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# Human Capital and Growth: Does Gender Matter?

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**Abstract:** Human Capital (HC) is considered one of the prominent determinants of economic growth. Perceiving its critical standings, this study analyzed the impacts of human capital on economic growth of Pakistan with special interest to female human capital. Study took primary enrolment rate as proxy of HC. The enrolment rates were further disaggregated into male and female enrolments for analysis. By taking time series data from 1960-2013, study applied ARDL approach for analysis. The results confirmed the existence of long run relationship of total, male and female human capital with economic growth. Study also found an inverse relationship of gender-enrolment inequality with growth. The results highlighted that beside social impacts, women education can play a significant economic role in Pakistan.

**Key words:** Gross capital formation, human capital development, economic growth, GDP, impact

## INTRODUCTION

Numerous theoretical studies (Lucas, 1990; Rebelo, 1992; Romer, 1990) of economic growth have necessitated the role of human capital in the form of training, experience and educational attainment. Likewise, number of cross sectional and time series studies portrayed human capital as a vital factor for economic growth (Qadri and Waheed, 2011). However, some of the studies directly contradicted with common findings arguing a weak relationship between human capital and growth (Bils and Klenow, 2001). Such studies emphasized uneven or irregular influence of human capital on growth (Cadil *et al*., 2014). Further, despite of impressive empirical work on the human capital and growth, some aspects of issue still needs a attention of the researchers. Especially, analysis of human capital based on gender requires considerable attention. This is important because many societies, especially LDCs have a clear divide between male and female human capital. Considering in significant economic contribution of female many countries have a biased allocation of resources, directing most of the resources toward the development of male members of the society. One such case is Pakistan where in some areas woman economic participation is not only considered sin but they are forcibly stopped to take part in economic activities. Similarly, the same attitude is prevailing at level of policy makers where numbers of policy makers believe that woman direct role in economic growth is negligible and not require any attention. However, looking into situation not a single study can be found investigating the role of woman human capital in economic growth. In this backdrop, the objective of this study is to test the relationship between female human capital and economic growth in case of Pakistan.

### Literature review

**Human capital; definitions and dimensions:** The pioneering work on human capital triggered in the 60s when Mincer (1958), Schultz (1961) and Becker (1962) briefly theorized the concept of human capital and shed light on its importance. Schultz (1961) briefly expatiated the dimensions of human capital. To him, human capital was all the useful skills, capabilities and knowledge which were the result of deliberate investment. Pondering on, he presumed formal education (elementary, secondary and higher), education programs of adults and migrations as important strings of human capital. In 1962, seminal research of Becker (1962) captivated attention of lot of scholars. Considering investment in schooling as human capital investment, he described human capital as embedded knowledge, skills and values that affected the future income of an individual. Construing, further, he predicated education as important strands of human capital. In extant researchers, Frank *et al.* (2007) embellished HC as "a fusion of factors such as education, experience, training, intelligence, energy, work habits, trustworthiness and initiative that affect the value of a worker's marginal product". In the same manner, Conley (2012) confabbed human capital as amalgamation of innate ability, schooling, school quality and non-schooling investment. Congruently, angling in a focused perspective, Alexandru and Maria (2012) portrayed concept of human capital amalgamating from previous

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scholastic research. They mention human capital; the stock of knowledge, abilities, skills, health, innovations in the nation, cultural, spiritual and of humanism. Proceeding they considered research, education spending as major factors contributing to human capital which further leads to technical progress and innovation. Reviewing empirical researchers, it is revealed that all of the studies aimed at exploring human capital, took education as important filament of HC. Therefore, we have taken primary enrolment rate to represent human capital. Further, we have segregated male and female primary enrolment rate to surrogate male and female human capital, respectively. Additionally, the study also took difference in male and female enrolment rate.

**Human capital and growth:** Association between human capital and economic growth has been widely recognized since long. Schultz (1961), explaining the difference between greater increase in national output as compare to increase in resources (land, labor, physical resources), he points out that it is investment in human capital due to which this difference arose. Development of endogenous growth models by Romer (1986) brought the human capital at the centre of the process of growth. Explaining the Romer (1986) argument, Rebelo (1992) affirms that human capital embodiment is a source of endogenous growth.

As mentioned earlier, education is one of the indicators which have persistently appeared as investment in human capital. Despite of the significance of education as main contributor to human capital, a lot of studies have observed it's no or weak relationship with economic growth. In some cases even, it is significantly negative. For example, Pritchett (1996) using cross-country data portray a weak correlation between economic growth and increase in educational acquirement. Taking a range of models, Knowles *et al.* (2002) find insignificant relationship of education with life expectancy and per capita output. The results of Caselli *et al.* (1996) are more surprising where using panel data; he depicts a negative and significant correlation between growth and secondary enrolment ratio. Extrusive reason of these inconsistent results is that most of these studies, conducted to explore relationship of education with economic growth have used cross-country estimates taking gross enrolment rates or average years of schooling. The results of these cross-country estimates get suspicious if quality of education differs extensively across the countries. Temple (1999) and Hojo (2003) explaining these contradictory results, highlight that existence of influential outliers and measurement error of the model may be the main reason.

Contrary to the findings of earlier studies, Sala-I-Martin (2002), McGregor *et al.* (2004), Temple (1999) and Bils and Klenow (2000) have shown a positive significant relationship of schooling with growth rate of per capita output. Among these studies, most of the studies have taken primary enrolment rate to represent the education (Petrakis and Stamatakis, 2002; Qadri and Waheed, 2011). Justifying the rationale behind using primary enrolment as proxy of education, Petrakis and Stamatakis (2002) illustrate that in developed countries higher education has major influence on output whereas in developing countries primary education has leading effect. So in order to encapsulate the true effect of education in LDCs, primary enrolment rate is better proxy.

A lot of researchers have suggested that developing countries like Pakistan have to focus on elevating their education to achieve sustainable economic growth. Clarifying the same argument, Abbas and Foreman-Peck (2007, 2008) has illustrated that growth in Pakistan is endogenous and its augmentation depends upon Govt. Policy and technological absorption whereas technological absorption, further banks on the human capital. Further, maintaining they expound that despite of the inferior quality of education, its relationship with output is strong. Reviewed literature portrays that education (both male and female) has a significant influence on economic growth of a country.

**Female human capital in Pakistan:** We mentioned earlier that unique aspect of this study is to disaggregate human capital into male and female human capital in order to find how each of them effect economic growth. The reason to undertake it separately is the fact that gender inequality is one of the major problems of developing countries. Furthermore, it is important to discuss this issue because of two reasons. First, economic potential of female and secondly, it is women who nurtures the future of a nation. The educated woman not only contributes directly to the economy but also raises future generation of a country in a constructive way. In Pakistan where 47.6% of total population is female, gender inequality is at the peak. This has resulted in exclusion of women from education opportunities. Some part of the society has gone to such extent where girls who get education are brutally killed and schools are burnt. The famous case of Nobel laureate Malala Yousufzai can be presented here as an example. She was shot because of her act to go school. In such vulnerable conditions of society, it is important to make people factually understand about the economic and societal role of women.

Pakistan, having 63% population in rural areas, most of the spending of female education is done up to primary

level. Major portion of these spending consists of public spending whereas a minor part is from private spending. It has resulted in a very low level of education, especially in females. This fact can be visualized by seeing the difference between primary and middle enrolment rates. Looking into the figures provided by Federal Bureau of Statistics of Pakistan in year 2010 the drop out ratio was 55%. Means among total number of children who get registered in primary, only 45% reached to the middle. These figures are more hopeless in case of female where drop out ratio is 71%. So, observing the above situation we take, primary enrolment rate to represent education.

**Analytical framework:** We have taken the Augmented Solow Growth Model, with constant returns to scale as standard for this study:

$$Y_t = f(K, L, H) \quad (1)$$

Where:

$Y_t$ = GDP at factor constant price
K = Per worker capital series
L = Labor force
H = Human capital

In order to have the multi-facets analysis, we have taken four dimensions of human capital, i.e., total human capital, male human capital, female human capital and differences between male and female human capital. Hence, we have developed the following regression equations:

$$Y_t = \alpha + \beta_1 K + \beta_2 L + \beta_3 HCT + u_t \quad (2)$$

$$Y_t = \alpha + \beta_1 K + \beta_2 L + \beta_3 HCF + u_t \quad (3)$$

$$Y_t = \alpha + \beta_1 K + \beta_2 L + \beta_3 HCM + u_t \quad (4)$$

$$Y_t = \alpha + \beta_1 K + \beta_2 L + \beta_3 HDF + u_t \quad (5)$$

Where:

$Y_t$ = The gross domestic product taken at factor constant prices
L = The log natural of total civilian labor force
K = The log natural of gross capital formation per capita
HCT = The total Human Capital represented by log natural of total primary enrolment rate
HCF = The Female Human Capital represented by log natural of female primary enrolment rate
HCM = The Male Human Capital represented by log natural of male primary enrolment rate
HDF = The difference between male and female primary enrolment rate

## MATERIALS AND METHODS

The primary aim of the research is to determine whether the long run relationship exists between GDP and human capital. We used Autoregressive Distributed Lag Approach (ARDL) approach to check the relationship. Reason to use this approach is its applicability irrespective of whether the underlying variables are integrated of order zero I(0), order one I(1) or mutually integrated. Second, estimation of long and short run parameters of the model under study can be done simultaneously by using this approach. Thirdly, this approach well caters the problem of endogenity and it does not arise while using the ARDL approach. The Pesaran *et al.* (2001) ARDL procedure involves investigating the existence of a long run relationship in the form of the unrestricted error correction model . Below is the ARDL construction of Eq. 3:

$$\begin{aligned}\Delta \ln y_t = {} & \alpha_0 + \sum_{i=1}^{p} \alpha_1 \Delta \ln y_{t-i} + \sum_{i=1}^{p} \alpha_2 \Delta \ln K_{t-i} + \\ & \sum_{i=1}^{p} \alpha_3 \Delta \ln L_{t-i} + \sum_{i=1}^{p} \alpha_4 \Delta \ln fHCT_{t-i} + \\ & \gamma_1 \ln y_{t-1} + \gamma_2 \ln K_{t-1} + \gamma_3 \ln L_{t-1} + \gamma_4 \ln HCT_{t-1} + u_t\end{aligned} \quad (6)$$

$$\begin{aligned}\Delta \ln y_t = {} & \beta_0 + \sum_{i=1}^{p} \beta_1 \Delta \ln y_{t-i} + \sum_{i=1}^{p} \beta_2 \Delta \ln K_{t-i} + \\ & \sum_{i=1}^{p} \beta_3 \Delta \ln L_{t-i} + \sum_{i=1}^{p} \beta_4 \Delta \ln fHCF_{t-i} + \\ & \delta_1 \ln y_{t-1} + \delta_2 \ln K_{t-1} + \delta_3 \ln L_{t-1} + \delta_4 \ln HCF_{t-1} + u_t\end{aligned} \quad (7)$$

$$\begin{aligned}\Delta \ln y_t = {} & \phi_0 + \sum_{i=1}^{p} \phi_{0_1} \Delta \ln y_{t-i} + \sum_{i=1}^{p} \phi_{0_2} \Delta \ln K_{t-i} + \\ & \sum_{i=1}^{p} \phi_{0_3} \Delta \ln L_{t-i} + \sum_{i=1}^{p} \phi_{0_4} \Delta \ln fHCM_{t-i} + \\ & \omega_1 \ln y_{t-1} + \omega_2 \ln K_{t-1} + \omega_3 \ln L_{t-1} + \\ & \omega_4 \ln HCM_{t-1} + u_t\end{aligned} \quad (8)$$

$$\begin{aligned}\Delta \ln y_t = {} & \lambda_0 + \sum_{i=1}^{p} \lambda_{0_1} \Delta \ln y_{t-i} + \sum_{i=1}^{p} \lambda_{0_2} \Delta \ln K_{t-i} + \\ & \sum_{i=1}^{p} \lambda_{0_3} \Delta \ln L_{t-i} + \sum_{i=1}^{p} \lambda_{0_4} \Delta \ln fHDF_{t-i} + \\ & \psi_1 \ln y_{t-1} + \psi_2 \ln K_{t-1} + \psi_3 \ln L_{t-1} + \\ & \psi_4 \ln HDF_{t-1} + u_t\end{aligned} \quad (9)$$

The complete estimations of relationship (long and short run) through ARDL bound testing approach are acquired through certain stages. At first stage estimation of Eq. 6-9 will be done by applying OLS Method and the existence of long run relationship will be checked by using Wald Granger causality test and checking values of F-statistics and Chi Square. Following null hypothesis will be tested.

$H_0a$: $\gamma1 = \gamma2 = \gamma3 = \gamma4 = 0$ No co-integration
$H_0b$: $\delta1 = \delta2 = \delta3 = \delta4 = 0$ No co-integration
$H_0c$: $\omega1 = \omega2 = \omega3 = \omega4 = 0$ No co-integration
$H_0d$: $\psi1 = \psi2 = \psi3 = \psi4 = 0$ No co-integration

Two of critical values have been proposed by Pesaran *et al.* (2001). The one pair of values presume that all variables are I(0) and the second pair set presume that all are variables are integrated of order one. The decision to reject or accept null hypothesis is taken after a comparison of the calculated value with Pesaran values.

If co-integration has been detected than an error term is developed by normalizing the coefficients. Following equation represents error correction model:

$$\Delta \ln y_t = \alpha_0 + \sum_{i=1}^{p} \alpha_1 \Delta \ln y_{t-i} + \sum_{i=1}^{p} \alpha_2 \Delta \ln K_{t-i} + \sum_{i=1}^{p} \alpha_3 \Delta \ln L_{t-i} + \sum_{i=1}^{p} \alpha_4 \Delta \ln fHCT_{t-i} + \theta ECT_{t-1} + u_t \quad (10)$$

$$\Delta \ln y_t = \beta_0 + \sum_{i=1}^{p} \beta_1 \Delta \ln y_{t-i} + \sum_{i=1}^{p} \beta_2 \Delta \ln K_{t-i} + \sum_{i=1}^{p} \beta_3 \Delta \ln L_{t-i} + \sum_{i=1}^{p} \beta_4 \Delta \ln fHCF_{t-i} + \varepsilon ECT_{t-1} + u_t \quad (11)$$

$$\Delta \ln y_t = \phi_0 + \sum_{i=1}^{p} \phi_{0_1} \Delta \ln y_{t-i} + \sum_{i=1}^{p} \phi_{0_2} \Delta \ln K_{t-i} + \sum_{i=1}^{p} \phi_{0_3} \Delta \ln L_{t-i} + \sum_{i=1}^{p} \phi_{0_4} \Delta \ln fHCM_{t-i} + \zeta ECT_{t-1} + u_t \quad (12)$$

$$\Delta \ln y_t = \lambda_0 + \sum_{i=1}^{p} \lambda_{0_1} \Delta \ln y_{t-i} + \sum_{i=1}^{p} \lambda_{0_2} \Delta \ln K_{t-i} + \sum_{i=1}^{p} \lambda_{0_3} \Delta \ln L_{t-i} + \sum_{i=1}^{p} \lambda_{0_4} \Delta \ln fHDF_{t-i} + \eta ECT_{t-1} + u_t \quad (13)$$

where, $\theta$ECT, $\varepsilon$ECT, $\zeta$ECT and $\eta$ECT represents error correction term of each equation.

## RESULTS AND DISCUSSION

We have used the time series data from 1960-2013 taken from statistical hand books of SBP (2013) and Government of Pakistan (2013a, b). Economic survey the data of Per capita GDP (FC), civilians labor force. Study used primary enrolment rates as proxy variable for human capital. Previously, among many Abbas (2000) have also used the same proxy. The reason to take primary enrolment rate as one of the proxy of human capital is the level of the level of human capital development in Pakistan. Having 63% population in rural areas, most of the spending of female education is done up to primary level. Major portion of these spending consists of public spending whereas a minor part is from private spending. Second major reason is very low level of education, especially in females. This fact can be visualized by seeing the difference between primary and middle enrolment rates. Looking into the figures provided by Federal Bureau of Statistics of Pakistan in year 2010 the drop out ratio was 55%. Means among total number of children who get registered in primary, only 45% reached to the middle. These figures are more hopeless in case of female where drop out ratio is 71%. In such scenario the only variable which can represent the level of education is primary enrolment rate. To capture true relationship and we have taken four categories total primary enrolment rate, male primary enrolment rate, female primary enrolment rate and difference between male-female primary enrolment rates.

Figure 1 is showing the total, male and female primary enrolment rates. It can be observed that despite of increasing total enrolment rate the gap between male and female rate is not being bridged up. With the passage of time this gap has reduced as evident from Fig. 2 but still the speed of bridging this gap is very slow and inconsistent.

**Unit root tests:** Study applied Microfit 4.0 developed by Pesaran and Pesaran (1997) for analysis. Study applied Augmented Ducky Fuller test (Dickey and Pantula, 1987; Phillips and Perron, 1988) to examine the stationarity. The results show that LGDP, LK, LLF are integrated of order one. However, LFMR is I(0) at 10% level and LHTH is I(0) at 5% level. Since, all the variables are not integrated of order one, so we can only use the ARDL approach of Pesaran *et al.* (2001) where the variables are need not to be integrated of order one I(1). The results are shown in Table 1 and 2.

### Empirical analysis

**Co-integration results:** Following the procedure discussed in methodology, we processed the Eq. 6-9.

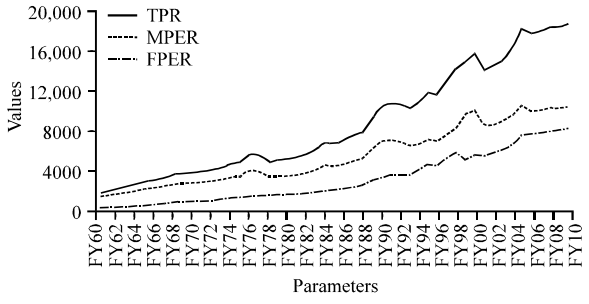


Fig. 1: Male, female and total primary enrolments

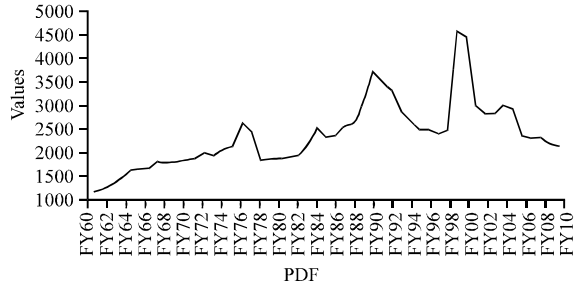


Fig. 2: Difference between male and PER

Table 1: Unit root tests results

| | Augmented Ducky Fuller test | | Philips-Perron test | |
|---|---|---|---|---|
| Variables | Intercept | Intercept and trend | Intercept | Intercept and trend |
| LGDP | -0.153 | -2.97 | -0.17 | -2.42 |
| D(LGDP) | -5.68* | -5.62* | -5.62* | -5.56* |
| LK | -0.85 | -1.32 | -0.72 | -1.20 |
| D(LK) | -3.57* | -3.57** | -3.89* | -3.88** |
| LL | -0.46 | -4.405* | -0.43 | -2.19 |
| D(LL) | -3.15** | -3.05 | -6.83* | -6.79* |
| LHCM | -1.89 | -3.42 | -2.18 | -2.66 |
| D(LHCM) | -5.64* | -5.77* | -5.529* | -5.79* |
| LHCF | -2.67 | -3.02 | -2.96** | -2.99 |
| D(LHCF) | -7.34* | -7.95* | -7.34* | -7.98* |
| LHCT | -2.10 | -2.66 | -2.06 | -2.77 |
| D(LHCT) | -5.77* | -5.98* | -5.74* | -5.93* |
| LHDF | -2.57 | -2.30 | -2.52 | -2.23 |
| D(LHDF) | -6.37* | -6.46* | -6.18* | -7.63* |

*,** represent significance at 1 and 5% level

Table 2: Co-integration test results

| | $\chi^2$-statistics | | |
|---|---|---|---|
| Null hypothesis ($H_0$) | Values | Prob. | Decision |
| $\gamma1 = \gamma2 = \gamma3 =$ | | | |
| $\gamma4 = \gamma5 = \gamma6 = 0$ | 15.50* | 0.0120 | Co-integration exists |
| $\delta1 = \delta2 = \delta3 = \delta4 = 0$ | 14.53* | 0.0058 | Co-integration exists |
| $\omega1 = \omega2 = \omega3 = \omega4 = 0$ | 18.85* | 0.0057 | Co-integration exists |
| $\psi1 = \psi2 = \psi3 = \psi4 = 0$ | 21.53* | 0.0002 | Co-integration exists |

* Indicates the rejection of null hypothesis at 1%

In order to determine whether long run relationship exists, we conducted Wald test. The null hypotheses for no co-integration were tested against the alternative hypotheses of co-integration. The results were lag sensitive; the appropriate lags were selected using the AIC criteria (Table 2).

Results reject all null hypotheses at the 1% level and imply that the co-integration exist between GDP and primary enrolment rates. It explicates that the GDP has long run direct relationship with male human capital, female human capital and total human capital. For further analysis, we processed Error Correction Models of Eq. 10-13. The ECMs were processed after producing the error correction term using the criteria described in ARDL approach. The error correction terms and long run coefficients of all four models alight in Table 3. The

Table 3: Long-term coefficients and error correction term

| Parameters | Model 1 | Model 2 | Model 3 | Model 4 |
|---|---|---|---|---|
| ECT*** | -0.21* | -0.19** | -0.34 | -0.007 |
| LTPER | 0.25** | - | - | - |
| LFPER | - | - | 0.08 | - |
| LMPER | - | 0.306* | - | - |
| LDTER | - | - | - | -0.039 |
| LK | 0.039* | 0.039* | 0.0035 | 0.021 |
| LL | 0.35* | 0.354* | 0.021 | 0.19 |
| Diagnostic tests | - | - | - | - |
| Heteroskedasticity test | 0.57 | 0.34 | 0.86 | 0.96 |
| Serial Correlation LM test | 0.77 | 0.11 | 0.26 | 0.57 |

*, ** represent significance at 1 and 5%, respectively; ***ECT represents error correction term at first lag

coefficient of Error Correction Term (ECT), measured at one lag difference, explains the speed of variables at which they converge to equilibrium. However, error correction term's coefficient can only be used if it has negative sign and is significant. In fact, the negative sign depicts the returning of variables to equilibriums and its absolute value shows the speed of adjustments. It is also a better way to establish the co-integration.

In Table 3, the ECT coefficient of first model, showing total primary enrolment rate's relationship with GDP, is -0.21. It has appropriate sign and is significant at 1%. The absolute value of 0.21 explains that ~21% of shocks will converge to equilibrium in each period. Further, the long-term estimates of the total primary enrolment rate are significant and it shows its direct relationship with GDP. In Model 2, showing male primary enrolment rate's relationship with GDP, the value of ECT coefficient is -0.19 and significant at 1%. It depicts that ~19% of shocks will converge to equilibrium in each period. The long term estimates of male primary enrolment rate (Model 2) are significant, showing its positive relationship with GDP. In Model 3, female primary enrolment rates, the value of error correction term is negative and significant. The ECT value of -0.34 implies that almost 34% disequilibria of last year's shock is adjusting back to long run equilibrium this year. The coefficient of female primary enrolment is positive and significant at 1%. It ramifies a direct relationship of female primary enrolment rate with economic growth. Lastly in Model 4, results depict the impact of difference in male and female enrolment rates on growth. These results are of particular interest as these depict. The long-term coefficient of this difference is negative and significant at 1%. It shows that as the gap between male-female primary enrolment widens, GDP growth decreases. Means the inequality in enrolment rates can subdue the economic growth. Further, error term sign is also right and its magnitude of 0.007 is showing that ~0.7% disequilibria of previous years are converging toward long run equilibrium current year. The results are consistent with other empirical studies. For example, Abbas and Foreman-Peck (2008) found that economic

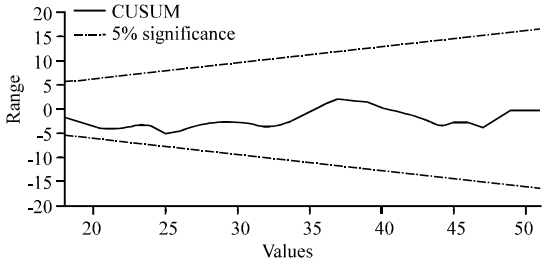


Fig. 3: LGDP = f (LK, LL, LTPER)

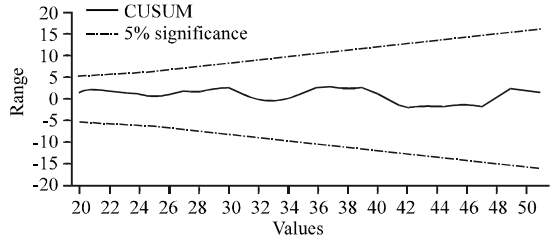


Fig. 4: LGDP = f (LK, LL, LMPER)

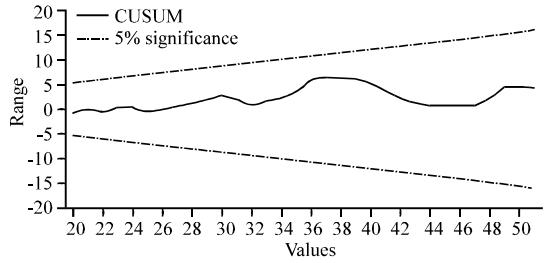


Fig. 5: LGDP = f (LK, LL, LFPR)

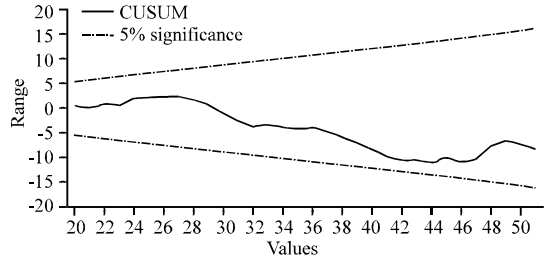


Fig. 6: LGDP = f (LK, LL, LPDF)

growth mainly dependent on education. Likewise, Zhang and Zhuang (2011) depicted that education had a significant direct influence on GDP growth in China. However, the findings differed from Kim *et al.* (2010) who concluded that higher education has greater impact upon growth as compare to primary and secondary and education.

**Stability test:** To test the stability of the model, we used the CUSUM test. According to Brown if the results of these two tests stay within the bands, it means that a stable and significant relationship among variables exist. In the case, the results of all equations tests are lying within limits (Fig. 3-6) which confirms the existence of significant relationship among variables.

## CONCLUSION

Though, numbers of studies have broached human capital-growth relationship in case of Pakistan, none of them checked the impact of male and female human capital on economic growth. This study by taking the primary enrolment rate as proxy of human capital, further disaggregating into male and female primary enrolment rates to represent male and female human capital, aimed to bridge this gap. This study not only analyzed the impact of human capital by taking male and female primary enrolment rates but also checked the relationship of difference of enrolments on growth. Researchers used time series data from 1960-2013 and applied ARDL approach to analyze the relationships.

## RECOMMENDATIONS

The results showed that total primary enrolment rates had significant influence on economic growth. By gender analysis revealed that both female and male primary enrolments had a momentous direct affect on economic growth.

Likewise, the difference in male and female enrolment rates had inverse relationship with growth. These results are consistent with the past studies like Waheed and Qadri, Afzal and Peck and Abbas. Based on the results, we conclude that in Pakistan female human capital significantly influences the pace of economic growth. These results provide fruitful insights for policy makers. These refute the conventional thinking about no or negligible economic role of educated woman. From, results it is implied that for attaining economic growth female education is as important as male.

Further for policy implications, this study urges that Pakistan should focus on female education and increase the female enrolment rates to promote economic growth. Moreover in order to decrease gender disparity, it is strongly urged to invest in education for both male and female equally, especially at primary level. It must be noted that this study used primary enrolment rates to represent human capital which may be somewhat biased due to the high drop out rates at primary level. Therefore, further researches should consider school dropout rates while taking enrolment rates as prxy of human capital.

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