NEXUS BETWEEN GENDER INEQUALITY IN EDUCATION AND ECONOMIC GROWTH IN PAKISTAN

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Abstract

Pakistan's women educational attainment has been the lowest in the entire South Asia; with women and girls continuing to suffer discrimination in the field of education. This study is designed to examine the linkage between gender disparity in education and Pakistan economic success, using annual secondary data to date range 1980 to 2019. Also the study checked the variables integration order by using Dickey-Fuller and Philip-Peron tests apart from utilizing the ARDL bound test technique for long-run co-integration relationship while the direction of causality were tested by using Granger causality. The analyses reflect that a strong adverse influence on growth was the result to be yielded from gender educational disparity in Pakistan. This finding is based on the empirical interpretation such as women educational attainment at primary and secondary levels, government expenditures on education, total secondary education and male secondary education significantly contribute to growth. However, the associations of population growth, total labor force, male education at primary level and total primary education with growth being significantly negative. This study also found long run pair-wise causality from male and female secondary school attainment separately, male primary education, total primary and total secondary education to economic success.

Keywords: Gender primary education, gender secondary education, economic growth, gender education disparity

Introduction

The status of women comprising almost half of human capital, determines to display a significant contribution to development process. Bearing the burden of struggle for survival particularly in the developing countries, women's role in the society development is more similar to the goal of macro socio-economic growth and development. Any strategically developmental plan ignoring increased women role which is designed as an integral part in the development process for social and economic progress cannot achieve macro level socio-economic development.

Women problems have been focused for the last few decades with the issue of their equality with men being considered as one of the burning issues. According to UNDP[1], a country should include gender equity in her developmental goals as accepted by the

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[1]UNDP, *Human Rights and Human Development* (United Nation Development Program, 2000), 1-309

convention relating to overcome all forms of discrimination, and opposite of women, ratified and signed by 165 countries. UNDP human development report indicates that South Asia has a lowest value (0.235) for gender inequality measure in the world with Pakistan giving a poorest rate (0.179). According to the measure of Gender Development Index (GDI), 0.226 is the average index among the entire South Asian.

An eloquent performance of education in the formation of human capital as recognized the 21st century's defining enterprise aimed high global competition and evolution of globalization. Education increases individuals' efficiency and productivity thus producing more skillful labors may have the potential to sustain the economic success. As per the conventional human capital theory presented by Mincer[2] and Becker[3], education and training are the main determinants in accumulating human capital that in turn has a positive and direct influence on the lifetime earning of an individual.

Dollar & Kraay[4] argued that several developmental goals have been adversely influenced by gender discrimination in education; with low mortality and fertility being prevented by the gender inequality in education as explored by various studies. Secondly, lower economic success may certainly be the result of high gender educational inequality and further contended that economic benefits boost welfare of the society.

Hence the study main objective is to reveal the economic consequences of educational Gender disparity in Pakistan, using time series data covered period 1980-2019. Several researchers argued that gender disparity in education directly a significant cause of growth prospect specifically at the low average rate of human capital. Any strategically development plan ignoring the role of educated women will be misleading and unsuccessful with regard to socio-economic development.

Gender educational disparity in Pakistan

Social, economic, demographic and cultural problems in Pakistan have created serious gender disparity in education with our patriarchal society creating certain discriminations which make women suffer in every field of life. Several methods including net and gross enrolment rates in addition to dropout and completion ratios have been used to measure gender inequality in education. According to Pakistan Economic Survey[5], the current figure for males in terms of enrolment and literacy rate at the level of primary and secondary education is far better than females in Pakistan; with our government making negligible efforts to narrow down gender discrimination gap in education.

In 2015 education census, figure for educational institutions in Pakistan is 257000, including boys 25 percent and girls 21 percent whereas 53 percent for coeducation system. The data indicates that Punjab is the highest in the overall participation rate in

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[3] Becker, G. S. Human Capital: A Theoretical and Empirical Analysis, (with Special Reference to Education, Second Edition, 1962), 1"
[4] Dollar, D., & Kraay, A..*Growth is Good for the Poor*. (Washington DC: World Bank, 2000),1"-56.
[5] Pakistan Economic Survey.(Education, 2018-19), 171-186

enrolment followed by Khyber Pakhtunkhwa and Sindh while Balochistan is the lowest in this regard. On the other hand, remote areas like AJK and Gilgit-Baltistan have almost equal participation rate in enrolment. Girls' enrolment witnesses lower ratio in all regions with Fata registering the lowest ratio in the entire country.

On the contrary, data displayed a strong interdependence between gender disparity and growth. As per UNESCO [6], 87 million female students were enrolled at primary level in Pakistan in 2015 while the measure for male is 110 million. Likewise, the enrolment ratios at secondary level highlighted 51 million for females and 69 million for males. However a more obvious discrimination was found at the tertiary level with figure for enrolled females being 0.8 million while 1.2 million male students got enrolled at the same level.

Also there exist certain constraints in the way of women participation, thus affecting adversely development and growth in Pakistan. The country critical developmental targets at broad range could be achieved by investing more in women education as result of which less number of children can be provided with better health and nutrition opportunities. Also, women education can significantly reduce the rate of child mortality and generate more income apart from being able to educate their children which could contribute to development.

Gender inequality and economic growth

In two different studies of Barro et.al.[7,8] a negative economic contribution of gender disparity in education has been explicitly established. Literature of these studies emphasized that the role of women education in the fertility declines and then the development of human capital in the next generation, reducing gender gap may spur economic success. Though the same result was also displayed in parallel by few empirical studies, however the others contended that gender educational gap determines to boost economic benefits. Nevertheless, Forbes and World Bank[9,10] are the more recent studies have suggested the opposite economic yielding of gender disparity in education. As demonstrated by Lorgelly[11], the recent findings identify not only the difference between the result of the current studies and the previous but also explain comprehensively the reason behind the recent adverse association and positive linkage in the previous between gender educational disparity and growth.

[6] UNESCO. Education: Gross Enrolment Ration by Level of Education, (United Nation Educational Scientific Cultural Organization, 2016), 1-5
[7] Barro, R. J..Economic Growth in a Cross Section of Countries. *The Quarterly Journal of Economics*, (1991) 407–443.
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[9] Forbes, K. J.*A* Reassessment of the Relationship between Inequality and Growth, *American Economic Review*, (2000),4, 869–887.
[10] World Bank, *Engendering Development: Through Gender Equality in Rights, Resources, and Voice.* (New York: Oxford University Press, 2001)
[11] Lorgelly, P. K., & Owen, P. D. The Effect of Female and Male Schooling on Economic Growth in the Barro-Lee Model, *Empirical Economics*, (1999). 537-557

Certainly several studies on the gender educational gap in context of Pakistan are available but very few empirical studies on the economic outcome of gender educational disparity in Pakistan were found. Major studies earlier conducted are: [12], [13], [14], [15], [16], [17], [18], [19], [20], [21], [22], [23], [24], and [25].

Annual secondary data to date range 1980-2015 used in this study to explore the economic yielding of gender educational gap in Pakistan. The data to be used is related with Gross Domestic Product and total labor force is taken from world development indicators. On the other hand, figures about gender education at primary and secondary level and government spending on education could be obtained from UNESCO. Furthermore, data for population growth will be taken from the new Pakistan Economic Survey.

This study follows[26], to estimate a certain set of equations to investigate a direct influence of gender educational gap on economic growth in Pakistan. Thus we captured the following econometric equations for estimation.

$$LnGDPt = \beta_0 + \beta_1 TPE_{+} \beta_2 TSE + \beta_3 LnPEFt + \beta_4 LnPEMt + \beta_5 LnSEFt + \beta_6 LnGEEt + \beta_7 LnSEMt + \beta_8 LnTLFt + \beta_9 LnPGt + \mu_1 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

$$LnGDPt = \beta_0 + \beta_1 TPE + \beta_2 TSE + \beta_3 LnGEEt + \beta_4 LnTLFt + \beta_5 LnPGt + \mu_2 \ldots . (2)$$

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$$LnGDPt=\beta_0+\beta_1TPE+\beta_2TSE+\beta_3LnFPEt+\beta_4LnMPEt+\beta_5LnFSEt+\beta_6LnMSEt+\mu_3-\ldots\ldots\ldots(3)$$

It's very much important to discuss shortly the way we putted variables in the above three equations. The multi co-linearity problem arises with the inclusion of overall level of educational attainment and separate gender bias educational attainment simultaneously. Thus we adopt a different way to put variables of total educational attainment and then the separate gender bias educational attainment in order to avoid the problem of multi co-linearity. Table 1 shows description of each variable used in the above econometric equations.

Table-1

DESCRIPTION OF THE VARIABLES

Variables	**Description**
GDP	Gross domestic product (LCU)
FPE	Primary education of female (Enrolment ratio)
MPE	Primary education of male (Enrolment ratio)
FSE	Secondary level enrolment ratio of female (Enrolment ratio)
GEE	Government expenditure on education
MSE	Secondary enrolment ratio of male (Enrolment ratio)
TLF	Total labor force
PG	Population growth
TPE	Total primary education (Total Enrolment ratio)
TSE	Total secondary education (Total Enrolment ratio)

Empirical findings

Annual secondary data will be used in the study covering the period of 1980-2019. The variables in the econometric models have transformed into log-linear form. GDP will be used as a dependent variable and a proxy for economic growth, while separate gender bias enrollment ratios at primary and secondary school level, Government expenditures on education and total labor force are explanatory variables in the equations.

As argued by Nelson et.al., [27,28] several studies with the properties of time series data relate mostly with macro-economics follow a random walks. Further, as shown by Granger et.al, if the time series data in the study of econometrics found to be non-stationary then such a data does not follow the conventional theory of the regression.[29,30,31,32,33]

Thus as regarded by Engle, Schwert & Johansen[34,35,36] that the coefficients in the regression with non-stationary data will be considered as misleading or spurious. Thus it's very much important to analyze the property of the time series data to be used in macro-economics studies especially for examining the interrelationship among the variables.

Hence to avoid from misleading or spurious regression analyses, First the integration order for all the variables required to be checked by using of unit roots tests such as before proceeding to examine co-integration among variables.[37,38,39]

The empirical findings and analysis

The Following Table -2 displays the result of ADF and PP, implying that the integration order for the entire variables are I(1), irrespective of the random walk model to be used with drift or slope.

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[39] Dickey, D. A., & Fuller, W. A, Likelihood Ratio Statistics for Autoregressive Time Series with a Unit Root, *Econometrica*, (1981), 4, 1057-1072.

Table 2

RESULT OF TESTING UNIT ROOTS BY ADF AND PP, BASED ON THE SELECTION CRITERIA OF AIC WITH TREND AND INTERCEPT

ADF test statistics			**PP test statistics**	
Variables	**Level**	**1st difference**	**Level**	**1st difference**
LnFSE	-1.3188	-4.5734*	-1.4617	-4.2433*
	(-0.9803)	(-0.0078)	(-0.9421)	(-0.0120)
LnGDP	-2.3878	-5.57135*	-2.3878	-5.5824*
	(0.5123)	(0.0002)	(0.3121)	(0.0003)
LnGEE	-3.4227	-5.7072*	-2.9648	-11.4638*
	(0.0922)	(0.0003)	(0.2515)	(0.0000)
Ln FPE	-1.2076	-5.33405*	-1.0544	-8.8654*
	(0.9818)	(0.0008)	(0.9234)	(0.0000)
LnMPE	-1.3116	-3.80866**	-1.4256	-7.9272*
	(0.9105)	(0.0478)	(0.8054)	(0.0000)
LnMSE	-3.5055	-8.56487*	-3.5618	-9.3527*
	(0.0647)	(0.0000)	(0.0675)	(0.0000)
LnTLF	-3.4170	-6.99035*	-3.4676	-6.9962*
	(0.0877)	(0.0000)	(0.0801)	(0.0000)
LnPGR	-1.8362	-7.3450*	-1.8362	-7.3160*
	(0.7085)	(0.0000)	(0.7085)	(0.0000)
LnTPE	-1.4025	-4.7500*	-0.9469	-15.7312*
	(0.9343)	(0.0053)	(0.9409	(0.0000)
LnTSE	-1.5630	-4.6575*	-1.7040	-4.6654*
	(0.9078)	(0.0058)	(0.8587)	(0.0055)

Note
*and ** display significance of the statistics at 1%, and 5% respectively, where the values in the parenthesis show probability of the statistics.

Statistical analysis

The descriptive statistics such as the average, standard deviation, skewness and kurtosis of each respective variable have demonstrated in Tables 3 and 4. All the variables are negatively skewed except GDP, PGR and TLF. The higher Kurtosis statistics of GEE, MPE and MSE reflect leptokurtic means high peak or long tails, while the variables other

than these are platykurtic means low peck and short tails. The test of Jerque-Bera for the entire variables shows insignificant, meaning their residuals distributed normally.

Table-3
STATISTICAL ANALYSIS

	LGDP2	LFSE	LFPE1	LGEE	LMPE1	LMSE1
Mean	28.50002	13.07099	15.39590	0.887032	15.83707	13.73201
Median	28.51822	13.31298	15.53093	0.912283	15.93429	13.78195
Maximum	30.85663	14.21563	15.98776	1.105257	16.21966	14.74254
Minimum	26.18084	11.77529	14.45526	0.609766	15.12168	12.84529
Std. Dev.	1.410219	0.764524	0.485508	0.125481	0.336621	0.491380
Skewness	0.054437	-0.327906	-0.524557	-0.478534	-0.688340	-0.076856
Kurtosis	1.812324	1.776523	1.955362	2.424037	2.229904	2.188572
Jarque-Bera	2.074374	2.810188	3.196530	1.819580	3.628760	0.994646
Probability	0.354450	0.245344	0.202247	0.402609	0.162939	0.608156

Table-4
STATISTICAL ANALYSIS

LPGR	LTLF	LTPE	LTSE
Mean 0.855860	15.16367	16.26647	14.08918
Median 0.875469	15.13593	16.38721	14.23750
Maximum 1.131402	15.62445	16.78241	14.94981
Minimum 0.587787	14.78363	15.46668	13.07317
Std. Dev 0.167187	0.279361	0.417769	0.567051
Skewness 0.140329	0.291096	-0.489626	-0.285860
Kurtosis 1.647409	1.729266	1.887564	1.848914
Jarque-Bara 2.782895	2.849166	3.203156	2.408967
Probability 0.248715	0.240609	0.201578	0.299847

First the stationary level of each respective variable was checked, later highlighted the descriptive statistics for the complete data set and now proceeding to employ Bound test technique of ARDL, to reveal long-run co-integration. According to Bahmani[40], the selection of lag length is very much sensitive to the determinant of long-run association. The selection of optimum lag length recorded in Table 5 for the computation of F statistics is based on the Akaiki information criteria (AIC) and Scwarz information criteria (SC). The upper and lower bound values for the selection of optimum lag 2 at the significance level of 5 percent presented by[41] are 3.3 and 2.14 respectively. The higher F statistics than the value of upper bound (F > 3.3), displays null hypothesis rejection relate with no co-integration and accept the alternative, associate with presence of co-integration.

Table-5

ARDL BOUND TEST APPROACH FOR COMPUTING F STATISTICS TO TEST LONG RUN COINTEGRATION

Lag order selection	Computed F statistics	Lower bound at 5%	Upper bound at 5%
2	5.47	2.14	3.3

The ARDL long-run significant and positive coefficients for female primary and secondary education are 7.157541 and 3.417252 respectively as shown in table 6, implying that an increase of one percent in female primary and secondary education may enhance seven percent and three percent of GDP respectively in Pakistan. This result is consistent with the findings of [42, 43, 44 and 45]. The coefficient of male primary education being -7.157541 reflects significantly negative, indicating that expansion of one percent in male primary education may decrease seven percent in GDP. While the positive and significant coefficient of male secondary education is 4.378475, indicating that a significant rise of four percent in GDP could be yielded with the contribution of one percent in male secondary education. The impact of government expenditures on education and total secondary education on economic growth found to be significantly positive. While the association of population growth, total labor force and total primary education with growth found to be significantly negative. The negative growth effect of population progress means population expansion is a real issue for the economy of

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Pakistan. On the other hand, the adverse impact of total labor force on economy is specifically due to the fact that Pakistani labors lack in knowledge, training and skills.

Table-6

LONG RUN COEFFICIENTS OF ARDL MODEL (2, 1, 1, 1, 1, 1, 1, 0, 1, 1)
Dependent variable: Gross domestic product (GDP)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LFSE	3.417252	2.552317	2.674055	0.0148
LMPE	-7.157541	2.653385	-2.664013	0.0195
LGEE	3.351159	1.021779	3.192725	0.0071
LFPE	5.243905	1.343876	3.835188	0.0021
LMSE	4.378475	1.345866	1.187232	0.1371
LPGR	-17.909312	4.471269	-3.983304	0.0016
LTLF	-4.619919	1.575019	-2.869820	0.0131
LTPE	-14.338420	2.848637	-5.002228	0.0002
LTSE	11.242257	3.857504	2.891343	0.0126
C	226.158609	52.747987	4.285847	0.0009

The finding of error correction mechanism (ECM-1) with short-run elasticity identified in the subsequent table 7.The result indicates that FPE insignificantly and FSE significantly contribute to GDP in Pakistan. Similarly, GEE and MPE both expand GDP but statistically insignificant. However, MSE, PG, TLF, TPE and TSE identify an adverse contribution to growth in Pakistan. The ECM-1 is significantly negative, showing long-run causality running from explanatory variables to GDP.

Table-7

REPRESENTATION OF ERROR CORRECTION TERM (ECT) WITH SHORT RUN ELASTICITIES OF THE ARDL (2, 1, 1, 1, 1, 1, 1, 0, 1, 1)
Dependent variable: LGDP

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LFPE)	1.206647	3.351904	0.333470	0.7441
D(LFSE)	11.690505	4.085356	2.815328	0.0146
D(LGEE)	1.089322	1.345868	0.735907	0.4749
D(LMPE)	2.385607	3.491151	0.657868	0.5221
D(LMSE)	-2.549448	1.729606	-1.416831	0.1800
D(LPGR)	-14.965379	5.313777	-2.799605	0.0150
D(LTLF)	-5.637837	2.845079	-1.950367	0.0730
D(LTPE)	-1.162114	4.745125	-0.226174	0.8246
D(LTSE)	-1.762656	9.075783	-0.184421	0.8565
ECT-1	-1.316527	0.251162	-4.887840	0.0003

The model stability were tested by using of CUSUM and CUSUMSQ, stand for cumulative sum of recursive residual and cumulative sum of square of recursive residual respectively. The following figures 1 and 2, express plots of CUSUM and CUSUMSQ lie within the critical bounds of five percent significance level indicate that the model structure is stable.

Figure - 1
PLOT OF SUM OF RECURSIVE RESIDUAL (CUSUM)

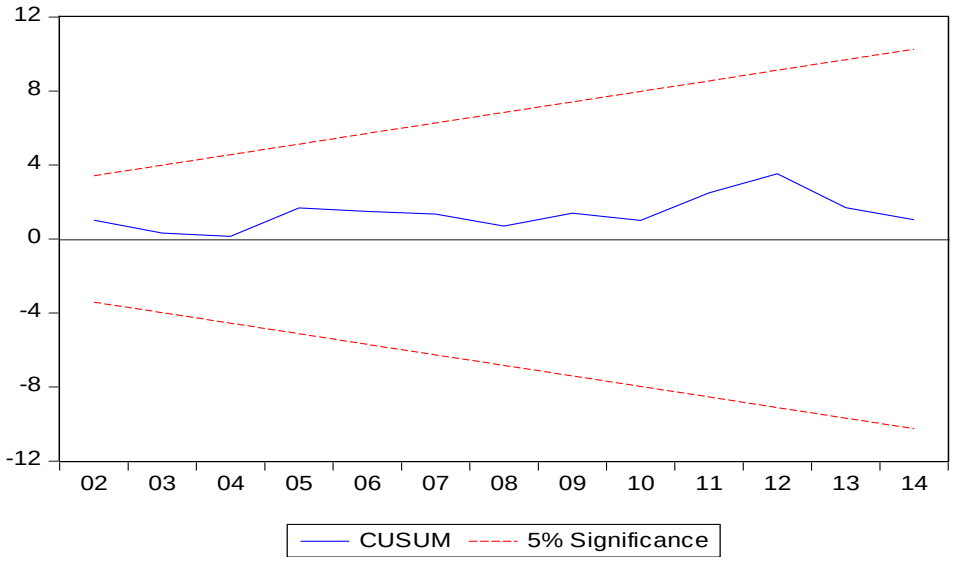
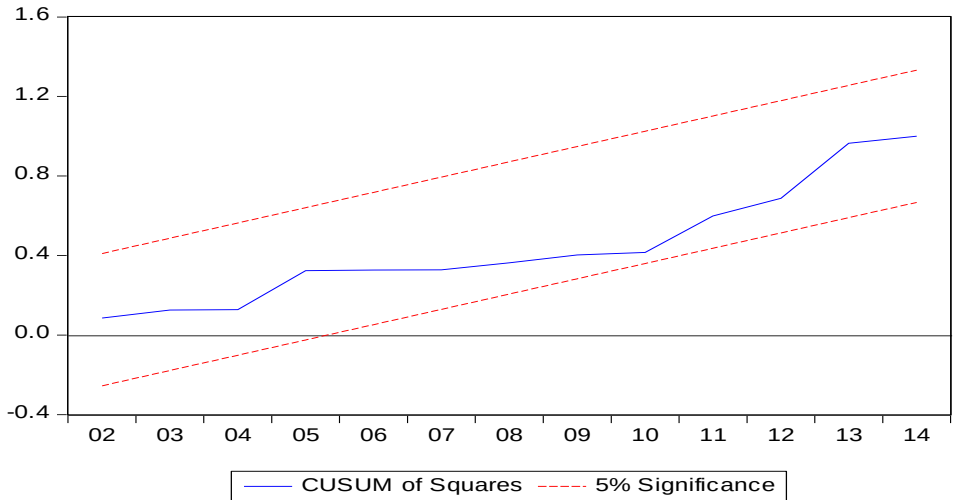


Figure - 2
PLOT OF SUM OF SQUARE RECURSIVE RESIDUAL (CUSUMSQ)



The cointegrated model is heteroskedastic and serially uncorrelated as confirmed from the insignificance of Chi-square in the following tables 8 and 9.

Table 8

LM TEST OF SERIAL CORRELATION, PROPOSED BY *BREUSCH_GODFREY*

F-statistic	0.063836	**Prob. F(2,11)**	0.9598
Obs*R-squared	0.403544	**Prob. Chi-Square(2)**	0.9433

Table 9

TEST OF HETEROSKEDASTICITY PROPOSED BY *BREUSCH-PAGAN-GODFREY*

F-statistic	0.511989	**Prob. F(19,13)**	0.9573
Obs*R-squared	12.68947	**Prob. Chi-Square(19)**	0.9478

The same techniques were also performed for equation 2, first the optimum lag four selected with using of VAR criteria, later the Bound test approach found co-integration as revealed from the higher F-statistic than upper bound (F > 3.79),as shown in the table 10.

Table 10

***ARDL* BOUND TEST APPROACH FOR COMPUTING F STATISTICS TO TEST LONG RUN COINTEGRATION**

Lag order selection	Computed F statistics	Lower bound at 5%	Upper bound at 5%
4	5.12	2.62	3.79

ARDL long-run coefficients identified in the following table 11 relates with equation 2, have more similar with the coefficients in equation 1. ECM-1 is significantly negative, displays the long run relationship of the variables.

Table-11

LONG RUN COEFFICIENTS OF *ARDL* MODEL (2, 1, 1, 1, 1, 1, 1, 0, 1, 1) -
Dependent variable: Gross domestic product (GDP)

Variables	Coefficient	Std. Error	t-Statistic	Prob.
ECM-1	-1.498651	0.373157	-3.509948	0.0027
LPGR	-10.840032	2.712811	-3.963100	0.0010
LTLF	-4.478120	1.622761	-2.704792	0.0150
LTPE	-2.913443	3.474227	-0.835389	0.4151
LTSE	2.332279	2.292116	0.978737	0.3414
LGEE	0.926185	1.188473	0.704510	0.4907
C	120.1572	38.403573	3.126486	0.0061

The diagnostic assessment of the model identifies no hetroskedasticity and serially uncorrelated, as confirmed with the insignificant of chi-square in tables 12 and 13.

Table-12

LM* TEST OF SERIAL CORRELATION, PROPOSED BY *BREUSCH-GODFREY

F-statistic	0.817860	**Prob. F(2,15)**	0.5876
Obs*R-squared	2.835052	**Prob. Chi-Square(2)**	0.3422

Table-13

TEST OF HETEROSKEDASTICITY PROPOSED BY *BREUSCH-PAGAN-GODFREY*

F-statistic	1.555117	**Prob. F(13,17)**	0.3157
Obs*R-squared	16.47475	**Prob. Chi-Square(13)**	0.3178

Furthermore, the tests of CUSUM and CUSUMSQ in figures 3 and 4 respectively, confirm the model stability, because of the plots remained within the critical bounds at the significance level of 5 percent.

Figure - 3

PLOT OF SUM OF RECURSIVE RESIDUAL (CUSUM)

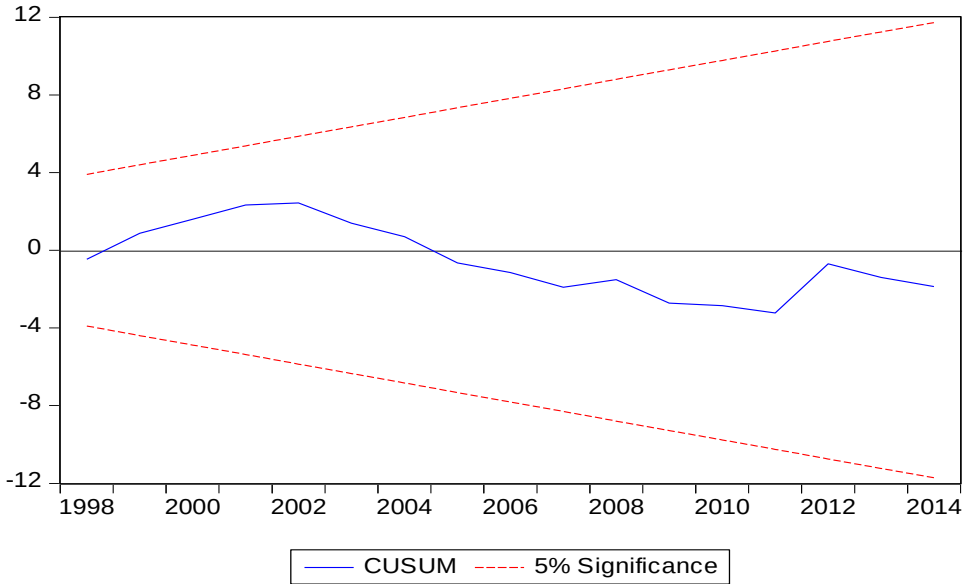
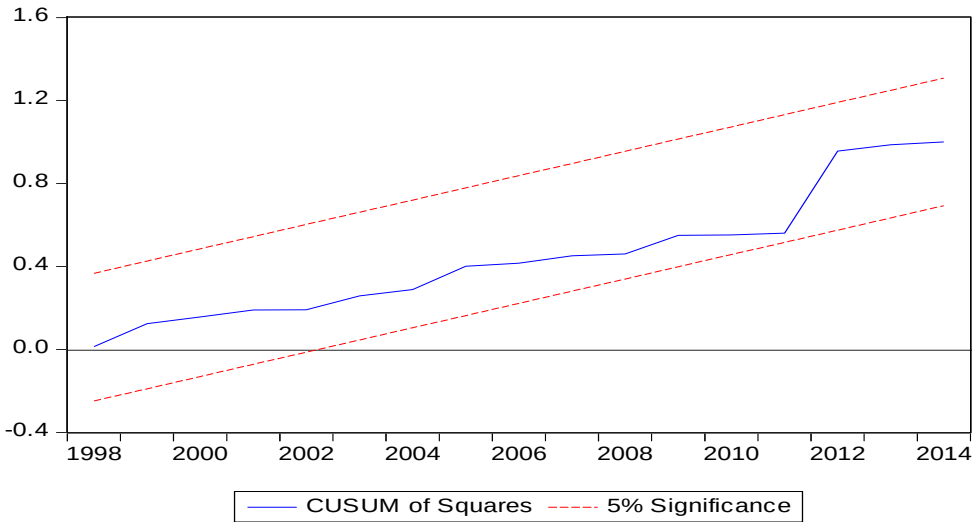


Figure - 4

PLOT OF SUM OF SQUARE RECURSIVE RESIDUAL (CUSUMSQ)



Similarly, with the implication of the same procedure for equation 3, the VAR criteria permitted the usage of lag 3 to explore that F-statistic, is higher than upper bound at five percent level of significance (F > 3.61), indicate long run association within the variables.

Table - 14

***ARDL* BOUND TEST APPROACH FOR COMPUTING F STATISTICS TO TEST LONG RUN CO INTEGRATION**

Lag order selection	Computed F statistics	Lower bound at 5%	Upper bound at 5%
3	7.81	2.45	3.61

The long run coefficients sign in Table 15 are also identical with the coefficients sign in equation 1 and 2. ECM-1 is positive and significant confirms long-run co-integration.

Table - 15

LONG RUN COEFFICIENTS OF ARDL MODEL (2, 3, 3, 3, 2, 3, 3)
Dependent variable: GDP

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LFPE	3.551170	4.751006	0.728747	0.0436
LFSE	27.872888	6.884590	4.035680	0.0068
LMPE	-0.580745	2.725565	-0.180460	0.8627
LMSE	3.558802	3.916715	0.885924	0.4098
LTSE	17.668220	7.747820	2.268939	0.0638
LTPE	-25.229081	6.239827	-4.027386	0.0069
C	319.632473	64.155502	4.980767	0.0025
ECM-1	-1.351585	0.288219	-4.381024	0.0047

The diagnostic evaluation in the model shows no serial correlation or heteroskedasticity as confirmed from the insignificant of chi-square in the Table 16 and 17 respectively.

Table - 16

LM* TEST OF SERIAL CORRELATION PROPOSED BY *BREUSCH-GODFREY

F-statistic	3.540381	**Prob. F(2,4)**	0.2235
Obs*R-squared	20.35909	**Prob. Chi-Square(2)**	0.7469

Table - 17

TEST OF HETEROSKEDASTICITY PROPOSED BY *BREUSCH-PAGAN-GODFREY*

F-statistic	0.576917	**Prob. F(25,6)**	0.9154
Obs*R-squared	21.52533	**Prob. Chi-Square(25)**	0.7579

CUSUM and CUSUMSQ tests have shown in the following figures of 5 and 6 that the plots remained within the critical bounds at the significance level of five percent display model stability.

Figure - 5

PLOT OF SUM OF RECURSIVE RESIDUAL (CUSUM)

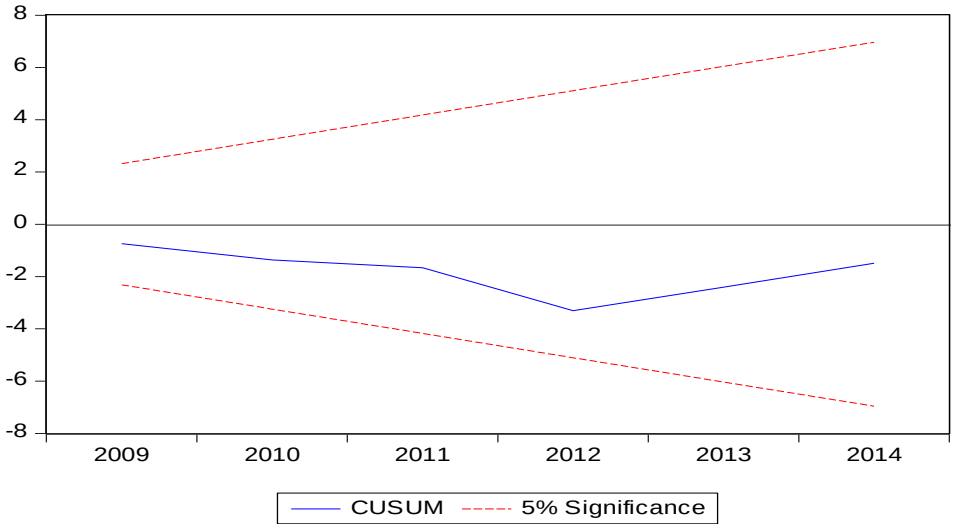
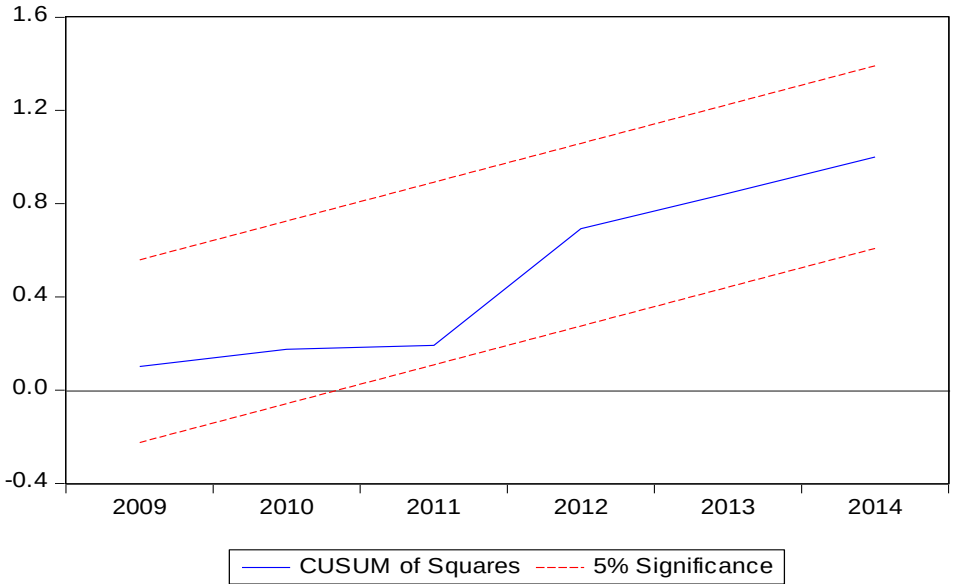


Figure - 6

PLOT OF SUM OF SQUARE RECURSIVE RESIDUAL (CUSUMSQ)



Summing up we conclude that women educational attainment at both primary and secondary levels significantly contribute to economic growth in Pakistan. However, male education enrolments at both the levels have no or very weak contribution to the growth process in Pakistan.

The result for short and long run Granger causality demonstrated in the following Table18. The empirical findings show that in case of short run, female primary education and GDP have two-way linkage causality while total secondary education and female secondary education have also two-sided effect. In case of long run, the evidence shows pair-wise causality from female secondary education, male secondary education, male primary education, total primary education and total secondary education to the GDP.

Table - 18

PAIR WISE GRANGER CAUSALITY FOR SHORT AND LONG RUN

Dependent variable	LGDP	LFSE	LMSE	LFPE	LMPE	LTPE	LTSE	Long run
	Short Run Causalities							**ECM (t-stat)**
LGDP	.....	3.440082*	-1.39497	0.925618	-0.11767	0.391413	2.1445**	-4.470*
LFSE	2.9183**	.....	0.868701	-1.29220	0.357731	-0.66092	2.6325**	-5.1730*
LMSE	-0.90324	1.791413	.....	0.799441	0.230770	0.920715	2.7444**	-5.7645*
LFPE	1.941730	-1.39400	-0.33514	.....	0.542076	-0.4678	1.671120	-0.96754
LMPE	-0.29343	1.10910	-0.1687	1.42933	.....	1.14732	-1.44222	-3.6096*
LTPE	-0.25466	-0.15307	0.945437	0.446321	1.144797	.....	-0.34386	-3.6000*
LTSE	-0.75778	2.502895*	1.608587	1.688811	0.379357	0.921115	.....	-5.9401*

Note: The selection of appropriate lag is according to the VAR lag order selection criteria. * and ** denote significant relationship within the variables at the significance level of 5 and 1 percent respectively.

Concluding remarks and policy implication

This study concludes that significantly a negative economic contribution of gender educational gap is based on the result of empirical analyses of this study such as women enrolment ratios at primary and secondary level significantly accelerate Pakistan's economic growth in the long run. However, male enrolment ratio at primary level have negative contribution to growth, while at secondary level male enrolment has a very weak addition to long-run growth. Similarly, total secondary education has a strong relation in spurring economic growth, while total primary education has negative relation with growth. Moreover, population growth and labor growth significantly an adverse influence on long run economic success, while government expenditures on education significantly spur long run growth in Pakistan.

The direction of causality were checked by using of Granger causality test, implying that in case of short run, female primary education and GDP have two-way linkage causality similarly, total secondary education and female secondary education have also two sided effect. In case of long run, the evidence show pair-wise causality from female and male secondary school attainment separately, male primary education, total primary education and total secondary education to GDP. Based on the above findings, this study recommends the following suggestions for the policy makers.

1. Priority should be given to women education at both primary and secondary level, in order to reduce gender disparity in education consequently is an economic success.
2. To obtain the objective of higher women education attainment, more preference should be given to allocate sufficient fund by the government for investment in education especially on women education.
3. Education/knowledge/training should be aimed at improving the quality and potential of the working force which could be used to spur productivity and growth.

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