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Econometric Analysis Of Family Expenditure On Education In Pakistan - A Case Study For Higher Education

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Abstract
This paper assesses family spending on Higher education in Pakistan. It researches the components and variables completing the families spending on schooling utilizing information from PSLM data 2018-19. The results derived from estimation depict that change in the level of degrees, college/Universities type, organizations distance from home, change in area, and change in residency concerning across country sets the expenses of family on higher education. Additionally, an increase in both the number of children and income has also an effect on higher education, as an increase in the number of children and income of family head drives an increase in household education spending. Nonetheless, ends with respect to all factor have positive influence in policy recommendations for education. Further, all revelations can have inferential scope of issues concerning educational implications in Pakistan. These all factors have specific role in the determination of the allocation of budget on education from government side. The OLS (ordinary Least Square) Method and Regression analysis technique used to execute the regression. This method and technique signifies to situation when a model has dependent variable as quantitative. Estimations and outcomes will accomplish the policy and way out of all those complications that are explicated by the variables and explained the education spending from household.

KEYWORDS: Education expenditure, PSLM, family head, university type, region, employment status, gender of household, income level, OLS, regression.

Introduction

As education acts as significant role in the improvement and creating reconciliation in any society. Therefore it has always stayed central attention of argument in society. Education performs main effect on earning or work-related status and essentially almost elucidation of economic glitches such a joblessness and poverty. Education plays key role in founding and consolidation of institutions in state. According to theory of human capital, education surges revenue and efficiency (Walker, 2003; Chevalier et al., (2004).

A momentous portion of Pakistan's residents is currently enrolled in school; 48 percent of the people are between the ages of 5 and 24 (LFS, 2013–14), making up a significant portion of the population who are already in school. This populace can be converted into a segment profit by putting resources into education and capabilities improvement. In addition, Pakistan has a demographic share likely for monetary growth since the proportion of its total population that is working age is growing and is expected to continue growing till 2040 (Bongaarts , Sathar, & Mahmood, 2013; Saad, 2016). It goes without saying that Pakistan's macroeconomic performance could be affected in the future by this pattern of demographic change. Additionally, the China-Pakistan Economic Corridor, or CPEC, will soon be fully operational. Therefore, investing in education is necessary to increase the workforce's education and skills in order to benefit from the demographic dividend.

There are two ways that the public capitalizes in schooling: administration level and family level. In the circumstance of Pakistan, there is a realistic amount of evidence about how much money the government spends on education, but there is not much information about how much money households spend on education. Public and private sector expenditures are equally significant. Because the presence or absence of either one indicates a

suboptimal allocation of resources, investments made by households and by the government are interconnected and dependent on one another. As a result, ignoring education expenditures by households is costly because a lack of information leads to incorrect assumptions regarding households' willingness to pay for education. National educational policies are less effective because of these flawed assumptions. As a result, it is crucial to investigate and evaluate the demand for education in Pakistan and the willingness of households to pay for it.

The goal of this study is to find out how different socioeconomic factors affect how much money is spent on education at the household level in Pakistan. A double logarithmic specification of the Engel Curve has been used in this study to evaluate the association between education expenses and their elements. Attention of household in training is assessed by the family's uses on schooling. Instead of focusing on factors that influence educational attainment as did previous studies (Ahmed, Amjad, Habib, & Shah, 2013 ;) the study focuses on the factors that influence education spending at the household level. 2001; Sarwar, Sial, & Muhammad, (2019). Educational achievement is likewise a purpose of individual features of the kids in addition to the features of the household, so it somewhat enlightens the outlay in or petition for edification by families (Qian & Smyth, 2011). Expenditure on education reflects households' readiness to recompense for their kids' education. Second, we examine whether household budgets and income elasticity of demand for education in Pakistan change with income level to trial the hypothesis that schooling is an essential worthy.

Organization of Education in Pakistan

The schooling scheme in Pakistan is broken down into three stages: five year of essential training (Class 1 to Class 5), seven years' time span of auxiliary instruction (Class 6 to Class 12) and tertiary schooling. Pre-primary education, which includes play groups, nursery classes, and prep lessons for teenagers over the phase of 3, is also available. Specialized and professional foundations are additionally proposing three year diplomas package afterward conclusion of a decade of tutoring. Deeni Madrassas, also known as religious institutes, offer free boarding and lodging in addition to public and private schools. Maximum of the period, such Madrassas are executed by native societies and funded by donations and generous determinations.

The organization of schooling in Pakistan is almost identical for both public and private institutions. Primary education, which spans Class I through V, requires five years of instruction after pre-primary education. Secondary schooling entails of middle level (Class 6^{th} to 8^{th}), matriculation (Class 9^{th} to 10^{th}), and intermediate level (Class First Year to second Year) or higher secondary school certificates. Private schools also offer international examination systems including O and A level) for upper middle class students. Colleges offer two-year bachelor's degrees, such as BA, B.Sc., and B.Com. After secondary school, while universities offer four-year degrees. Students are eligible to pursue a two-year master's degree after graduating after two years. Afterward the finish of sixteen years of schooling (2-year ace degree/long term's graduation) the understudies can sign up for educated/exploration founded post-graduation scheme MS /M.Phil (at least two years) in significant field of review. PhD is a three-year research-based degree program offered by universities after the MS/M.Phil program.

Background and Significance of the Study

The current study is related to factors that influence household outlay on higher schooling. Many researcher has prior done work on education but no one has clearly attempted to segregate education expenditure on higher education. However, the scholar has attempted to determine the factors that influence household expenses on higher learning from graduation to a doctorate. It will surely help researchers to quantify household expenditures on higher schooling gradations. The current study is related to features that effect home expenses on higher schooling. However, the scholar has attempted to determine the elements that impact home expenses on advanced education from graduation to a doctorate. It involves bachelor's degrees (B.A., B.Sc., and B.Ed.), master's degrees (M.A., M.Sc., and M.Ed.), degrees in engineering, medicine, agriculture, and law, M.Phil., Ph.D and other degrees also. According to a review of the literature, numerous researchers have not yet examined this kind of expenditure on higher education with such variables and degree types. It will really help researchers quantify household expenditures on higher education degrees.

Kuvat and Ayvaz (2020) inspected the determinants of personal instructive consumptions of Turkey families and for this they utilized the Turkey Family Spending plan Study, 2017. The Tobit and Probit model was utilized to examine the information. The consequences of the review features that schooling of the family head, pay of the family, and family's having individual house were the positive huge determinants of instructive consumptions in concentrate on region. Then again, they further found the adverse consequence of family size and distance from home to instructive establishment on the family head's choice with respect to instructive consumptions.

Song and Zhou (2019) explored the job of disparity in an open door in instructive consumptions in China utilizing Board information of china. Schooling of family heads, area (metropolitan/rustic) and pay of the family was taken

as free factor and the outcomes uncovered that each of the previously mentioned factors tracked down the critical yet the negative determinants of instructive consumptions.
Abbam (2018) directed a review to investigate the job of socio-segment variables of families in the event of instructive uses in Ghana. The outcomes show that destitution of families huge however the adverse consequences on instructive consumptions of the family heads while the area (metropolitan/country) and families having female heads were the positive critical determinants in such manner. The specialists additionally came to at the resolution that comparative with male family heads, the female headed families were bound to put on their relatives in Ghana.
Wongmonta and Glewwe (2017) attempted to investigate the job of orientation on the determinant of instruction utilizing the Socio-financial aspects Overview Information of Thailand, Thailand. They utilized the Engel bend to figure out the level of equity among the orientation with regards to instructive consumptions. The consequence of the review that uncovered similar to male kid, the female kid was like by the guardians regarding instructive uses. They likewise inferred that guardians of Thailand treated both the orientation similarly when they settled on contribute on them.

Sabir (2003) analyzed that to what extension had government schooling spending in Pakistan stayed employable in plunging orientation cuts in enlistments? To reaction this inquiry, this article modified the benefit recurrence of government schooling expense. It started that administration supported fixed to essential schooling is ace denied in each of the four territories of Pakistan. Besides, females experienced issues in permission to essential schooling. Notwithstanding, government support coordinated towards advanced education wiped out beset and humblest pay bunch recognized not as much as wealth income bunch and without a doubt favored the people who are richer.

Material and Methods

This investigation is grounded on examination of Pakistani households to find out how much each household spends on higher education. The Pakistan Social and Living Standard Measurement (PSLM) Assessment Round VII 2018-2019 provided the data for this analysis. The informational collection comprises of the multitude of four areas of Pakistan (KPK, Punjab, Sindh and Baluchistan). It is a cross-sectional review with a random sample extent of 2166 people as of all over Pakistan. The statistics from the survey provided information at the household level regarding higher education as well as various socioeconomic variables like the region, income, type of university, distance from home, age and employing position of the household head, province, education of the family head, digit of children, sex of the family head, and so on. Consumption on education includes the educational expense, Scholastic Charge fixed, Lodging and transport charges.
The equation is assessed using the Linear Regression and Ordinary Least Squares (OLS) methods. The kind of dependent Variables determines the estimation method. The OLS Method and the regression analysis method are applied because the dependent variable in this instance is quantitative. Because we have a dependent variable that is quantitative or scale in this instance. It makes no doubt that the regression analysis method was used to estimate the model. All of the explanatory variables' measurable statistics and reliability will be provided by the estimated model. A variable is statistically significant if its probability or P value is less than 5% or 0.05 or 10% 0.10, while a variable is statistically insignificant if it is greater than 5% or 10%.
Additionally, we evaluate the Model's overall performance using the F statistic. The power of the explanatory variable is sufficient to sustenance the model if the probability value of the F test is less than 5%. Additionally, the significance of each individual variable can be assessed using the T test. The P esteem has same case and circumstance with as past examined. The outcome that the explanatory variables have on the dependent variable, which is the amount that a household spends on higher education, will be quantified using estimated coefficients. The model's coefficient will explain the extent of the effect on the dependent variable.

3.3 Econometric Model

Forming the model's shape and specifying its variables are essential before beginning the estimation and data analysis. The Model provides the foundation and estimation methods by demonstrating the variety and nature of variables. The form of this Multiple Linear Regression Model is as shadows: Dependent variable = **C** + $B_1X_1 + B_2X_2 + B_3X_3 B_4X_4 + B_5X_5 + B_6X_6 + B_7X_7 + B_8x_8 + B_9X_9 + B_{10}X_{10} + e$

Dependent variable (Y) = Education Expenditure

Constant = C

X_1	=	Education Level (Degrees)
X_2	=	Age of the family heads
X_3	=	Total income of the family heads
X_4	=	Province
X_5	=	Region (Urban & Rural)
X_6	=	University/College Type (Public & Private etc.)
X_7	=	Gender of the family head (Male & Female)
X_8	=	College/University Distance from House
X_9	=	Employment status of the family head
X_{10}	=	Number of children of family head
X_{11}	=	Residential status of the family head
e	=	Error Term

In addition, this model will explain categorical variables that will occur during the course of the regression. For instance, income is the first variable in the above form; it is a quantitative variable that will never change, but all other variables will be recoded into single variables to form a single categorical variable. We align all categorical variables into their new variables, which will clear the model's results and make it much easier to comprehend the model's regression and actual shape.

We have absolute factor named "School/College Distance from House" this looks single variable however it contains various classifications. For instance, the first category that includes the distance between a residence and an educational establishment is "zero to two kilometers." The second category of this categorical variable covers distances between two and five kilometers, while the third category covers distances between five and ten kilometers, or five to ten kilometers, and the fourth category covers distances greater than ten kilometers. The type of college or university, which includes both public and private options, is the next variable. Employment status will be the next categorical variable, which will be further broken down into subcategories for use in regression. Employer is the first category of this variable. The employees of this employer number more than ten. Employees who work in non-agricultural fields, such as own cultivators, share croppers, contract cultivators, and livestock only, fall into the second category of self-employed individuals. Employees, who include paid employees, make up the third and final category of employment status, respectively, as well as all other categories. The next categorical variable is the "Education Level," which includes higher degrees. After running regression in SPSS, individual or separate expenditures on each degree will be calculated. The region will be the next variable, and its purpose will be to find out the proportion of households expenses on higher education in urban and rural regions. The next variable is gender, which is further broken down into male and female to determine the gender-based education expenditure. We want to test and check household expenditures based on the trends of people living in four Pakistani provinces, so the net variable is province. The provinces of Punjab, KPK, Sind, and Baluchistan are all included in this categorical variable. A few different factors will be viewed as on a similar premise.

Table 4.1 (Researcher's own contribution, PSLM 2018-19)

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.516[a]	0.266	0.255	84675.6886

This table 4.1 represents the value of R square and Adjusted R square that explains the variation that how all the explanatory variable explains the variation in dependent variable. It depicts that variation in education expenditure

that accounts for all the independent variables in the regression mode. It corresponds that 26.6 % variation in education expenses is explained by the independent variables.

Table 4.2 (Researcher's own contribution, PSLM 2018-19)

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5550248752327.473	32	173445273510.234	24.391	.000[b]
	Residual	15293550803414.492	2133	7169972247.264		
	Total	20843799555741.965	2165			
Dependent Variable: Total Education Expenditure						

This summary of table 4.2 shows the statistic of F test which inclusive depicts the strength and power of all independent variables that how these affect the dependent variable. The probability value of F statistic that is 0.000 which is statistically significant and indicates that the overall regression model is substantial. The value of R square is statistically significant based on this F test. The overall F-test determines the statistical significance of this relationship. If the P value for the overall F-test is less than significance level, we can conclude that the R-squared value is significantly different from zero.

We have above discussed the Model Summary and ANOVA table, which entirely discusses the performance and credibility the model. Researcher now focuses to discuss and interpret the impact and extent of each variables on education expenditure. It will further clarify that how each variable contributes its shares in schooling outlay. We will plot the compare means and coefficients table in order to understand the essence of this thesis designed in order to understand the aspect of household expenditure on education.

Table 4.3 Compare Means (Researcher's own contribution, PSLM 2018-19)

Total Expenditures			
Education Degrees	Mean	N	Std. Deviation
BA/B.SC/B.Com	34653.975 Rs	726	39661.0743
B.Ed./M.Ed.	48541.127 Rs	71	69035.9159
B.A/B.SC/BS/BE	69960.991 Rs	454	57551.1260
MA/MSC	54251.555 Rs	299	54671.3398
Degree in Medicine(MBBS/BDS/Pharm-D)	242270.561 Rs	107	280201.8506
Degree in Agriculture	98307.692 Rs	13	127890.3401
Degree in Law	83215.152 Rs	33	49761.3751
Degree in Engineering	129034.545 Rs	99	94143.7682
Degree in Accountancy	110503.846 Rs	26	64332.9432
MPhil	123361.765 Rs	34	84433.6067
PHD	202600.000 Rs	7	142580.6906
MS	250222.222 Rs	9	302608.2566
Other	23196.094 Rs	288	48854.4060

Table 4.4 (Researcher's own contribution, PSLM 2018-19)

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	T-Values	P-Values
		B	Std. Error	Beta		
1	(Constant)	38197.746	7383.474		5.173	0.000
	Age in Complete Year	86.169	94.839	0.017	0.909	0.364
	Total Income	-.003	.010	0.006	0.294	0.009
	KPK	-1401.826	1187.726	0-.024	-1.180	0.238
	Sindh	-7568.526	2550.111	-0.061	-2.968	0.003
	Baluchistan	-23421.802	7539.988	-0.061	-3.106	0.002

Rural	-12236.644	3956.227	-0.062	-3.093	0.002
Private	32867.036	2302.244	0.280	14.476	0.000
Deeni Madrassa	-8801.504	2112.394	-0.085	-4.367	0.000
NGO	-5978.464	21227.455	-0.005	-.282	0.778
Non Formal Education	69780.405	10740.494	0.132	6.497	0.000
Privately	-3216.941	1256.208	-0.054	-2.561	0.011
Others	3157.147	3438.117	0.018	.918	0.359
Female	-1477.596	1832.732	0-.015	-.806	0.420
2+ 5 Km	6225.101	2741.410	0.050	2.271	0.023
5+ 10 Km	6028.898	2072.445	0.063	2.909	0.004
10+20 Km	5415.268	1823.792	0.062	2.969	0.003
20+ Km	7311.412	1343.590	0.116	5.442	0.000
Don't Know	786.174	1427.155	0.011	.551	0.582
Hostel	15157.666	939.352	0.348	16.136	0.000
Employer, employing less than 10 person	-196850.383	65734.891	-0.061	-2.995	0.003
Employer, employing 10 or more persons	-16994.396	42436.239	-0.007	-.400	0.689
Self-employed non- Agriculture	1277.057	3106.162	0.008	0.411	0.681
Contributing family worker	-1196.280	1510.836	-0.015	-0.792	0.429
own cultivator	-828.572	1884.534	-0.008	-0.440	0.660
share cropper	-5095.879	2737.243	-0.035	-1.862	0.063
contract cultivator	1426.374	4343.771	0.006	.328	0.743
livestock (only)	-843.040	2860.370	-0.005	-.295	0.768
Number of Children	459.504	1231.008	0.007	.373	0.009
Owner occupied (self-hired)	13945.988	11825.934	0.022	1.179	0.238
On Rent	1915.685	1617.316	0.022	1.184	0.236
Subsidized rent	2763.055	2520.207	.021	1.096	0.273
Rent free	-1680.495	2215.447	-.014	-0.759	0.448

The significance level for the model estimation was taken as (5 & 10 %.) Dependent Variable = Log (Expenditure on Education)
Log on Independent Variables as well that are quantitative in nature.
R Square = 0.266 Adjusted R square = 0.255 F Statistic = 24.391 Probability = 0.000 e = Random Error Term
As this section will tag complete presentation and enactment of the model. It will infer the magnitude of each variable on education spending. If we identify an overhead table (4.4), we will be able to understand each variable and its extent and consequence on dependent variable.
Table 4.3 represents the mean expenditure of each degree bearing by the family or household for attaining education and described exclusive table in a crystal manner. This spending seems very logical according to the nature of a degree and with the behavior of the family head or member.
As we glance over table 4.4, it signifies the relation of all variables with education expenditure. Age of the family head shows insignificant portability value which illustrates that the age of the household does not matter while accomplishing the education for his child. This is logical and indicates the data's true depiction. Income variable also shows significant probability value which further indicates that if family or household income increases by one unit it causes its expense to decreases on average by 0.006 units. The next is province that will show the how one province is dissimilar from other in term of family expenditure for education. By taking Punjab province as base, we can conclude that there is no difference between the spending level of people residing in Punjab and KPK. However, Sindh and Baluchistan province have different trends in term of spending on higher education. Families of Sindh on average spend 0.061 units less as compared to Punjab families. Similarly the people living in Baluchistan spend 0.061 on average also less as compared to Punjab Province. Next is the category of area whether it matters the education expense or not? It makes no doubt that the nature of areas like urban and rural also greatly matters on the household expenditure on education. We can clearly assess through results that people living in rural areas spend 0.062 units less on education compared to people living in urban areas.
Next variable is the type of educational institution. We can conclude by taking government institution as the base category and compare the difference of expenditure. It shows that private organizations spend on average 0.28 units more as compared to the public organizations. It further enlightens that Deeni Madrassa spends 0.085 units

less. Similarly the NGO and those who study privately spend 0.005 and 0.054 spend less in relation to government institutions respectively. In case of non-formal educational colleges or universities, their spending shows comparatively 0.132 more units or 13.2 %. But NGO is quite indifferent in association with state education institutes with respect to spending on education by the families residing in Pakistan. Then we have a variable termed the gender of the family head. We can conclude that there is no difference whether the gender of the family head is male or female because the P- Value of this variable is greater than ten percent percent which is statistically insignificant indicating that gender does not create any hindrance or obstacle in the way of getting education. The next variable that will determine the household expenditure on education is the distance of educational institutions from their houses. Categories can be explained through tables 4.4 as we have considered the 0 to 2 Km as base category. Students of those families who travel among two to five kilometer on average bearing the expense of 0.050 units more as compared to those who fix it between zeros to two kilometer. Likewise those who travel five to ten, ten to twenty and more than twenty kilometer spend on average 0.063, 0.062 and 0.116 units more respectively. That category who answer in not knowing the exact distance are quite the same with those who afford the expense while travelling between zeros to two kilometer. In the last category of this variable those who travel form different hostels afford on average 0.348 units more expense.

The next variable that will determine the nature of expense by the household for the attainment of education for their kids is the employment status. This variable acting an important role in determining the expenditure of education by the families who come from different professions. In this scenario we have different subcategories of employment status but we have taken paid employees as base category to find out the expenditure of subcategories.

In this type where the employer employs less than 10 people spend 0.061 units on average less as compared to those who are paid workers. In the second class that is the employer, employing 10 or more persons also spend 0.007 units less comparatively. Next four sub categories of employment status specifying Employer where he employs 10 or more persons, self-employed non- agriculture, Contributing family worker and own cultivator have probability values more than five and ten percent showing statistically insignificant results. In the present scenario, these categories and paid employees have no any kind of difference in terms of spending on higher education. The people belonging to the share cropper group spend 0.035 less as compared to those who are paid employees. Contract cultivators and household assembling with livestock only has also no difference in their trends and behaviors for executing expenditure for getting higher education for their offspring.

Researcher target is also to explore the impact of an increase in the number of children, either it causes household expenditure to grow the household expenditure or not. But through this statistical analysis, we can conclude that one unit increase in children causes to rise the education expenditure of the family by 0.007 units. The final variable to determine the family expense on higher education is residency type. It also has five sub categories. We have taken Owner occupied (Not self-hired) as a base category to find out the results that ought to be statistically significant. Those households who are owner occupied (self-hired), On rent, Subsidized rent and Rent free make no difference in spending with respect to those who are owner occupied (Not Self-hired) which is considered as the base for comparison.

Conclusion

As this study investigates family disbursement on higher education. In this paper, we have investigated family expenses on higher education through different socio economic and demographic variables. It suggests that there must be an increase in household's income that causes a decrease in family expenditure. So government should increase the volume of GDP to improve the financial status of people living in Pakistan. If we observe the provincial situation, we can see that there is a huge difference in spending within provinces and states should allocate more funds to overcome such disparities. Another important aspect is the difference in urban and rural spending. People residing in rural areas spend 6.2 % less on education compared to people who educate their child in urban areas. Private sector spends 28% more compared to the public if we examine the private and public educational institutions expenditure. In this scenario, the State needs to fund more and deeply focus on the public education sector. Another tool to examine the family education expenditure is to measure the distance of educational institutions from family houses. It indicates that as distance goes upward the expenditure also tends to increase. Government should subsidize students in order to reduce their expenses so that they may not be discouraged while getting their degrees. Further employment status needs more attention as families related to business and paid employees seem no more difference in spending for education for their kids. People belonging to the livestock sector or related to agriculture or non - agriculture professions don't show any serious difference in spending for their children as compared to those who come in the orbit of paid employees. This situation is definitely alarming for the government by indicating that people's businesses tend to be squeezed and the

government should focus on both agriculture and non - agriculture sectors. Residency type in this analysis plays no serious role as all types of residency whether owned or rented does not matter in the way of education.

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