

The Role of Female Education in Economic Growth of Pakistan: A Time Series Analysis from 1990-2016

¹ Syeda Anam Hassan, ² Nazish Rafaz

^{1,2} Govt. Girls Postgraduate College. No.1 Abbottabad, KPK, Pakistan

Abstract: Education is an essential factor of economic growth and a fundamental right of every person. No country can attain sustainable economic growth without substantial investment in education. Education improves technical capabilities of exploring new ideas and innovations. It improves the quality of life and leads to collective benefits to individuals and societies. In this study, we investigate the impact of female education on the economic growth of Pakistan by adopting the methodology of the simple Ordinary Least Squares regression with time spanning from 1990 to 2016. OLS regression results show that 1% increase in female education, female labour force participation, education expenditure and fertility rate causes 96% increase in GDP of Pakistan. Female education has a significant and positive impact on economic growth. Female education has a positive relationship with female labour force participation rate. The female labour force is dramatically increasing the economic growth. The policy recommendation is that government should allocate more of its budget on education and make efforts for improvement of the quality of education at different levels. The fertility rate has a negative relationship with female education and economic growth. Female education can reduce fertility rate and play a magnificent role in economic growth of Pakistan.

Keywords: Economic growth, Female education, Female labour force participation, Education expenditure.

1. Introduction

The economic growth of a country is a broad process of growth, progress and change that is deliberate by residents of the area to be developed, organizations and governments. Women literacy rate plays a vital role to enhance the economic development of the nationwide. The advancement of the society rely on the efficiency of its educational systems that provides same prospects of getting an education to everyone (Parveen, 2008).

Economic growth and development are essential for progress but it is not supporting situation to human development. Historically Pakistan has an adequate GDP growth rate but on the other hand, failed to interpret the level of human development and focusing to make available basic social necessities (Husain et al, 2003). Human capital is one of the essential factors for economic growth. Women, as half of the population, have a great impact on the development of the community. The international community noticed the women's problems so, in recent decade's legislation in this matter made in sequence to stop the discrimination against women and make sure their participation in social fields (Hasani, 2013).

Female education has a great impact on preceding the country's growth and it is necessary to attain the consequences of the social welfare outcomes. The social outcome of education gives opportunities to get the social benefits. According to modern economic theory, education leads to economic prosperity. In developing countries, education is prior for their governments so,

they have fiscal policies to spend government revenue on their major educational heads. Moreover, the governments make effort for attaining economic objectives and focusing on an efficiency of human resource allocations (Muktdair-Al-Mukit, 2012).

Female education plays a vital role in the reduction of poverty and contributes to sustainable growth in developing nations. So, there the attention must be paid to the promotion of female education for structural transformation and economic growth. Women education also lessens the population growth rate and fertility growth rate (Dauda, 2012). In recent years there are enormous cultural, social and economic changes in North African and the Middle East countries, so this has created new advancements for women in socioeconomic life. Female labour force participation depends on the status of women in a particular area. There are a number of problems attached to the female labour force participation rate with multidimensional aspects of that particular region in developing nations (Aboohamidi & Chidmi, 2013).

Female labour force participation rates are worldwide increasing. Female labour force share from 41 percent in 1996 has greater than before to 66 percent in 2012 (World Bank 2012). These trends make prospects and challenges for the women for their professional careers. In developed countries, the shares of women employment have been increased and role of women in developing countries can also observe in every field of life and informal activities (Hasani, 2013).

Female labour force participation is a key driver for economic development and growth. In developing countries Female labour force participation rate has a significant and positive association with economic growth and it also leads to increase the education level, improves the health, communication and infrastructure. On the other hand, it reduces the unemployment rate and gender inequality. There are certain restrictions and policies which lessen the female employment rate so, the government must pay attention to the advancement of female employment level (Nchake and Koatsa, 2017).

In developed countries, empirical work carried out concerning to the relationship between education expenditure and economic growth. Developing countries are the emerging nations that have a considerable impact on the world economy. The education sectors of the developing countries significantly contribute to the economic growth (Mallick et al., 2016). Education expenditure measures long-term investment that indicates higher production level for the economy. Economists debated over the advanced education system that propagates the socioeconomic development and performances. Developing and developed nations focus on improving its educational system for staying in competition with the worldwide economies, so far the governments put a huge share for the education sector of its budget allocation (Hussin et al., 2012).

Female's education is negatively linked to fertility rate and positively to marriage at a higher age. As for the women who are engaged in education, they are married and give birth to children at an older age hence the fertility rate declines. The Iranian government reorganized and closed its educational system for a short period of time, as the measures indicate that the ratio of females toward marriage is high so that fertility rate increases (Saadat et al., 2010). The fertility rate has a significant and dramatic impact on the economic growth. Income per capita increase as there is a reduction in fertility rate in the developing countries. A decline in the population growth rate is an important indicator and necessary for attaining certain objectives in the economy. Moreover, the low fertility rate is essential for economic growth (Ashraf et al., 2013).

The fertility rate has been reducing in the developed nations than developing nations due to upgrading progressive levels of economic development. Low fertility rate provides the Massive participation of the peoples for economic activities so this further leads to improve the growth

rate. Human Development Index (HDI) indicates the negative to a positive adaptation of association between the fertility and growth rate (Fox et al., 2015).

1.1 Objective of the study

The key objectives of the study are:

- To empirically investigate the impact of female education on the economic growth.
- To empirically investigate the impact education expenditure on economic growth.
- To empirically investigate the impact fertility rate on economic growth.
- To empirically investigate the impact female labour force participation on economic growth.

2. Literature Review

Khattak et al., (2011) attempted to examine the relationship of female education and fertility rate over the time period 1981 to 2008 in Pakistan. By employing Multiple Regression Model and Johansen Co integrations the results reveal that female education playing a vital role in the reduction of fertility rate. In 1989 the total fertility rate was 7.0 and after government policies, it reducing up to 3.0 in 2008. Female age at marriage has a negative relationship to the fertility rate. This study recommends that for reducing the level of fertility rate government should pay attention to the education of both males and females.

Mujahid and Zafar (2012) aimed to find out the relationship between Female labour force and economic development in Pakistan during the time period from 1980 to 2010. By using ARDL technique, the results reveal that there is long run U-shaped relationship between Female labour force and economic development. This study shows that education and economic activities lead to labour force participation and further improve the economic development. Muktdair-Al-Mukit (2012) aimed to study the long-run relationship between public spending on the education sector and economic growth in Bangladesh from the time period 1995 to 2009. By using Co-integration technique the results reveal that there is a significant and positive association between the variables in the long run. There is 1% increase in education expenditure leads to 34% increase in economic growth in the long run. This study recommends that government should increase its education expenditure and improves the quality of education.

Hussin et al., (2012) checked the causality between expenditure on the education system and economic growth in Malaysia during the time period 1970 to 2010. By using Vector Auto Regression (VAR) method the results show that education expenditure and economic growth is positively cointegrated in a long run time period. Moreover, short-run granger cause association between the variables exist. This study concludes that human capital plays a significant role in prompting Malaysian GDP.

Dauda (2013) aimed to find out that female education leads to economic growth in Nigeria during the time period 1975 to 2008. By employing co-integration and error correction techniques the results shows that there is long-run relationship equilibrium between variables. The female education has negative and male education has a positive impact on economic growth of Nigerian economy. This study recommends that government should focus on policies regarding educational system, increase female enrollment and improve female contribution to economic growth.

Hafner and Mayer-Foulkes, (2013) find out the determinants of economic growth and development in a relation to high human development, high-income level and declining the fertility rate over the 72 developing countries in the time period 1980 to 2007. By using co-integration, panel unit root and OLS (DOLS) the results show that there is a causal relationship between the variables. This study found no significant relationship between human development and income. In developed nations only changes in income and human development is essential

for developed lifestyle; but in developing countries, the fertility rate is showing negative relation to the human development and positive to the income.

Lahoti and Swaminathan (2013) analyzed the impact of Female Labor Force Participation on Economic Growth in India for the time period 1983 to 2010. By employing dynamic panel models the results reveal that there is an insignificant relationship between Female Labor Force Participation and economic growth. Moreover, Indian female labour participation rate decrease by 23% and rising again due to changes in income, female education proportion and structural changes in the economy. This study suggested that policymakers have to design new policies which can effectively increase the labour force participation rate for future economic benefits.

Shahid (2014) studied to investigate the relationship between labour force participation and economic growth in Pakistan over the time 1980 to 2012. By using Augmented Dicky Fuller and Phillip Perron and Johnson co-integration the result shows that there exists a positive and significant relationship between the variables in the long run. Moreover, the insignificant relationship found between variables in short run. The policy implication is that government should build a new education and training institutes that promote the skilled labour which directs the economic growth.

Urhie (2014) investigated the impact of Public Education Expenditure on both the education attainment and Economic Growth in Nigeria for the time period 1970 to 2010. By employing Least Squares estimation technique the results show that capital education expenditure has a negative effect and recurrent education expenditure have a positive impact on economic growth. This study suggested that in order to boost the economic growth make sure the efficient allocation of education expenditure.

Li (2015) studied the association between fertility rate and economic growth for 120 developing countries during the time period 1970 to 2014. By employing pooled OLS and fixed effect the results reveal that the total fertility rate and economic growth is negatively associated for a recent scenario because the quantity of human capital is scarce in nature so people tend towards higher fertility rate in order to get more returns from each child. Firstly, by increasing fertility rate economic growth also increases and later decline because of higher fertility rate Burdines the economic system.

Mallick et al., (2016) aimed to examine the relationship between education expenditure and economic growth for 14 Asian countries during the time period 1973 to 2012. By using FMOLS and Pedroni co-integration, the results show that there is long-run positive and significant relationship between education expenditure and economic growth. Education is key variable for economic growth so that government of each country should be prior education sector and increases its spending on a share of the budget. Moreover, the government spends for each sector of education including technical educations for the long-term economic benefits.

Nowak and Dahal 2016 attempted to examine the association between education and economic growth in Nepal for the time period 1995 to 2013. By employing the OLS and Johansen Co-integration technique the results reveal that there is a significant and positive relationship between education and economic growth in a long run. This study recommends that policymakers must pay serious attention to the development of education system and make efforts for improvement of the quality of primary, secondary and higher education level that further leads to economic growth.

Afridi, (2016) studied to investigate the relationship between human capital and economic growth in Pakistan during the time period 1972 to 2013. This study used ARDL and VECM models. There is a positive impact of birth rate and physical capital on economic growth so the result demonstrates that human capital plays significant role in the progress of the economy. These results suggest that there is effective need to invest for the better outcomes in the long

run for the bright future of Pakistan. More expenditure on health and education make sure the people to serve the nation efficiently.

3. Research Methodology

This chapter focuses on the methodology of the study by emphasizing on the Ordinary Least Square (OLS) to capture the impact of female education on economic growth. This study examines the relationship of Female education, female labour force participation, Fertility rate, Education expenditure with economic growth. The data has been taken from World Bank Indicator (2016) over the time period 1990 to 2016. The specified model as follows:

Model 1:

$$\ln GDP = \beta_0 + \beta_1 \ln FE + \beta_2 \ln LF + \beta_3 \ln FR + \beta_4 \ln EE + \varepsilon \dots\dots\dots 1$$

- FE = Female education
- LF = female labor force participation
- FR = Fertility rate
- EE = Education expenditure

4. Data Analysis and Interpretation

4.1 Correlation Table

Table 1: Correlation Table

	Female Education	Labor Force	GDP	Fertility Rate	Education Expenditure
Female Education	1.000000	0.398831	0.454172	-0.095676	-0.066047
Labor Force	0.398831	1.000000	0.962378	-0.915670	0.198360
GDP	0.454172	0.962378	1.000000	-0.851332	0.373391
Fertility Rate	-0.095676	-0.915670	-0.85133	1.000000	-0.156650
Education Expenditure	-0.066047	0.198360	0.373391	-0.156650	1.000000

These variables have a different level of correlation; Female education, female Labor force participation, fertility rate, education expenditure and GDP. Female education has a positive correlation with female Labor force participation and economic growth. On the contrary female education has a weak negative correlation with Fertility Rate and Education Expenditure. Female Labor force participation has a strong positive correlation with economic growth and weak positive with Education expenditure but there is a strong negative correlation between fertility rate and female labour force participation. The fertility rate has a strong negative correlation with economic growth and weak positive with education expenditure. The fertility rate has a weak negative correlation with education expenditure. Before applying the model the stationary of the variables have been tested by ADF test. The results show mix results that is Female education, fertility rate and labour force is integrated at first order I(1), whereas GDP and Education Expenditure is integrated at the level I(0). The results of Augmented Dicky Fuller test recommend Ordinary Least Square technique.

4.2 Table of Ordinary Least Square Method

Table 2: Table of Ordinary Least Square Method

Dependent Variable: LOG(GDP)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.072185	1.549447	1.337371	0.1948
LOG(EE)	0.488951	0.156177	3.130744	0.0049
LOG(FR)	-0.857379	0.440743	-1.945305	0.0646
LOG(LF)	1.164683	0.322812	3.607930	0.0016
LOG(FE)	0.222623	0.066135	3.366211	0.0028
R-squared	0.968261	F-statistic		167.7896
Adjusted R- squared	0.962491	Prob(F-statistic)		0.000000
Durbin-Watson stat				1.951045

In the above table, the coefficient value of education expenditure is 0.48, which is positive and suggests 1% change in education expenditure results 48 % increase in economic growth that is significant at a level of 1 %. The coefficient value of fertility rate is -0.85, negative sign shows the negative relationship between fertility rate and economic growth. The probability value of fertility rate is 0.06 that is significant at 10%. Moreover, 1% increases in fertility rate result in 85% reduction in economic growth.

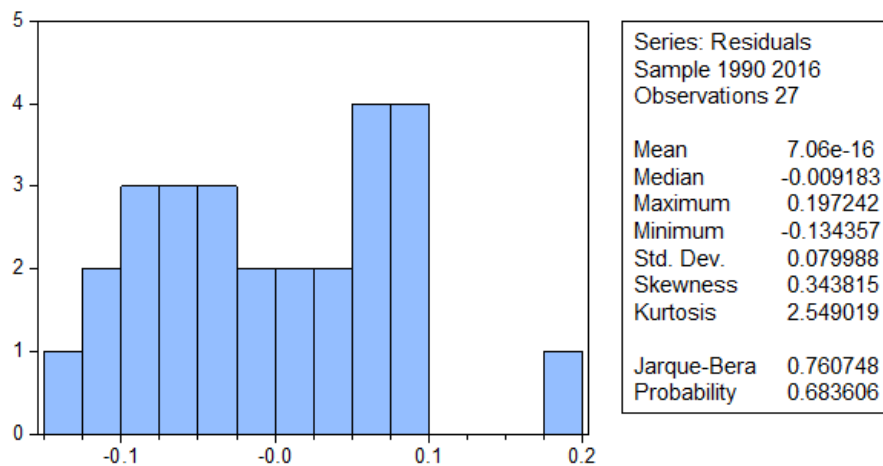
The value of the coefficient of the female labour force is 1.16 that is positive and shows a positive relationship between female labour force participation and economic growth. 1% increases in female labour force participation result in 1.16 % increase in GDP. The probability of female labour force participation is 0.0016 which is significant at a level of 1%. The coefficient value of female education is 0.22 that is also positive and depict the positive relationship of female education and economic growth at a significance level of 1%. There is 1% increase in female education also increases the GDP by 22%.

The value of R-squared shows the impact of all the independent variables on dependent variable as the high-income is 0.96 means independent variables explain the 96% variation in the dependent variable. It means 1% change in independent variables i.e. female education, female labour force participation, fertility rate, education expenditure, result 96% change in dependent variable economic growth. The value of adjusted R-squared 0.96% shows that after including all the residual effect the impact of female education, female labour force participation, fertility rate, education expenditure on economic growth is 96% that is desirable. The Durbin Watson value shows that there is no autocorrelation. The between of F-statistic is positive and high that is 167 and Prob (F-statistic) demonstrates the goodness of the fit of the model and value 0.0000 which prove that entire model is significant at 1% and the results are reliable.

4.3 Diagnostic Test

Table 3: Auto correlation

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob	
. * .	. * .	1	0.187	0.187	1.0550	0.304
.** .	.** .	2	-0.264	-0.310	3.2406	0.198
.* .	. .	3	-0.074	0.056	3.4198	0.331
. .	.* .	4	0.006	-0.081	3.4210	0.490
. .	. .	5	0.012	0.024	3.4264	0.635
.** .	*** .	6	-0.287	-0.358	6.4949	0.370
.* .	. * .	7	-0.098	0.091	6.8718	0.442
. * .	. .	8	0.209	0.025	8.6668	0.371
. .	. .	9	0.045	-0.037	8.7566	0.460
.* .	.* .	10	-0.090	-0.070	9.1300	0.520
.* .	.* .	11	-0.147	-0.125	10.182	0.514
. .	. .	12	0.072	0.054	10.455	0.576



The value of Mean is 7.06 which is average of the whole data of 27 observations. On average from last 27 years, all the independent variables explain the variations in GDP. Median is the midpoint of the data which is -0.009183. Mean and Median are used to measure the central tendency. The maximum value is 0.197 in the data shows the possible outlier and data entry error to the maximum end.

The minimum value shows that data is spread to the lowest value up to -0.134. By comparing the values of maximum and minimum we can estimate to which extend data is spread out. Skewness shows to which extent the data is not symmetrical. The value of skewness 0.343 shows that data is positively skewed. Standard deviation is used to measure the dispersion and value in the table shows that data is 0.0729 deviated from a mean. Kurtosis indicates the distribution of data. The value of kurtosis is 2.549 shows that data is negatively kurtosis.

Normality test is concerning the value of Jarque-Bera. The p-value of normality test is less than 0.05% shows the rejection of H_0 : errors are normally distributed and lead towards the acceptance of H_1 : errors are not normally distributed. The current model has the probability value of Jarque-Bera is 0.683 that encourage us to accept the H_0 that errors are normally distributed that is desirable.

Table 4: Serial correlation LM test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.555174	Prob. F(2,20)	0.2356
Obs*R-squared	3.633843	Prob. Chi-Square(2)	0.1625

By summing up, the result of Breusch-Godfrey Serial Correlation LM Test this model have no serial correlation as the probability value of LM test is 0.2356 that is more than 0.05% which is desirable.

Table 5: Heteroskedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	2.865938	Prob. F(4,22)	0.4473
Obs*R-squared	9.249450	Prob. Chi-Square(4)	0.1552
Scaled explained SS	4.756203	Prob. Chi-Square(4)	0.3132

Breusch-Pagan-Godfrey is Heteroskedasticity test if the probability value is less than 0.05% which exhibits the rejection of Null Hypothesis. H_0 is that there is no Heteroskedasticity. The probability value is 0.44 signify that this model is not heteroscedastic.

Table 6: Stability test

Ramsey RESET Test:

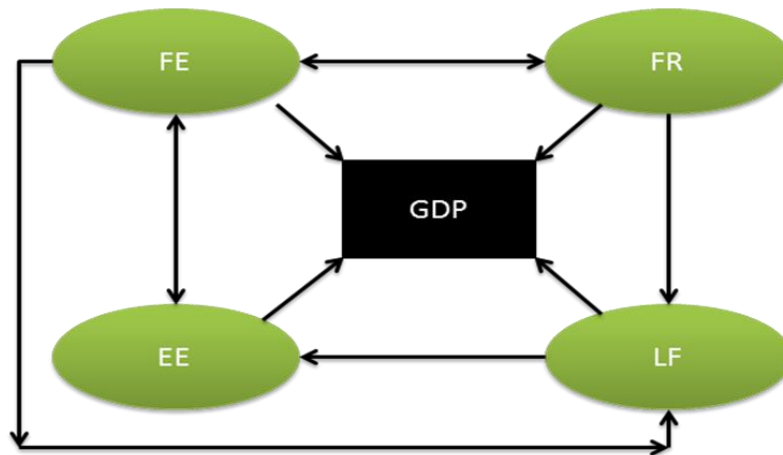
F-statistic	10.06979	Prob. F(1,21)	0.1146
Log-likelihood ratio	10.57627	Prob. Chi-Square(1)	0.1011

Ramsey Reset test is stability test that shows if probability value is less than 5% there is acceptance of H_1 that is there is stability. For this model, the probability value of stability test is 0.1146 which is insignificant and model is stable. All the diagnostic tests revealed the desired econometric results. Model's residuals are, homoskedastic, serially uncorrelated normally distributed and has an accurate and well specified functional form. Further, the reported results are applicable for interpretation. All the tests show that model has well specified functional form and econometric properties. Therefore, the results are significant for reliable and consistent interpretation.

4.4 Granger Causality

Table 7: Granger Causality

Null Hypothesis:	Obs	F-Statistic	Prob.
FR does not Granger Cause GDP	25	2.84634	0.0817
GDP does not Granger Cause FR		0.63724	0.5391
EE does not Granger Cause GDP	25	1.46117	0.0557
GDP does not Granger Cause EE		4.23424	0.0293
LF does not Granger Cause GDP	25	4.80829	0.0197
GDP does not Granger Cause LF		0.13631	0.8734
FE does not Granger Cause GDP	25	1.44766	0.0287
GDP does not Granger Cause FE		0.31721	0.7318
EE does not Granger Cause FR	25	0.17564	0.8402
FR does not Granger Cause EE		1.21471	0.3178
LF does not Granger Cause FR	25	1.10424	0.3508
FR does not Granger Cause LF		5.20159	0.0152
FE does not Granger Cause FR	25	2.45240	0.0015
FR does not Granger Cause FE		4.05600	0.0332
LF does not Granger Cause EE	25	3.52518	0.0488
EE does not Granger Cause LF		0.15638	0.8563
FE does not Granger Cause EE	25	1.23160	0.0330
EE does not Granger Cause FE		3.14471	0.0649
FE does not Granger Cause LF	25	2.77221	0.0866
LF does not Granger Cause FE		0.96461	0.3982



By summing up, the results of the Granger causality test the results show that fertility rate Granger causes the GDP as the probability value 0.08 indicates significance at 10 %. As the

GDP does not show Granger cause fertility rate because the probability value is insignificant. There is unidirectional relationship found between fertility and GDP. Education expenditure Grangers cause GDP at 10 % significance level and GDP also granger cause education expenditure at 5 % level of significance. Female labour force participation in Granger cause GDP at the level of 5% significance and GDP does not Granger cause Female labour force participation as the probability value is insignificant. There is found the unidirectional relationship. Female education does Granger cause GDP at 5% as their probability value is 0.02. GDP does not Granger cause female education as there is indicate insignificant probability value 0.73. So there is unidirectional relationship exist between GDP and female education. Education expenditure does not Granger cause fertility rate and fertility rate also does not Granger cause education expenditure as there is found an insignificant relationship. Female labour force participation does not Granger cause fertility rate but fertility rate Granger cause female labour force participation at 5% significant level. There is unidirectional relationship exist. Female education Granger cause fertility rate and there exist bidirectional relationship, as their probability value is significant at 5%. Labor force participation Granger cause education expenditure at 5 % and education expenditure does not Granger cause labour force participation as their probability value is insignificant. Female education Granger cause education expenditure at 5 % and education expenditure does Granger cause female education and 10%. There is found a bidirectional relationship between female education and education expenditure. Female education Granger causes labour force participation at 10% and labour force participation does not Granger cause female education as their probability value is insignificant. There exists unidirectional relationship.

5. Conclusion and Recommendations

This study was conducted to find the role of female education in the process of economic growth using OLS regression over the time period 1990-2016. New technological institutions are developed and opportunities are created for female employment that rises the female labour force participation. There should be low fertility rate in the economy that can contribute efficiently for economic progress. Female education will reduce the level of fertility rate. Female labour force participation has a significant relationship with economic growth. Female labour force participation can contribute greatly to the economic growth of Pakistan. This study suggested that there is a fundamental need for investment in female education. The government needs to subsidise the student as well as teachers that will increase the quality of education. So Government of Pakistan should increase its public spending on education and pay more attention towards improving the quality of education at primary, secondary and high schools. Technical and vocational institutes would develop that help to increase the female labour force participation. Policymakers should make policies regarding less developed areas and make education less costly for them. Funds are appropriately allocated for each region across the country and have efficiently utilized without any corrupt and fraudulent practices.

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