

Gender Differences in Education: Are Girls Neglected in Pakistani Society?

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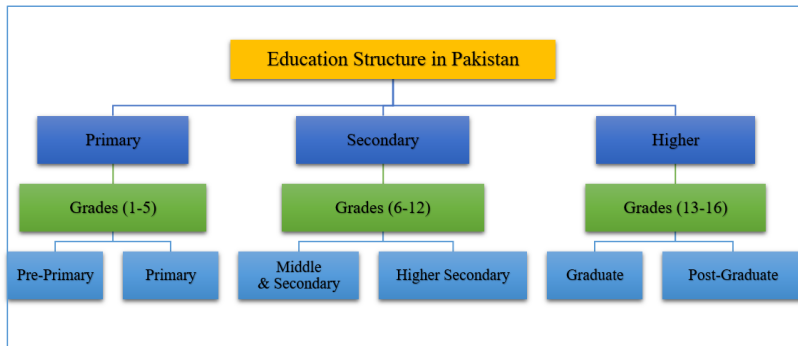
Outline

- 1 Motivation and Background
- 2 Stylized Facts in Pakistan
- 3 Empirical and Theoretical Background
- 4 Data, Variables and Methodology
- 5 Results
- 6 Discussion and Conclusion

Motivation and Background

- Education and Gender Gap, EFA Report (Barro et al., 2013), MDGs (World Bank 2019)
- UPE and education in Pakistan (Chaudhary et al., 2009)
- Human Development Report and Pakistan in South Asia (HDI 2016)
- Poverty and employment sector towards human capital
- Dependency on agricultural sector

Education Structure in Pakistan



Source: Author construction based on information by Education Ministry of Pakistan

Micro and Macro Institutions

- Government policies and plans
Alternative Learning Programs: formal schools
TAWANA Pakistan Program: Ministry of women development
SDGs and future incentives: World Bank Programs
Umbrella Facility for Gender Equality (UFGE) for developing countries
- Bias treatment within the society
- Long term asset and education investment
- Cost effective analysis for girls' education

Objectives

- To study the importance of gender differences in education by focusing females in Pakistan with contribution of income, individuals and socioeconomic characteristics
- To implement an empirical strategy for dealing potential endogeneity for non-linear models by exploiting exogenous variation of income shocks, windfall income and family background characteristics with 2SRI approach
- To capture discrimination and bias treatments by different parameters of inequalities and decomposition of gender effect

Literature Review

- Economic development between developed and developing countries (Klasen 2015)
- Gender discrimination in achieving first class degree (Robb et al., 2012)
- Difference in performance by budget and within households (Lloyd et al. 2005; Sathar et al., 2005)
- Bias treatment by personal and external communal factors (Kingdon 2002)
- No significance gender gap in current enrollment (Maitra 2003)

Contribution to Literature

- Unobserved and undocumented treatment- Child's environment and family structure, relative position of females in Pakistan
- First empirical investigation in Pakistan: Impact of income and socioeconomic characteristics with longitudinal data-set at micro level
- Issue of endogeneity (2SRI Approach)
- Gender Inequalities and decomposition in non-linear models at micro level.
- Examining gender variations for the impact of educational achievement on household's income per capita alternatively

Data Source

- Micro data from the Pakistan Social and Living Standards Measurements (PSLM) survey conducted by the Pakistan Bureau of Statistics (PBS), from 2005 to 2016 (Survey rounds 2005-06, 2007-08, 2010-11, 2011-12, 2013-14 and 2015-16) for 80000 households approximately

Variables

Dependent Variables: two alternative measures of education achievement

$$Education\ attainment = \begin{cases} 0 & = \text{No education} \\ 1 & = \text{Primary education (Grade 1-5)} \\ 2 & = \text{Secondary education (Grade 6-12)} \\ 3 & = \text{Tertiary education (Grade 13-16)} \end{cases}$$

These levels restricted to age groups 9-15, 16-19 and 20-24 years respectively. While, other measurement restricted to age group 5-24 years,

$$Current\ enrollment = \begin{cases} 1 & = \text{Currently enrolled in school} \\ 0 & = \text{otherwise} \end{cases}$$

Explanatory Variables: Individual, Household and community characteristics

Inequality Parameters: Gini, AYS, SD, Gender gap, Gender Difference, Gender gap ratio

Model

The structural model for latent education is,

$$Y_i^* = x_i\beta + \epsilon_i$$

Where, β is vector of parameters, ϵ is disturbance term and Y^* can take value with observations.

For the discrete choices the following are observing as,

$$Y^* = 0 \text{ if } -\infty < x_i\beta + \epsilon_i < \tau_0 \text{ for (No Education)}$$

$$Y^* = 1 \text{ if } \tau_0 < x_i\beta + \epsilon_i < \tau_1 \text{ for (Primary Education)}$$

$$Y^* = 2 \text{ if } \tau_1 < x_i\beta + \epsilon_i < \tau_2 \text{ for (Secondary Education)}$$

$$Y^* = 3 \text{ if } \tau_2 < x_i\beta + \epsilon_i < \tau_3 \text{ for (Tertiary Education)}$$

Where Y and τ denote educational categories and threshold parameters respectively.

Consequently, $\tau_0 < \tau_1 < \tau_2 < \tau_3$ as the ϵ_i is logistically distributed.

Econometric Model

Whereas, the log likelihood function for ordered logistic regression,

$$\sum_{i=1}^J \sum_{j=1} Ln[F(\tau_j - x\beta) - F(\tau_{j-1} - x\beta)]$$

The conversion formulates in multi-equations ordered logit models with each equation presenting logit model (Williams 2005).

Model:

The econometric model therefore is,

$$\text{Education Achievement} = f(\text{PC Income, individuals, HH, ..., provinces} + \epsilon_i)$$

while the extended model,

$$\text{Education Achievement} = f(\text{PC Income, Inequality, individuals, HH, ..., provinces} + \epsilon_i)$$

Empirical Strategy

- Endogenous variable (Behrman et al., 1997; Bratti 2007; Hoogerheide 2012; Kuehnle 2014)
- Income and windfall shocks, family characteristics (Fichera et al., 2015; Powdthavee et al., 2013; Ferreira 2009; Bratti 2007)
- Two Stage Residual Inclusion Method (2SRI) by Terza et al., (2008a), IV Probit, Control Function, 2SLS
- Extended models (Thomas et al., 2001, 1999; Hojo 2009; Digdowiseiso 2010)
- Gender decomposition (Kingdom 2005; Maitra 2003; Oaxaca 1973; Pal 2004; Dong et al., 2009; Golsteyn et al., 2014)
- Alternative approaches (Cooray 2011; McGillivray et al., 2015; Digdowiseiso 2010)

Ordered Logit Model for Education Attainment

Table 1. Average Marginal Effects for Education Attainment: Ordered Logit Model Regression

Variables	Both				Girl				Boy			
	None (1)	Primary (2)	Secondary (3)	Tertiary (4)	None (5)	Primary (6)	Secondary (7)	Tertiary (8)	None (9)	Primary (10)	Secondary (11)	Tertiary (12)
Gender (9-24)	-0.00723*** (0.00183)	0.00243*** (0.00062)	0.00365*** (0.00093)	0.00115*** (0.00029)								
Age (9-24)	-0.04152*** (0.00215)	0.01397*** (0.00073)	0.02098*** (0.00114)	0.00657*** (0.00030)	-0.02912*** (0.00301)	0.00953*** (0.00099)	0.01441*** (0.00154)	0.00519*** (0.00050)	-0.05273*** (0.00306)	0.01811*** (0.00106)	0.02722*** (0.00168)	0.00740*** (0.00037)
Sq. Age (9-24)	0.00128*** (0.00007)	-0.00043*** (0.00002)	-0.00065*** (0.00004)	-0.00020*** (0.00001)	0.00085*** (0.00010)	-0.00028*** (0.00003)	-0.00042*** (0.00005)	-0.00015*** (0.00002)	0.00166*** (0.00010)	-0.00057*** (0.00003)	-0.00086*** (0.00005)	-0.00023*** (0.00001)
Married	0.11291*** (0.00407)	-0.04375*** (0.00179)	-0.05419*** (0.00187)	-0.01497*** (0.00051)	0.10831*** (0.00510)	-0.04013*** (0.00212)	-0.05156*** (0.00236)	-0.01662*** (0.00077)	0.14544*** (0.00703)	-0.06039*** (0.00340)	-0.06916*** (0.00311)	-0.01589*** (0.00070)
Head Edu	-0.21328*** (0.02029)	0.04760*** (0.00214)	0.11538*** (0.01135)	0.05030*** (0.00691)	-0.47286*** (0.06876)	0.02120 (0.02147)	0.21777*** (0.00907)	0.23389*** (0.08162)	-0.22429*** (0.02100)	0.05008*** (0.00213)	0.12579*** (0.01235)	0.04841*** (0.00674)
Member Edu	-0.32031*** (0.00415)	0.05082*** (0.00063)	0.17647*** (0.00269)	0.09302*** (0.00192)	-0.31376*** (0.00620)	0.04899*** (0.00088)	0.16494*** (0.00369)	0.09982*** (0.00309)	-0.32440*** (0.00561)	0.05202*** (0.00090)	0.18689*** (0.00392)	0.08550*** (0.00238)
PC income	-0.00491*** (0.00040)	0.00165*** (0.00013)	0.00248*** (0.00020)	0.00078*** (0.00006)	-0.00501*** (0.00056)	0.00164*** (0.00018)	0.00248*** (0.00028)	0.00089*** (0.00010)	-0.00501*** (0.00056)	0.00172*** (0.00019)	0.00258*** (0.00029)	0.00070*** (0.00008)
Threshold Point	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	154,037	154,037	154,037	154,037	75,651	75,651	75,651	75,651	78,386	78,386	78,386	78,386
Log-Likelihood	-105271.45				-51069.65				-53947.95			
Chi-square test	36586.09				16668.99				20342.02			
AIC/BIC	210603.91				102197.31				107954.91			
Nagelkerke R2	0.313				0.310				0.321			
Prob > chi2	0.000				0.000				0.000			

The dependent variable is education attainment that is categorical variable. The category 1 displays for primary, 2 for secondary and 3 for tertiary level of education and 0 demonstrates none education. Models include individual and HH characteristics. Reference province is Punjab. Robust standard errors are in parentheses. Significance levels denote as *** p<0.01, ** p<0.05, * p<0.1

Ordered Logit Model by 2SRI

Table 2. Average Marginal Effects for Education Attainment by IV Approach: 2SRI/Ordered Logit Model Regression

Variables	Both				Girl				Boy				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
Gender (9-24)	-0.02062*** (0.00306)	0.00693*** (0.00114)	0.01043*** (0.00158)	0.00326*** (0.00040)									
Age (9-24)	-0.05538*** (0.00503)	0.01862*** (0.00078)	0.02800*** (0.00091)	0.00876*** (0.00022)	-0.04468*** (0.00564)	0.01460*** (0.00182)	0.02211*** (0.00198)	0.00796*** (0.00096)	-0.06644*** (0.00325)	0.02281*** (0.00089)	0.03433*** (0.00334)	0.00931*** (0.00039)	
Sq. Age (9-24)	0.00165*** (0.00015)	-0.00056*** (0.00002)	-0.00083*** (0.00004)	-0.00026*** (0.00001)	0.00128*** (0.00015)	-0.00042*** (0.00006)	-0.00063*** (0.00006)	-0.00023*** (0.00003)	0.00203*** (0.00009)	-0.00070*** (0.00003)	-0.0011*** (0.00010)	-0.00028*** (0.00001)	
Married	0.12180*** (0.00371)	-0.04758*** (0.00202)	-0.05826*** (0.00221)	-0.01596*** (0.00047)	0.12053*** (0.00067)	-0.04507*** (0.00355)	-0.05718*** (0.00121)	-0.01829*** (0.00043)	0.14718*** (0.00825)	-0.06124*** (0.00017)	-0.0699*** (0.00454)	-0.01603*** (0.00082)	
Head Edu	-0.37872*** (0.02864)	0.04461*** (0.00222)	0.20231*** (0.01311)	0.13179*** (0.02301)	-0.61238*** (0.02172)	-0.03657*** (0.00488)	0.16628*** (0.02357)	0.48267*** (0.14243)	-0.38404*** (0.01640)	0.04548*** (0.00248)	0.21558*** (0.00805)	0.12298*** (0.02370)	
Member Edu	-0.31613*** (0.00817)	0.05067*** (0.00094)	0.17445*** (0.00184)	0.09101*** (0.00430)	-0.30963*** (0.00430)	0.04894*** (0.00077)	0.16293*** (0.00415)	0.09776*** (0.00419)	-0.32010*** (0.00608)	0.05181*** (0.00192)	0.18481*** (0.00749)	0.08348*** (0.00411)	
PC income	-0.10929*** (0.01734)	0.03674*** (0.00309)	0.05527*** (0.00241)	0.01728*** (0.00205)	-0.11676*** (0.01966)	0.03817*** (0.01072)	0.05778*** (0.00846)	0.02081*** (0.00692)	-0.11014*** (0.00875)	0.03781*** (0.00245)	0.05691*** (0.01251)	0.01543*** (0.00084)	
Observations	749,503	749,503	749,503	749,503	749,503	749,503	749,503	749,503	749,503	749,503	749,503	749,503	
Instruments Criteria													
Hausman Test	190.846	Overid Test	0.7090	First Stage	196.125								

The dependent variable is education attainment that is categorical variable. The category 1 displays for primary, 2 for secondary and 3 for tertiary level of education and 0 demonstrates no education. Models include individual and HH characteristics. Reference province is Punjab. The instruments are income shock described as head unemployed and grandparents' resources. The validity of instruments estimates with 2SLS estimators. The Hausman test provides F-statistics and test of overidentification states P-value. The value for First Stage regressions give F-statistics. Bootstrapped standard errors are presented in parentheses. Significance levels denote as *** p<0.01, ** p<0.05, * p<0.1

Table 3. Average Marginal Effects for Current Enrollment

Variables	Logit Model: Without Endogeneity			Logit/2SRI Model: With Endogeneity		
	Both (1)	Girl (2)	Boy (3)	Both (4)	Girl (5)	Boy (6)
Gender (5-24)	-0.01394*** (0.00177)			-0.0109*** (0.00150)		
Age (5-24)	0.06093*** (0.00099)	0.04950*** (0.00139)	0.07091*** (0.00139)	0.0589*** (0.00187)	0.0477*** (0.00159)	0.0680*** (0.00130)
Sq. age (5-24)	-0.00209*** (0.00004)	-0.00166*** (0.00005)	-0.00247*** (0.00005)	-0.00201*** (6.82e-05)	-0.00158*** (4.68e-05)	-0.00235*** (5.64e-05)
Married	-0.15821*** (0.00340)	-0.17206*** (0.00397)	-0.13034*** (0.00672)	-0.151*** (0.00566)	-0.166*** (0.00269)	-0.125*** (0.00953)
Parents Edu	0.11875 (0.12854)	0.14539 (0.14607)	0.09850 (0.17726)	0.0927 (0.119)	0.109 (0.0001)	0.0794** (0.0359)
Head Edu	0.01061 (0.01146)	-0.04850 (0.05343)	0.01637 (0.01219)	0.0208 (0.0144)	0.268*** (0.0935)	0.206** (0.0966)
Member Edu	0.14836*** (0.00536)	0.14363*** (0.00776)	0.15262*** (0.00740)	0.130*** (0.00465)	0.124*** (0.00755)	0.132*** (0.00348)
PC Income	0.00464*** (0.00039)	0.00519*** (0.00054)	0.00407*** (0.00056)	0.0580*** (0.00483)	0.0552*** (0.00824)	0.0597*** (0.0133)
Observations	221,313	106,444	114,869	749,503	749,503	749,503
Log-Likelihood	-111048.68	-51505.82	-59383.47			
Chi-square test	36178.75	17974.32	18232.44			
AIC/BIC	222151.36	103062.65	118819.95			
Nagelkerke R2	0.314	0.330	0.300			
Prob>Chi2	0.000	0.000	0.000			
Instruments Criteria						
Hausman Test	72.1936	Overid Test	0.1591	First Stage	38.3886	

The dependent variable current enrollment is binary. Models include individual and HH characteristics. The set of instruments are income shocks, income windfall and income difference. Robust standard errors are in parentheses. Significance levels denote as *** p<0.01, ** p<0.05, * p<0.1

Inequalities Parameters: Ordered Logit Model

Table 4. AMEs Estimation for Education Attainment with Education Inequalities by Ordered Logit Model

Variables	Both				Girl				Boy			
	None (1)	Primary (2)	Secondary (3)	Tertiary (4)	None (5)	Primary (6)	Secondary (7)	Tertiary (8)	None (9)	Primary (10)	Secondary (11)	Tertiary (12)
Panel A: Gini Coefficient												
Gender (9-24)	-0.00361*** (0.00042)	-0.00070*** (0.00008)	0.00258*** (0.00030)	0.00174*** (0.00020)								
Age (9-24)	0.00612*** (0.00066)	0.00118*** (0.00012)	-0.00437*** (0.00046)	-0.00293*** (0.00031)	0.00960*** (0.00101)	0.00126*** (0.00015)	-0.00623*** (0.00065)	-0.00463*** (0.00047)	0.00346*** (0.00086)	0.00091*** (0.00022)	-0.00273*** (0.00067)	-0.00164*** (0.00040)
Sq. Age (9-24)	-0.00070*** (0.00002)	-0.00013*** (0.00001)	0.00050*** (0.00002)	0.00033*** (0.00001)	-0.00081*** (0.00004)	-0.00011*** (0.00001)	0.00053*** (0.00002)	0.00039*** (0.00002)	-0.00061*** (0.00003)	-0.00016*** (0.00001)	0.00048*** (0.00002)	0.00029*** (0.00001)
Gini (9-24)	0.11420*** (0.00967)	0.02205*** (0.00192)	-0.08152*** (0.00674)	-0.05473*** (0.00462)	0.12600*** (0.01475)	0.01653*** (0.00214)	-0.08177*** (0.00935)	-0.06076*** (0.00708)	0.10040*** (0.01263)	0.02638*** (0.00331)	-0.07910*** (0.00973)	-0.04769*** (0.00599)
PC income	-0.00071*** (0.00008)	-0.00014*** (0.00002)	0.00051*** (0.00006)	0.00034*** (0.00004)	-0.00083*** (0.00012)	-0.00011*** (0.00002)	0.00054*** (0.00008)	0.00040*** (0.00006)	-0.00065*** (0.00011)	-0.00017*** (0.00003)	0.00051*** (0.00009)	0.00031*** (0.00005)
Panel B: Avg. Years of Schooling												
Gender (9-24)	-0.00359*** (0.00042)	-0.00070*** (0.00008)	0.00258*** (0.00030)	0.00172*** (0.00020)								
Age (9-24)	0.00606*** (0.00065)	0.00117*** (0.00012)	-0.00433*** (0.00046)	-0.00290*** (0.00031)	0.00958*** (0.00100)	0.00126*** (0.00015)	-0.00622*** (0.00065)	-0.00462*** (0.00047)	0.00339*** (0.00086)	0.00089*** (0.00022)	-0.00267*** (0.00067)	-0.00161*** (0.00040)
Sq. Age (9-24)	-0.00070*** (0.00002)	-0.00013*** (0.00001)	0.00050*** (0.00002)	0.00033*** (0.00001)	-0.00081*** (0.00004)	-0.00011*** (0.00001)	0.00053*** (0.00002)	0.00039*** (0.00002)	-0.00060*** (0.00003)	-0.00016*** (0.00001)	0.00048*** (0.00002)	0.00029*** (0.00001)
AYS (9-24)	-0.00405*** (0.00063)	-0.00078*** (0.00012)	0.00289*** (0.00045)	0.00194*** (0.00030)	-0.00523*** (0.00097)	-0.00069*** (0.00013)	0.00339*** (0.00062)	0.00252*** (0.00047)	-0.00309*** (0.00082)	-0.00081*** (0.00021)	0.00243*** (0.00064)	0.00146*** (0.00039)
PC income	-0.00067*** (0.00008)	-0.00013*** (0.00002)	0.00048*** (0.00006)	0.00032*** (0.00004)	-0.00079*** (0.00012)	-0.00010*** (0.00002)	0.00052*** (0.00008)	0.00038*** (0.00006)	-0.00060*** (0.00011)	-0.00016*** (0.00003)	0.00048*** (0.00009)	0.00029*** (0.00005)
Panel C: Standard Deviation												
Gender (9-24)	-0.00820*** (0.00260)	0.00182*** (0.00057)	0.00483*** (0.00151)	0.00163*** (0.00051)								
Age (9-24)	-0.05623*** (0.00328)	0.01237*** (0.00075)	0.03279*** (0.00199)	0.01107*** (0.00057)	-0.03929*** (0.00467)	0.00842*** (0.00103)	0.02235*** (0.00273)	0.00852*** (0.00093)	-0.06975*** (0.00460)	0.01556*** (0.00109)	0.04169*** (0.00289)	0.01250*** (0.00071)
Sq. Age (9-24)	0.00150*** (0.00011)	-0.00033*** (0.00002)	-0.00087*** (0.00007)	-0.00029*** (0.00002)	0.00094*** (0.00015)	-0.00020*** (0.00003)	-0.00054*** (0.00009)	-0.00020*** (0.00003)	0.00193*** (0.00015)	-0.00043*** (0.00004)	-0.00115*** (0.00009)	-0.00035*** (0.00002)
SD (9-24)	0.00207*** (0.00083)	-0.00046*** (0.00018)	-0.00121*** (0.00049)	-0.00041*** (0.00016)	0.00355*** (0.00120)	-0.00076*** (0.00026)	-0.00202*** (0.00069)	-0.00077*** (0.00026)	0.00039 (0.00115)	-0.00009 (0.00026)	-0.00023 (0.00069)	-0.00007 (0.00021)
PC income	-0.00602*** (0.00056)	0.00133*** (0.00013)	0.00351*** (0.00033)	0.00019*** (0.00011)	-0.00586*** (0.00081)	0.00126*** (0.00017)	0.00333*** (0.00046)	0.00127*** (0.00018)	-0.00649*** (0.00079)	0.00145*** (0.00018)	0.00388*** (0.00047)	0.00116*** (0.00015)

The dependent variable is education attainment that is categorical variable, 1 displays for primary, 2 for secondary and 3 for tertiary level of education and 0 demonstrates none education.

Panel A, B and C contain Gini Coefficient, Average Years of Schooling and Standard Deviation for education attainment (9-24).

Each panel contains threshold points, individuals, household and community characteristics.

Robust standard errors are in parentheses. Significance levels denote as *** p<0.01, ** p<0.05, * p<0.1

Inequalities Parameters: Logit Model

Table 5. AMEs Estimation for Current Enrollment with Education Inequalities by Logit Model

Variables	Panel A			Panel B			Panel C		
	Gini Coefficient			Avg. Years of Schooling			Standard Deviation		
	Both	Girl	Boy	Both	Girl	Boy	Both	Girl	Boy
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Gini (5-24)	-4.07726*** (0.10456)	-3.50969*** (0.14814)	-4.56796*** (0.14744)						
AYS (5-24)				0.67111*** (0.00447)	0.63842*** (0.00632)	0.69898*** (0.00631)			
SD (5-24)							-0.00129** (0.00052)	-0.00232*** (0.00075)	-0.00036 (0.00072)
Gender (5-24)	-0.01393*** (0.00176)			-0.01201*** (0.00166)			-0.01687*** (0.00212)		
Age (5-24)	0.05961*** (0.00098)	0.04867*** (0.00139)	0.06916*** (0.00139)	0.05380*** (0.00092)	0.04515*** (0.00130)	0.06125*** (0.00130)	0.01495*** (0.00112)	0.00802*** (0.00162)	0.02040*** (0.00155)
Sq. age (5-24)	-0.00206*** (0.00004)	-0.00164*** (0.00005)	-0.00242*** (0.00005)	-0.00188*** (0.00003)	-0.00154*** (0.00005)	-0.00217*** (0.00005)	-0.00098*** (0.00004)	-0.00069*** (0.00006)	-0.00122*** (0.00006)
PC income	0.00475*** (0.00039)	0.00529*** (0.00054)	0.00420*** (0.00056)	0.01497*** (0.00139)	0.01517*** (0.00200)	0.01491*** (0.00192)	0.00710*** (0.00041)	0.00737*** (0.00058)	0.00686*** (0.00058)
Observations	221,313	106,444	114,869	221,313	106,444	114,869	192,312	91,903	100,409
Log-Likelihood	-110356.44	-51247.54	-58950.04	-27052.65	-12075.27	-14921.92	-117392.38	-55637.62	-61634.00
Chi-square test	36639.89	18080.17	18621.46	10182.79	4865.68	5395.09	23355.04	11919.72	11575.34
Prob >chi2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

The dependent variable is binary for 1 displays current enrollment in primary, secondary and tertiary education and 0 demonstrates no current enrollment. Panel A, B and C contain Gini Coefficient, Average Years of Schooling and Standard Deviation for current enrollment (5-24). Each panel contains threshold points individuals, household and community characteristics. Robust standard errors are in parentheses. Significance levels denote as *** p<0.01, ** p<0.05, * p<0.1

Inequalities Parameters: Alternative Specification

Table 6. Relationship between Gender Differences in Education and Income by OLS: Alternative Specification

Variables	Panel A			Panel B			Panel C		
	Gender Gap			Gender Difference			Gender Gap Ratio		
	Both	Girl	Boy	Both	Girl	Boy	Both	Girl	Boy
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Education Attainment									
Gender gap (9-24)	-0.05864*** (0.01181)	-0.09300*** (0.01700)	-0.02633 (0.01634)						
Gender diff. (9-24)				-0.03301*** (0.00370)	-0.04584*** (0.00551)	-0.00967* (0.00498)			
Gap Ratio (9-24)							-0.01044* (0.00581)	-0.03136*** (0.00917)	0.00852 (0.00770)
Gender	-0.11512*** (0.01018)			-0.09138*** (0.01031)			0.01302 (0.01218)		
Age (9-24)	-0.13452*** (0.00927)	-0.13205*** (0.01379)	-0.13383*** (0.01248)	-0.13582*** (0.00927)	-0.12606*** (0.01380)	-0.13565*** (0.01252)	-0.05351*** (0.01149)	-0.03319** (0.01610)	-0.08051*** (0.01642)
Sq. age (9-24)	0.00361*** (0.00028)	0.00313*** (0.00041)	0.00393*** (0.00037)	0.00365*** (0.00028)	0.00301*** (0.00042)	0.00397*** (0.00037)	0.00142*** (0.00034)	0.00081* (0.00047)	0.00221*** (0.00048)
Observations	215,308	105,371	109,937	215,308	105,371	109,937	37,398	20,493	16,905
Current Enrollment									
Gender gap (5-24)	-0.04728*** (0.00764)	-0.05913*** (0.01094)	-0.03779*** (0.01065)						
Gender diff. (5-24)				-0.00743** (0.00299)	-0.01955*** (0.00435)	0.00288 (0.00415)			
Gender ratio (5-24)							-0.0242*** (0.00568)	-0.0281*** (0.00858)	-0.0184** (0.00762)
Gender (5-24)	-0.11036*** (0.00893)			-0.10627*** (0.00889)			-0.0724*** (0.0123)		
Age (5-24)	0.00096 (0.00464)	0.02557*** (0.00695)	-0.01757*** (0.00622)	0.00099 (0.00464)	0.02626*** (0.00695)	-0.01708*** (0.00622)	0.0226*** (0.00650)	0.0453*** (0.00951)	0.00128 (0.00887)
Sq. age (5-24)	-0.00076*** (0.00016)	-0.00192*** (0.00024)	-0.00192*** (0.00021)	-0.00076*** (0.00016)	-0.00195*** (0.00024)	-0.00195*** (0.00021)	-0.00163*** (0.000227)	-0.00283*** (0.000337)	-0.000521* (0.000304)
Observations	268,277	130,856	137,421	268,277	130,856	137,421	155,064	80,374	74,690

The dependent variable is household's per capita income. Panels A, B and C include Gender Gap in Illiteracy, Gender Difference and Gender Gap Ratio for education attainment of children (9-24) and current enrollment of children (5-24) respectively.

Each Panel contains individuals, household and community characteristics. Robust standard errors are in parentheses.

Significance levels denote as *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Gender Decomposition: Parameters and Oaxaca Type

Table 7. Gender decomposition by Predicted Probabilities

Gender Decomposition	Education Attainment	Current Enrollment
By Parameters		
Personal Attributes	Girls' Advantage	Girls' Advantage
Individuals' Attributes	Boys' Advantage	Boys' Advantage
HH Attributes	Girls' Advantage	Girls' Advantage
Community Attributes	Boys' Advantage	Boys' Advantage
By Probability Percentage		
Girls using Boys' equation	+ 3%	+1.5%
Boys using Girls' equation	-2%	-2%
By Variations		
Explained	-61%	41%
Unexplained	161%	58%

Robustness Tests

- Ordered Probit and Probit Model
- Per capita expenditure
- Heterogeneity among provinces
- Different age groups (13-24)
- Control Function approach
- IV Probit estimation by generating binary variables

Discussion and Conclusion

- Probability of education attainment of the girls is equally significant as boys however, associated socio-economic and individuals' characteristics are playing major role in the related marginal differences (Orepoulos et al., 2007).
- Positive relationship between education achievement and per capita income and significant transformation of education from lower levels to higher levels (Jacob 2002).
- Effect of age in boys determine economic returns at higher levels that is the plausible explanation of delayed admission in the tertiary education (Freedom et al., 1990)
- Gini coefficient and educational inequalities provide education achievement gap among girls more than boys. Similarly lower returns are associated with girls' education.

Discussion and Conclusion

- Positive relationship between education achievement and household infrastructure, girls might receive higher advantages in personal attributes and household infrastructure while other individuals and community support boys' education (Aslam 2009; Gong et al., 2016).
- Occupational heterogeneity as lower socio-economic backgrounds and lower income families provide higher aspirations for education achievement (Chowdary et al. 2011).
- Allocation of the time can shift from the agricultural activities or household chores to the schools attendance has significant influence on education achievement.

Policy Implications

- Reforming education policies by prioritizing rural and tribal areas with adequate public and private funds and cost effective education.
- Allocation of incentives, scholarships and financial support on merit for talented and hardworking females.
- Controlling gap between having enrolled and not having enrolled by considering low-income groups of the society.
- Improving supply of education with mobile learning and by collaboration of federal and local governments for constructing schools, colleges, universities and research labs.
- Economic policies that can facilitates the income generation and transitional effect of education for gender equity.

The End

Thank you for your attention