility rate, infant mortality rate [6-8] and can also have negative effects on children's education and health [9]. It may also affect economic growth through a number of channels. These channels include direct and indirect growth effects of gender inequality and have been intensively discussed in literature (see for example; Hill and King [8], Klasen [10], Seguino [11], Klasen [12], Klasen [13], Knowles *et al.* [14] and Klasen and Lamanna [15]). As a direct effect of gender inequality, a household's investment in children's education will be biased in favour of boys' education and if girls are more able and talented than boys then this

investment will be considered as misallocation of resources. This will result in poor quality human capital accumulation and considering the role of human capital in economic growth the ultimate result will be slowing down the pace of economic growth. The indirect growth effects of gender inequality may be via its effects on fertility rate, infant mortality rate and children's education and health. Lower fertility rates will slow down population growth and will decrease dependency burden which will have an effect of increasing savings and investment. This will lead to enhance the economic growth.

Gender inequality in employment and wages is also argued to be having economic growth effects through different channels. For instance, gender gap in employment can reduce the average ability of work force by reducing the pool of talent from which employers can draw. This reduction in average ability of work force can impede economic growth. Similarly gender wage gap can also have effect on economic growth and degree of development of a country. Growth effects of gender wage differentials can be summarized as: lower wages for female work force in export oriented industry increases the competitiveness of the country by decreasing the per unit production cost which is helpful in export expansion and stimulates investment through increasing the profitability of producers. This increase in investment and exports leads towards increase in economic growth. However opposing view regarding the economic growth effects of gender wage differentials can also be perceived. There is ample evidence suggesting that women's consumption

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pattern is different from men and they tend to spend more of their income on children's education and health which can also affect development in long run. More spending on children's education and health is an investment in future generation which will be helpful in providing more productive and efficient labour force for the future. Thus by reducing gender wage differentials, one can expect for more spending in more productive channels which will enhance economic growth in long run.

In order to unveil the mystery of growth differentials across countries a lot of research has been conducted. Different important determinants of economic growth such as investment rate, saving rate, technology, human capital, trade openness and institutional quality have been identified in this regard. Recently, the interest of economists has increased in studying the effects of income inequality on economic growth. Gender perspective of inequality has also been studied by feminist scholars. In this regard they have studied that how gender inequality on the basis of literacy, labour force participation and gender wage gap can affect economic growth. Most of these studies are cross country studies but cross country regression has its certain limitations due to which its results cannot be generalized. In Pakistan, there is a huge development gap between male and female section of society. Thus Pakistan may be an interesting case study to analyze the effect of gender inequality on economic growth.

Literature Review: The relationship between gender inequality and economic growth is not very much conclusive. One part of literature describes positive relationship between gender inequality and economic growth whereas other part shows negative relationship between the two. Galor and Weil [16] describe that gender gap in education and earnings results in high fertility and low economic growth. Same results have been presented by Lagerlof [9] in an overlapping generations framework. Female education is considered as beneficial for economic growth through various channels such as reduction in fertility and positive effects of mother's education on next generation's education [8, 17, 18]. Negative effects of gender inequality on economic growth, when gender inequality is measured through the investment gap between male and female schooling, are presented by Hill and King [8] and Knowles *et al*. [14]. The opposite case has also been reported in cross-country regressions of some empirical studies in which gender inequality in education has positive effect on economic growth [19, 20]. But these puzzling findings have been challenged by

Dollar and Gatti [21] on the grounds that negative effect of female schooling on economic growth is vanished when a dummy variable is included for Latin America and East Asia. They suggest that these puzzling findings may be due to combination of low economic growth and high female education in Latin America and high economic growth and low female schooling in East Asia. But this low economic grow in Latin America may be associated with some other factors instead of high female education. Similarly high economic growth in East Asia cannot be termed as an effect of low female schooling. Klasen [22] also supports the arguments of Dollar and Gatti [21] by pointing out that the data used by Barro and Lee [19] has serious problems of multicollinearity and the use of econometric techniques by controlling for multicollinearity does not support the evidence provided by Barro and Lee [19].

Gender inequality in education is found to be having negative effects on economic growth by reducing the average amount of human capital and excluding the talented girls from educational opportunities which could perform better than boys. It is proposed that educational inequality based on gender downgrades the quality of human capital and slowdown the pace of economic growth [10]. Similar findings have been put forward by King *et al*. [18] by taking into account the externalities generated by female education such as reduction in fertility rate.

Baldwin and Johnson [23] describe the negative effects of gender wage differentials on female labour force participation by arguing that women may hesitate to contribute in labour market if they are paid lower wages. Women's wages relative to men also affect household's fertility decision. If women are paid higher wages then opportunity cost of children increases which can lead to slow down population growth, increase capital per worker and enhances economic growth [16]. Female are more likely to spend large proportion of their income on education and health of their children so with higher wages and incomes of women and with their greater control over resources more will be spent on children's wellbeing [24, 25] which could affect the human capital creation in a society. But on other hand gender wage gap has been shown stimulus to economic growth in semi-industrialized economies [11]. It is due to the reason that lower wages for women as compared to men reduces the cost of production, stimulates investment [26] and enhances economic growth through export expansion. This argument has also been supported by Busse and Spielmann [27].

Economic growth implications of gender employment gap have also been discussed in literature. For instance, Klasen and Lamanna [15] investigate 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. Low female participation in some regions, particularly in Middle East and North Africa, may be termed as a major cause of these regions' low economic growth when compared with East Asia, a region comparatively with high female labour force participation rate. Negative effects of gender employment gap have also been documented by Esteve-Volart [28]. Apart from direct effects of female employment on economic growth, it can also boost economic growth through its positive externalities.

While numerous studies have been conducted to study the effects of gender inequality on economic growth, the results are still inconclusive. Thus the issue needs further investigation. Moreover the previous studies have taken into account different dimensions of gender inequality by using the educational gap, employment gap and wag gap as proxies for gender inequality. The use of some comprehensive unitary index may be a useful exercise in order to investigate the effect of gender inequality on economic growth.

MATERIALS AND METHODS

Drawing upon our discussion in the previous section and following Seguino [11] and Klasen and Lamanna [15], we use the following specification for estimating the direct effects of gender inequality on economic growth.

$$GDPPG_t = \alpha + \beta_1 LFG_t + \beta_2 Inv_t + \beta_3 Trd_t + \beta_4 GI_t + \varepsilon_t \quad (1)$$

Where *GDPPG* is growth rate of real gross domestic product (GDP) per capita, *LFG* is labour force growth, *Inv* is gross total investment in million rupees, *Trd* is trade openness measured as total trade, exports plus imports, as a percentage of GDP. *GI* is used to measure gender inequality and ε_t is error term. Unlike previous studies in which gender wage gap, education gap or employment gap are utilized for measuring gender inequality, the present study uses an index of gender inequality developed by Ahmed and Bukhari [29] as a measure for quantifying gender inequality. The index has been constructed by taking into account eight dimensions related to the issue which include primary school

enrollment, secondary school enrollment, adult literacy rate, number of employed teachers, labour force participation rate, crude death rate, life expectancy and under five years mortality rate. By using information about the variables mentioned above, they developed three sub-indices including educational index of gender, gender labour participation index and survival index. After that, using equal weighting method, composite index of gender inequality is formulated by using the three above mentioned indices.

In order to analyse the relationship between gender inequality and economic growth for the case of Pakistan, the present study uses the time series data for the period of 1972-2009. Applying regression on time series data can give spurious results [30, 31] due to the possibility of non-stationarity of such data. Thus checking the stationarity of data is prerequisite for applying co-integration test. For this purpose, Augmented Dickey-Fuller (ADF) test proposed by Dickey and Fuller [32, 33] has been used by this study. Once the variables are found to be stationary at the same order then we can proceed for the checking of co-integration or long run co-integrating relationship among the variables. In doing so, we use Johansen Co-integration Test suggested by Johansen [34] and Johansen and Juselius [35] which uses maximum likelihood testing process to know about the number of co-integration vectors in the Vector Auto-Regressive (VAR) setting. The common form of VAR is as given below:

$$x_t = \alpha + \beta_t x_{t-1} + \ldots\ldots + \beta_k x_{t-k} + \varepsilon_t \quad (2)$$

Where x_t is an ($n \times 1$) vector of ρ variables having integrated order of 1(I(1)), α is a ($n \times 1$) vector of intercepts, $\beta_t \ldots \beta_{t-k}$ are parameters and ε_t is a normally distributed residual term. The common VAR based model shown in equation (2) may also take the following Vector Error Correction Mechanism (VECM) based alternative form.

$$\Delta x_t = \alpha + \sum_{i=1}^{\rho-1} \Gamma_i \Delta x_{t-i} + \Pi x_{t-1} + \varepsilon_t \quad (3)$$

Where x_t is a ($n \times 1$) vector of ρ variables, α is a ($n \times 1$) vector of constant terms, ε_t is ($n \times 1$) vector of residual term, Δ is difference operator and Γ and Π are coefficient matrices. Π is also known as impact matrix and it comprises information about long term equiblirium relationship of the variables. It contains the long term effect while the matrix of coefficients Γ contains the short term effect. The form of VECM for the variables used in our study is as under:

$$\Delta GDPPG_t = \alpha_\circ + \sum_{J=1}^{n} \beta_1 \Delta LFG_{t-j} + \sum_{j=1}^{n} \beta_2 \Delta Inv_{t-j} + \sum_{j=1}^{n} \beta_3 \Delta Trd_{t-j} + \sum_{j=1}^{n} \beta_4 \Delta GI + \eta ECT_{t-1} + \varepsilon_t \tag{4}$$

The statistical significance of the coefficient of error correct term, ECT_{t-1}, i.e. η, indicates that there exists short-run relationship among the time series variables used in the study. The sign and value of that coefficient provides information about the speed of convergence or divergence of the variables from their long-run co-integrating equilibrium. the positive value of coefficient tells about the divergence whereas its negative value provides evidence about is convergence from the long run equilibrium point. According to Banerjee *et al*. [36] high significance of the coefficient of error correction term strengthens the evidence about the existence of long-run stable equilibrium relationship. Negativity of the coefficient of ECT_{t-1} along with its significance is considered favorable for the stability of long-run equilibrium.

Data Sources: The present study uses the time series data for the period of 1972-2009. The data for gross domestic product (GDP) per capita, investment and trade openness is taken from World Development Indicators, World Bank [37]. Data for labor force is taken from The Pakistan Economic Survey, Government of Pakistan [38]. Data for gender inequality (GI) is taken from Pervaiz and Chaudhary [39] who have extended the series generated by Ahmed and Bukhari [29].

RESULTS

In this section we present the empirical results of our study. The results of ADF unit root test have been presented in Table 1.

These results indicate that all variables of our interest are non-stationary at level and become stationary at first difference. Thus Johansen Co-integration Test proposed by Johansen [34] and Johansen and Juselius [35] can be appropriate method to find out the long run relationship among the variables of our interest. Before applying Johansen Co-integration Test, selection of optimal lag length is required. Schwarz Information Criterion (SIC) suggests that optimal lag length 1 should be selected for further VAR based analysis. Table 2 presents the results of Johansen's Co-integration Test. Trace test statistic λ_{trace} is utilized to confirm the number of co-integrating vectors. The null hypothesis stating that there is no co-integration is tasted against the alternative hypothesis of co-integration by using Trace test.

Table 1: Augmented Dickey-Fuller (ADF) Test for Unit Root

Variables	At Level		At 1st Difference	
	T-statistics	P-values	T-statistics	P-values
$GDPPG_t$	0.461127	0.9829	-4.250619	0.0019
LFG_t	-1.773621	0.3854	-7.539674	0.0000
Inv_t	0.017320	0.9526	-3.921859	0.0057
Trd_t	-2.266444	0.1886	-6.122370	0.0000
GI_t	0.561944	0.9865	-6.263071	0.0000

Table 2: Unrestricted Co-integration Rank Test (Trace)

H0	H1	Trace Statistic	0.05 Critical Value	Prob.a
R = 0*	R ≥ 1	92.81319	88.80380	0.0249
R ≤ 1	R ≥ 2	58.72602	63.87610	0.1257
R ≤ 2	R ≥ 3	33.55248	42.91525	0.3094
R ≤ 3	R ≥ 4	19.84095	25.87211	0.2341
R ≤ 4	R ≥ 5	8.643862	12.51798	0.2035

a MacKinnon-Haug-Michelis (1999) p-values
* denotes rejection of the hypothesis at the 0.05 level

Table 3: Short Run Estimates

Dependent Variable = DGDPPG

Variable	Coefficient	t-Statistic	P-value
DGDPPG (-1)	-0.161650	-0.958211	0.3471
DGI	0.302879	1.112715	0.2764
DGI (-1)	-0.128769	-0.417573	0.6798
DInv	0.259449	0.798457	0.4321
DInv (-1)	0.359077	1.153535	0.2596
DLFG	-0.211019	-1.427877	0.1657
DLFG (-1)	-0.269155	-1.275721	0.2138
DTrd	0.285975	1.950609	0.0624
DTrd (-1)	0.056336	0.487662	0.6300
ECT(-1)	-0.852910	-3.239252	0.0034
C	0.059937	0.133993	0.8945

R2 = 0.5476
F-Statistic = 3.02622
Prob (F-statistic) = 0.0119
Durbin-Watson = 1.7615

Based on Trace statistics, the null hypothesis stating that there is no co-integration ($R = 0$) is rejected against the alternative hypothesis of atleast one co-integrating vector ($R \leq 0$) exists as the trace-test statistics, 92.81319, is greater than its critical value, 88.80380, at 5 percent level of significance. But the null hypothesis of $R \leq 1$ cannot be rejected in favour of alternative hypothesis of $R \geq 2$ as the value of trace statistics 58.72602 is less than its critical value of 63.87610 at five percent level of significance. Thus the time series data analysis based on VAR model confirms the existence of one cointegrating vector and it can be concluded that there is long-run equilibrium

relationship among the time series variables of investment, labour force growth, trade openness, gender inequality and economic growth. The long run coefficients of our analysis are reported in equation (5).

$$GDPPG = CONSTANT + 1.686918*LFG + 0.379648*Inv + 0.929502*Trd - 0.840527*GI \quad (5)$$

* indicates the significance at 0.05 level.

These results indicate that labour force growth, investment and trade openness have statistically significant and positive effect on economic growth whereas gender inequality has negative and significant impact on economic growth. Short run dynamics have been reported in Table 3.

Significance of error correction term (ECT) as shown in Table 3 is a further proof of proof of the existence of stable long run relationship among variables of our interest.

DISCUSSION

The issue of gender inequality has been debated much among the circles of academicians and policy makers. Though it has gained importance as a matter of concern on intrinsic grounds yet the application of gender as a macroeconomic variable has been embraced by the economists recently. The present study, through its empirical findings, notes the retarding effects of gender inequality on economic growth in Pakistan. Thus the issue of gender inequality should be addressed not only due to its intrinsic value but also because of its instrumental value for economic growth.

Gender-specific statistics for Pakistan present a very gloomy picture. Although an equal treatment for all persons of society has been underlined in the constitution of Pakistan yet on-ground situation is different. Women are behind men in almost every field of life. They have less access to education, health and employment opportunities. They enjoy very limited ownership rights. This has restrained them in playing an active role in economic and development activities. The issue of gender inequality is of very complex nature. It is deeply rooted in history, culture and traditions of a society. Thus a holistic approach is needed to cope with this issue. On one hand, public policies should be formulated in a way which could enhance women's access to education, health and employment opportunities and on the other hand social mobilization is also needed.

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