Gender Differentials in Education and their Impact on Economic Growth of Pakistan

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Abstract:

South Asian economies in general and Pakistan in particular exhibit gender inequalities in education, employment, and health outcomes. These inequalities have significant impact on economic development. Gender inequality in education and access to resources may prevent the reduction in child mortality, fertility, and expansion of education. Assuming the male and female have the similar innate abilities, gender inequality in education means that less able boys get the chance of education and the average innate ability of educated pupils is lower in comparison to the situation if boys and girls received equal educational opportunities. Hence, gender biasedness in the education will result in lowering the human capital having negative impacts on economic growth. This study analyses the impact of gender equality on economic growth in Pakistan by taking the data for the period of 1972-2010 and using the cointegration analysis. It is found that gender inequalities at the level of education are undermining the economic growth and if these inequalities are removed then the country may grow much faster. However, the gender inequalities at higher level are more sever for economic growth in comparison to gender inequalities at primary and secondary level.

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"Equal access to education, training and science and technology: Pathway to decent work for women"

(United Nations, 2011)

1. Introduction

Human capital plays a pivotal role in sustainable economic growth. The concept of human capital in economic literature is defined broadly by including education, health, training, migration, and other investments that enhance an individual's productivity. The present difference in per capita income between developed and less developed countries is mostly attributed to the difference in education standards of their population and public investment in education. Developed countries have not only improved their overall literacy rates but have also reduced the gap between female-male literacy rates. According to UNESCO (1996), in order to obtain the goal of sustainable economic growth, investment in education should be 4 percent of GDP.

Nature has gifted both male and female with innate abilities. Studies have shown that if a country only educates its males then some unable persons enter the labour market which automatically reduces economic growth (Klasen, 1999). Gender inequality in education and access to resources may prevent the reduction in child mortality, fertility, and expansion of education. Assuming that the male and female have similar innate abilities, gender inequality in education means that less able boys get the chance of education and the average innate ability of educated pupils is lower in comparison to the situation if boys and girls received equal educational opportunities. Hence, gender biasedness in education will result in lowering the human capital having negative impact on economic growth.

In Pakistan, while the gender distribution of population is almost even (Pakistan Economic survey, 2010-11), there is a noticeable gender difference

in acquisition of education. In Pakistan Gender Parity at primary education level present a dismal picture, during the period 2004-2009 the gender parity index has declined from an already lower number of 0.85 to 0.84. It indicates that under present circumstances female participation in education has reduced and disparity between the participation of female and male counterparts of the society has increased.

The purpose of this study is to highlight the impact of gender differentials in education, at various levels, on economic growth in Pakistan. This study has further assessed the role of openness, investment and population growth rate in affecting the process of economic development in the long run.

The paper is divided into six sections, after the introduction, section two deals with the literature review; section three provides a brief overview of gender inequalities in education in Pakistan. Section four discusses the data and methodology of the study while section five of the study discusses the results emerging from the present study and the last section concludes the study by giving some policy implications.

2. Literature Review

While it may be imperative to study the importance of female education and the possible advantages that it accrues to both the female participants and the society along with the probable hindrances, it is rather of more importance to study the parent's lack of motivation in advancing both their time and money in educating their daughters. Gertler and Alderman (1989) argue this lack of motivation on three grounds which he identifies as the fewer benefits ensuing from investing in educating the female participants than educating the male participants. Such a condition, according to him prevails when the labor of either the female or male qualify to be inadequate for specific activities, requiring specific labor that are characteristic to either the female or the male counterpart hence necessitating specific choice of labor. Another reason for such a lack of motivation ruled out was parent's expectations of more benefits from educating their sons rather than their

daughters. Since support in their old age seems a matter of concern for many parents who often expect their sons as constants in their life to take care of them in their old age while daughters are deemed as temporary members of the family who would eventually move to another household. Hence, in such circumstances, the divide between private and social benefits leads to a market failure, which would eventually render investing in female education of least importance, and is likely to decline. Many studies so far suggest the numerous gains of educating the female population, however very little quantitative information exists to substantiate its very debated importance perhaps, because of the lack of information regarding the activities that women undertake at home, such as educating their children and family members while imparting and sharing their knowledge at the same time.

In developing countries, education plays a pivotal role and has both direct and indirect effect in ensuring female labor participation. Directly by the demonstration of skills, those acquired through formal or informal education or indirectly by affecting the fertility rates and resultantly lower birth rates while they remain conscious of their health and the health of their children.

Traditionally women often spend more time with their children, fewer children mean lesser time shall be spent on childcare and the remaining time can be utilized effectively by being a part of the labor force. While many benefits have been associated with female education, it is also worth mentioning that increase in the use of technology by the female has led to the eventual increase in female tech savvies. Studies have also linked female education with reduced corruption (Dollar and Gatti, 1999, & Glick, and Sahn, 2000). While others suggested lower gender income inequality to preventing the diminishing returns on capital. Increased participation of females in the workforce increases the per capita income, keeping wage and productivity constant (Largelof, 1999). Many studies have suggested that if there remains a difficulty for women to participate in the formal sector, this would reduce the competitiveness of that country in terms of increased labor costs. Hence with the above mentioned benefits associated with female education, studies conducted by Khan (1997), Blau and Kahn (1997),

Daymont and Adrisani (1984), Grogger and Eide (1995), Kane and Rouse (1995), Loury (1997) have indicated higher returns from investing in female education than that were associated with the men.

There are various factors that play as a barrier to female education, one of them being the education of parents themselves that plays a very significant role in deciding whether their daughters should be sent to school for education or not. Other important factors that also contribute and pose as barriers to female education include income of a household (NIPS, 1992); cultural background, schools within reachable proximity, available infrastructure, the order of birth of a child and also the household head's decision of sending their daughters to school, presence of children under five in age etc (King and Hill, 1995). Furthermore, the number of those earning within the household, preference for a son over a daughter (Moretti, 2004), indirect taxes (Malik, and Saqib, 1985 & 1989) also affect the household's head decision to send their daughters to school.

Dollar and Gatti (1999) found the innate abilities of students to be normally distributed between both the male and the female. While comparing two distributions, one in which half of the age cohort that gets educated is male and half is female, both being equal in comparison while in the other 70 percent were males and 30 percent were females. On comparison it was found that the return on capital in the latter was 13 percent less than the distribution which had a 50/50 proportion. Hence, in the light of the above arguments it is a well sought out perception, that human capital is a major asset to a country that drives the economy and social development on a boom and also the negative impact of gender disparity on attaining such a human capital for development is evident.

Abu-Ghaida and Kalsen (2004) suggests that gender equity in education promotes economic growth, reduce fertility, child mortality, and under nourishment. Authors estimated the costs of missing the gender related millennium development goals. The simulations suggest that by 2005, the countries that are off track in gender related goals are likely to suffer 0.1–0.3 percentage points lower per capita growth.

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Kalsen (2008) analyze the four strands of literature on 1) the importance of equity or fairness; (2) the importance of relative incomes and inequality 3) the distribution-adjusted well-being 4) the relationship between income and gender inequality and economic growth. The study concludes that all of these literatures provide a sound empirical basis for arguing that equity is critical for greater efficiency leading towards sustainable economic growth.

Sundaram and Vanneman (2008) find that in the areas where the share of women is higher in the labor force in India, female literacy rate is lower. The reason seems to be that girls' labor force participation rates, depress their literacy and education. Gender inequalities in literacy are therefore an exception to the usual egalitarian impact of women's labor force participation and there exists multidimensionality of gender inequalities.

In a recent study, Klasen (2009) finds that gender gaps in education and employment significantly reduces economic growth and is a major reason for growth differentials among the regions. The study concludes that costs of discrimination towards women in education and employment are not only harmful for the concerned women but the entire society suffers. The study asserts that an important constraint to higher economic growth in less developed regions appear to be the substantial gender inequality.

3. Gender Inequality in Pakistan

Pakistan finds itself in the clasp of many challenges in the recent past and in the present, being so it has stepped forward and adopted and implemented policies ensuring that rise in the literacy rate will contribute to its development. The overall literacy rate in Pakistan is around 57.7 percent, with a rate higher in the urban areas (73.2 percent) than in the rural areas (49.2 percent) and it is 69.5 percent for the male and 45.2 percent for the females (Economic Survey, 2010-11).

It has been observed that during the first half of the last decade, Pakistan has made significant increase in the net enrollment rate augmenting it from a

mere 42 percent to a 52 percent. The speed with which such figures increased however took a downturn in the following years with a mere increase of 4 percent. While Education is regarded as the basic 'human' fundamental right for both men and women it does not come as a surprise that while women have been the recipient of many biases and discrimination, they have also been denied the fundamental right of education in Pakistan. This disparity between participation among the male and female counterparts has seen an increased trend under the current unfavorable circumstances of social and economic uncertainty. Consequently, a significant portion of the population remains deprived of education while the nation remains deprived of a major portion of potential female workers. The number of such potential workers if improved should act as a stimulus for greater economic activity and improved social conditions. Hence, all of which require a higher investment on women education which would eventually lead to higher social benefits accruing to the female population and the nation as a whole in terms of economic and social prosperity.

The literacy rate of males has been estimated 69.5 percent in FY 2008-09 while it has been a mere 45.2 percent for the female, a percentage that makes up mostly the girls in the urban areas of the nation, that have been fortunate and privileged and those that belong to the high income families dwelling in the urban areas. Likewise, in case of Gender Parity at primary education the situation is not up to the mark. Gender Parity, saw an improvement from 0.82 to 0.85 points in the first half of this decade, but thereafter a decline by 1 percent have been witnessed during 2004-2005 to 2008-2009 indicating that under current circumstances female participation in education has reduced, increasing the disparity between the participation of female and male counterparts of the society.

Such disparity has often been sought as a contributing factor, contributing to poverty and the impoverished conditions in which women have to live along with the subordinate roles that most women in Pakistan have to assume. Such conditions often require a cut down to pro poor policies primarily for women without which it would be impossible to curtail

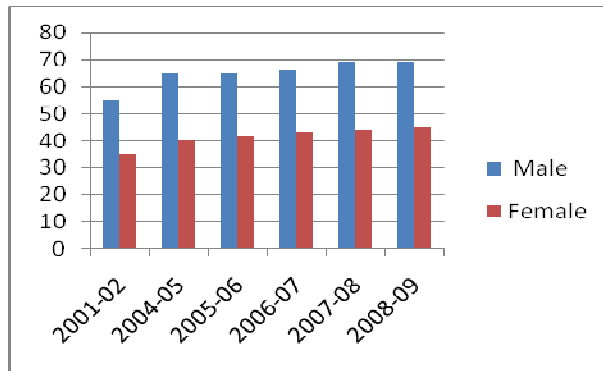the problems that women face in the Pakistani society.

Fig. 1 Literacy Rate
Source: Pakistan Millennium Development Goals Report 2010

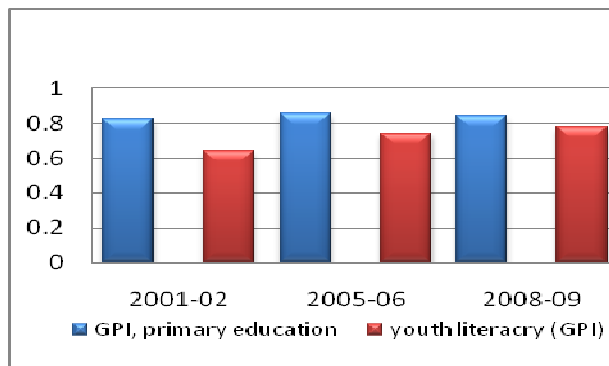Fig. 2 Gender Parity Index
Source: Pakistan Millennium Development Goals Report 2010

4. Data and Methodology

Solow's (1957) neo classical model provides the necessary foundations for growth estimation; however, it has ignored the role of human capital in the determination of economic growth. To overcome this, Mankiw et al. (1992) have incorporated human capital in growth models. Over the years

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various models have been used to incorporate the impact of gender biasedness in economic growth. A model proposed by Kalsen (1999) is considered as pioneer in this regard. This model is based on simultaneous equations; however, for time series estimation, the model can only be used if all the variables are stationary at level. To overcome such issues Seguino (2000) has developed a single equation model that lays the foundation for empirical model of the present study.

Using the neoclassical production function framework, with output as a function of capital stock, labor force supply and technological progress, the basic model is given below:

$$Y = AF\ (K, L, GPI, OP)$$

where Y denotes GDP growth, K capital stock, L labour force supply, Gender Parity Index (indicator for Gender equality) and OP represent openness used as control variables. The empirical specification that has been used in the present study is as under:

$$\log(y_t) = \alpha_1 + \alpha_2 [\log(K)_t] + \alpha_3 \log(l_t) + \alpha_4 \log(op_t) + \alpha_5 \log(w_{it}) + \varepsilon_t$$

Following the earlier prominent empirical studies on growth, all the variables are used in the log form. The w_i stands for the gender parity index (GPI) at various levels of education, i represent models 1,2,...5 representing enrolment at primary, secondary, professional, technical and higher education respectively. As openness has played an extremely important role for liberalization, gender rights and economic growth in Pakistan, so it is used as a control variable. There are various indicators for openness, in the present study (import +exports)/GDP has been used as an indicator for openness. The study uses data for the period 1972-2010; from State Bank of Pakistan annual reports (various editions) and Pakistan Economic Survey (various editions). Brief description of the variables used is summarized in Table 1.

Table 1
Description of Data

Sr. No.	Name of Variable	Data Source	Comment
1.	Real GDP (Y)	SBP Annual Reports	Different measures of GDP growth have been used in the literature e.g. Per capita GDP, GDP growth rate, Real GDP, Real GNP etc. In the study we have used real GDP, because it accounts for the inflationary impact.
2.	Physical Capital (K)	Pakistan Economic Survey	Physical Capital is another very important source of economic growth. We have used Gross fixed capital formation as ratio to GDP.
3.	Gender Parity Index at Various level of Education (Wi)	SBP Annual reports	Various measures of gender inequality in education have evolved over the years including gender parity index, Female to Male literacy ratio, Female as percentage of total enrolment etc. Keeping in view the data availability, this study has calculated the Gender Parity Index by using (Female enrollment/Male enrollment) it ranges from 0-1 and 1 stands for Gender equality.
4.	Openness (OP)		After globalization, openness has obtained great attention as a determinant of economic growth. In the literature, measures that were used include tariff and quotas, real exports, real imports, balance of trade and the ratio of exports and imports as percentage of GDP. This study has used the sum of exports and imports as percentage of GDP.
5.	Labour force (L)	Pakistan Economic Survey	Over the growth history, labour force is considered as a key ingredient for economic growth. Number of workers/ labour force, employment rate, population growth rate and number of hours worked are the most widely used variables. Among these variables, the authors have selected population growth rate.

5. Estimation of Results

For any time series analysis the first step is to check the stationarity of a series, according to Newbold et. al (1974) in case the series is not stationary (or there is presence of unit root) the OLS estimation may yield spurious results. To check the stationarity of the variables Augmented Dickey Fuller (ADF) test has been used and the results are summarized in Table 2.

Table 2
Augmented Dickey Fuller Results

	Constant	Constant & Trend	None	Constant
Y (GDP)	1.56 (0.49)	-1.10 (0.92)	3.47 (0.99)	4.09 (0.003)
K (Physical Capital)	-0.96 (0.74)	-1.82 (0.66)	-0.48 (0.49)	-4.25 (0.002)
L (Population Growth)	0.49 (0.98)	-1.28 (0.88)	3.90 (0.99)	-5.78 (0.00)
W1 (Primary Education)	-1.16 (0.68)	-2.86 (0.19)	-1.87 (0.06)	-5.77(0.00)
W2 (Secondary Education)	-0.94 (0.76)	-2.63 (0.27)	-1.31 (0.17)	-7.83 (0.00)
W3 (Professional Education)	-0.31 (0.98)	-1.94 (0.61)	-1.54 (0.11)	-7.41 (0.00)
W4 (Technical Education)	-2.01 (0.28)	-1.86 (0.65)	-0.84(0.35)	-5.59 (0.00)
W5 (Higher Education)	-1.46 (0.54)	-3.04 (0.13)	0.91 (0.31)	-8.68 (0.00)
Op (Openness)	-1.57 (0.48)	-2.72 (0.23)	-0.34 (0.56)	-5.71 (0.00)

* Values in parentheses are the p value

There are four different steps involved while testing cointegration, in the first step the order of stationarity is determined. It is already determined that variables are stationary at first difference i.e. series of the model are I (1). Therefore, the cointegration can be determined between the variables. Second step involves choosing the optimal lag length. To determine the lag

length VAR model has been used and on the basis of AIC criteria, the lag length of one for the models has been determined. The AIC values at various lag lengths are summarized in table 3. Next step deals with determining the number of co-integrating vectors. In the study, both trace statistics and eigen value statistics are used.

Table 3
AIC Values at Various Lags in VAR

Lag length	AIC Values
0	6.5138
1	5.316
2	5.493
3	5.737
4	5.767

The results of both of the statistics are summarized in table 4 for all the five specifications. The results of cointgration test suggest that in all the models there exist a cointegarting relationship among the variables. Hence, it can be concluded that there exist a long run relationship of the dependent variables with per capita GDP.

In the fourth step the normalized equation of the co integration equation is analyzed and it determines the long-run coefficients of the model, the results of the normalized cointegrating equation are presented in table 5.

Long Run Relationships

Physical Capital (Investment)

The study uses gross fixed capital formation as a proxy for investment. It reveals that in all the specifications, it has a positive and significant impact on real GDP. The findings are in accordance with theory that investment enhances economic growth; as it is supported by numerous studies, e.g. Mankiw et al. (1992) and Lucas (1988).

Table 4
Results of Johnsen Co- integration Test

Hypothesized No. of CE(s)	Eigen value	Trace Statistic	0.05 Critical Value	Prob.**
Model I (Wi=Primary Education)				
None *	0.646995	77.68197	69.81889	0.0103
At most 1	0.451239	40.19612	47.85613	0.2156
At most 2	0.338519	18.59277	29.79707	0.5225
At most 3	0.093825	3.714901	15.49471	0.9252
At most 4	0.004659	0.168098	3.841466	0.6818
Trace test indicates 1 cointegrating eqn(s) at the 0.05 level				
Model II (Wi=Secondary Education)				
None *	0.716078	73.63799	69.81889	0.0240
At most 1	0.372541	28.31192	47.85613	0.8000
At most 2	0.189907	11.53313	29.79707	0.9469
At most 3	0.100475	3.951301	15.49471	0.9075
At most 4	0.003863	0.139319	3.841466	0.7090
Trace test indicates 1 cointegrating eqn(s) at the 0.05 level				
Model III (Wi=Professional Education)				
None *	0.659086	80.51402	69.81889	0.0055
At most 1	0.411859	41.77352	47.85613	0.1652
At most 2	0.290575	22.66516	29.79707	0.2629
At most 3	0.246467	10.30636	15.49471	0.2579
At most 4	0.003299	0.118977	3.841466	0.7301
Trace test indicates 1 cointegrating eqn(s) at the 0.05 level				
Model IV (Wi=Technical Education)				
None *	0.659212	75.07701	69.81889	0.0179
At most 1	0.485796	36.32325	47.85613	0.3803
At most 2	0.203401	12.37839	29.79707	0.9179
At most 3	0.109470	4.191862	15.49471	0.8874
At most 4	0.000502	0.018084	3.841466	0.8929
Trace test indicates 1 cointegrating eqn(s) at the 0.05 level				
Model V (Wi=Higher Education)				
None *	0.690913	82.74790	69.81889	0.0033
At most 1	0.373913	40.47915	47.85613	0.2058
At most 2	0.368200	23.62156	29.79707	0.2169
At most 3	0.164077	7.090980	15.49471	0.5671
At most 4	0.017597	0.639123	3.841466	0.4240
Trace test indicates 1 cointegrating eqn(s) at the 0.05 level				

Table 5
Normalized Long run Coefficients

	Coefficient	t statistics	Standard error
Model I (Wi=Primary Education)			
Wi	0.17291	0.47676	0.36268
L*	-1.6974	-6.25056	0.27156
K*	0.71377	3.645217	0.19581
OP*	0.907	5.915346	0.15333
Model II (Wi=Secondary Education)			
Wi	0.04733	0.67265	0.07036
L*	-2.56615	-4.63271	0.55392
K*	1.757277	5.3987	0.3255
OP*	1.077618	4.805003	0.22427
Model III (Wi=Professional Education)			
Wi*	0.204584	3.128674	0.06539
L*	-1.76105	-9.21627	0.19108
K*	0.470564	3.362372	0.13995
OP*	0.59966	6.30095	0.09517
Model IV (Wi=Technical Education)			
Wi*	0.25877	2.13014	0.12148
L*	-1.56543	-5.51402	0.2839
K*	2.065679	4.625966	0.44654
OP*	1.333009	3.866708	0.34474
Model V (Wi=Higher Education)			
Wi*	0.743244	1.986646	0.37412
L*	-1.51806	-8.31174	0.18264
K*	0.842169	3.902906	0.21578
OP*	0.846862	5.652152	0.14983

*, **represents significance at 5% and 10% level respectively

Openness

Consistent with expectations, openness is significant with positive sign in all the specifications. It supports the findings of Naqvi (2010), Coe and Helpman (1995) and Lucas (1988). The reason is that greater openness of an economy to the outside world represents improved competitiveness and productivity of the economy that leads towards better economic performance.

Population Growth

The study finds that population growth has a negative relationship with economic growth, it supports the Malthusian theorem.

Gender Equality

Results of this study support the congenital wisdom that gender equality has positive impact on economic growth as in all the cointegration specifications Gender Parity Index (GPI) has a positive relationship with GDP suggesting that as GPI increases economic growth also increases. It can be inferred that the gender inequality undermines economic growth of a country. The results further assert that although gender equality at the primary and secondary level has a positive relationship with economic growth but its impact is not strong enough to be significant. However, it is important that this finding may not be taken to suggest that gender inequality at primary education does not hurt economic growth. Rather the reason seems to be that in Pakistan, schooling does not increase the cognitive skills or productivity, suggesting the limited role of primary and secondary education. So gender discrimination at schooling is not as severe for economic growth as it is at the higher levels. But as gender equality at primary and secondary education lays the foundation for equality at higher levels, so efforts to curtail gender inequality at schooling are extremely important. In addition, this is not an argument against gender equality at primary and secondary level, which has an intrinsic value regardless of its economic consequences. The results further assert that gender equality at higher education level have the strongest impact on economic growth, followed by technical education and professional education. It suggests that gender inequalities at higher levels are contributing significantly towards undermining economic growth of the country.

6. Conclusions and Policy Implications

Over the years, investment in human capital in general and particularly in

education is considered as the most important factor of economic growth. This study reveals that in Pakistan education is not given much importance. Not only the government's education budget remains inadequate but its utilization also remains questionable. At all levels of education, gender differential is very high. The present paper by using the cointegration technique, finds that gender inequality at all the levels is undermining economic growth, confirming that gender bias in education retards economic growth.

So if the gender differentials in education at all levels are reduced then our economy can move towards convergence and will achieve a high living standard that the other developed countries acquired by investing more in the skills of men but also their females. Reduction in gender inequality is the only right and speedy way to attain sustainable economic growth.

Gender inequality in education shows the backwardness of a country. To improve gender equality in education, following policies are recommended:

i.   Given the importance of education, particularly of the female education, it is strongly recommended that, in allocation of public funds priority may be given to the education. Furthermore, as many earlier studies including Akram et.al (2008) suggest that utilization of public funds for education and health are inadequate so a mechanism for monitoring these allocated funds may also be developed.

ii.   It is also important to mention here that female enrollment can only be enhanced if educational institutions are available very near to females. In rural areas of Pakistan many talented women are unable to get higher education due to non-availability of universities, colleges etc. Furthermore, considering the conservative Pakistani society there is dire need that women universities, professional institutions may be developed. Presently, few women universities are working, but these do not fulfill the needs of women education in Pakistan. Furthermore, it only provides educational facilities in the Social Sciences and not in Pure Sciences.

iii. It is worth noting here that education to females may not be provided at the cost of male counterparts. Rather it is suggested that education facilities may be provided to both females and males while creating awareness about the importance of female education so that females can play an active role in the economic development of Pakistan.

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