The Interplay between Poverty and Child Schooling in Pakistan: Evidence from Panel Data (2004-2010)

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Abstract

Child enrolment remains a crucial subject of concern in the developing countries. Low literacy rate and poor economic condition of household remains an extensive subject in the empirical work all over the world from the last few decades. This issue cannot be addressed properly without concerns the incidence of poverty and enrolment dynamics. Child remains enrolled in one period and drop-out in another period and households face poverty in different phases. The relationship between the movement in enrolment and moving into and out of poverty of household is relatively positive. When households move out of poverty, then it is obvious that the enrolment of children increases along with other determinants of living standard. To capture the enrolment status of the same child with different poverty levels at different time is impossible without following the same child in different time. So, the present study uses multi-nominal logistic regression and panel datasets to analyze such effects. A multinomial logistic regression is estimated for 2004 and 2010, and vector of change variable is also included in the model. It is found that high poverty, high dependency ratio, large household size and gender discrimination in rural areas of Punjab and Sindh affect child enrollment negatively and found that parent education, parent's income affect child enrollment positively and significantly.

Keywords: Poverty, Child Enrolment, Logistic regression, Household, Dependency Ratio

Introduction

Poverty functions as a devastating curse which represents a major problem throughout the current world since it creates adverse consequences throughout both the national level and personal lives. The current global environment shows considerable movement of people between poverty positions. This poverty movement has created widespread impacts on familial choices together with societal life quality alongside health and educational systems. The educational impacts of poverty on child education have received extensive empirical research during the last few decades. A majority of developing nations demonstrate poor public-school quality next to minimal enrollment rates for both public schools and private schools. The funding for this purpose remains insufficient to satisfy basic school needs. Most wealthy families place their children in private

educational institutions, yet low-income families cannot afford these costs thus children remain out of school. The inadequate educational quality at government schools makes the affected families choose not to send their children to public education.

During the 1980s the majority of society recognized education as essential for driving economic expansion. The increase of human capital investments started occurring as international organizations and developing nations recognized its importance. The research revealed that education represents the main foundation which relates economic expansion to human advancement. According to Talik (1989) education stands as a primary risk factor that contributes to the existence of poverty. Income distribution and social and political development. The capital value of human resources exceeds levels observed in developed nations according to Psaharapoulos (1984).

Children in Pakistan have the right to education as stated in 25A of 18th constitutional amendment yet the present state of primary schools makes achieving this right for all students extremely challenging. In 2018 Pakistan had the minimum enrollment statistics in primary educational institutions among all South Asian nations which achieved only 67.57 percent rates. According to the Economic Survey of Pakistan 2020 the 2023-24 budget presented 1.91 percent for public spending while the 2020 numbers showed 2.3 percent (Economic Survey of Pakistan 2020).

A quick reduction of poverty gripped Pakistan throughout the 1970s and 1980s followed by a resurgence of poverty throughout the 1990s. The growing poverty level in Pakistan prevents family members from sending their children to school enrollment programs. Education was offered cost-free despite minimal or no school expenses existing at that time. Social barriers tend to stand against the poor as they try to afford schooling for their children.

This research analyzes poverty patterns and child school enrollment trends using multi-nominal regression models with two time-series database. The collected households do not form a panel sample because data is only available for the rural areas of Punjab and Sindh provinces. Both this household and every other household within it have been taken out of the analysis because they moved their residence from the study area. The total sampling pool comprised 2721 households in PRHS-2010. The survey covered a total number of 1071 households in Punjab while 808 households belonged to Sindh and 447 to KP and 395 were located in Baluchistan. The PRHS-2004 included the same households while only conducting interviews in Punjab and Sindh during the re-surveys where they examined 1614 total households.

Literature Review
Arif, Saqib and Zahid (1999) conducted research to establish a connection between poverty and school enrollment. Analysis of PSES (1998-99 data shows children with poor household conditions have lower chances to study than children from non-poor households besides enrollment rates in rural areas stay lower than urban rates because of poverty affecting rural dwellers especially women badly.

Through studying 35 developing countries Filmer Pritchett (1999) determined that inadequate school infrastructure serves as one of the core factors behind enrollment shortages in these nations. In south Asian countries and other regions having a wide economic difference between population segments shows that poor children still have the ability to access educational institutions. Parents have low demands for quality education because of the shortages in learning standards.

Duncan J et al (2010) conducted research through a sibling model to determine that child wellbeing depends on parental socioeconomic standing and impacts their educational achievements. According to data from the panel study of income dynamics the researchers discovered that child education directly depends on parental income from childhood through adolescence. Family

income serves as a critical factor which leads to higher levels of child schooling according to the research findings.

The study conducted by Hunter and May (2002) investigated the relationship between poverty, shocks and education in South Africa. The study demonstrates that public policies create a vital contribution toward decreasing poverty and developing economic growth. Growth-based policies create positive effects on poverty reduction because they enhance economic activities which leads to improved living standards for the poor. Such programs constitute land reforms together with child support grants and public work programs. Using data obtained from household surveys this study discovered that poverty-stricken parents enroll their children in school to escape poverty while shocks on households remained insufficient to predict educational interruptions. Proper resource allocation to schools should prevent poor children from paying fees so they can attend classes.

Rehman (2006) examined the educational poverty connection in Bangladesh through his study. Through multiple regression analysis the study discovered that better employment opportunities and education both provide ways to reduce poverty based on SSC enrolment and completion data. The results of Phase II in Program for Research on Chronic Poverty (PRCPB). The main objective of this research focused on examining the link between poverty and education together with their root causes and the accessibility patterns of poor and non-poor students in primary and SSC education. This study analyzed poverty access distribution among poor and non-poor families and revealed that government policies directly influence poverty gap reduction.

Rose and Dyer (2008) researched the association between education and persistent poverty through their examination of policy data with numerical and descriptive data sources. Primary education stands vital for poverty reduction according to this research because improved productivity leads to positive results and the study highlights unclear understanding of how education affects poverty despite intergeneration poverty transfer mechanisms. Education serves to transmit poverty, yet existing literature pays scant attention to it when discussing factors like caste and race; education represents the sole instrument effective against poverty. Education deprivation leads to a variety of problems which create poverty and numerous evils stem from insufficient education. Education acts as the solution which addresses all forms of social disadvantages.

Data and Methodology

Specification of the Model
This research evaluates how variables associated with poverty and child demographics together with family circumstances and geographical placement impact a child's educational status as between permanent enrollment and current enrollment and dropouts and never being enrolled. A multinomial logistic regression model provided the evaluation methodology because our dependent variable includes four possible outcomes. The study estimates this model for its research purpose.

$$CE_{01/04} = \alpha_i + \alpha_1 PD_i + \alpha_2 Ch_i + \alpha_3 Hd_i + \alpha_5 Rg_i + \alpha_6 \Delta As_i + U_i \ldots\ldots\ldots\ldots............ (I)$$

The model measures enrollment status for the ith child through dependent variable CE_i. The 2004-2010 combined data use multinomial logistic model analysis to investigate changes in the situation during these years. When analyzing panel data, one needs to work with consistent household units throughout all observed periods. The research analyzes data that showcases the same child between 2001 and 2004. The variable ΔAs denotes the difference in age, Dependency ratio, land holding and Number of family member from the sample households and PD signifies poverty dynamics

and Ch represents child characteristics alongside Hd which stands for household characteristics and Rg reflects province of residence. Gender together with other variables maintain stability in values when analyzing data from 2004 to 2010. By chance the particular study households exhibited certain variables which did not change. The analyzed variables consist of region in addition to parental education levels. The variables that remain static throughout 2004-2010 period obtain a value of zero within the ΔAs vector.

Multiple explanatory variables determine the two dependent variables in this model design. Different elements of the person including their age and gender and family elements including parental education and family size and relationship to land rights together with regional elements such as location determine the education of children. Children between 5 to 15 years old were included as participants to evaluate how age influences the analysis. Two dummy variables indicate the effects both on education and the level of land ownership. The variable of household size is a continuous aspect which counts the members living together in each household.

Results and Discussion

Characteristics of Child Enrollment (A Bivariate analysis)

Figure-1   Enrollment Status of Child and Economic Condition of Household in 2010
Figure 1 has been constructed to show the school enrolment rate and economic status of households in 2010. In 2010, 41.38 percent of children belonging to non-poor households were not attending school, while 62.39 percent of poor households were not attending school.
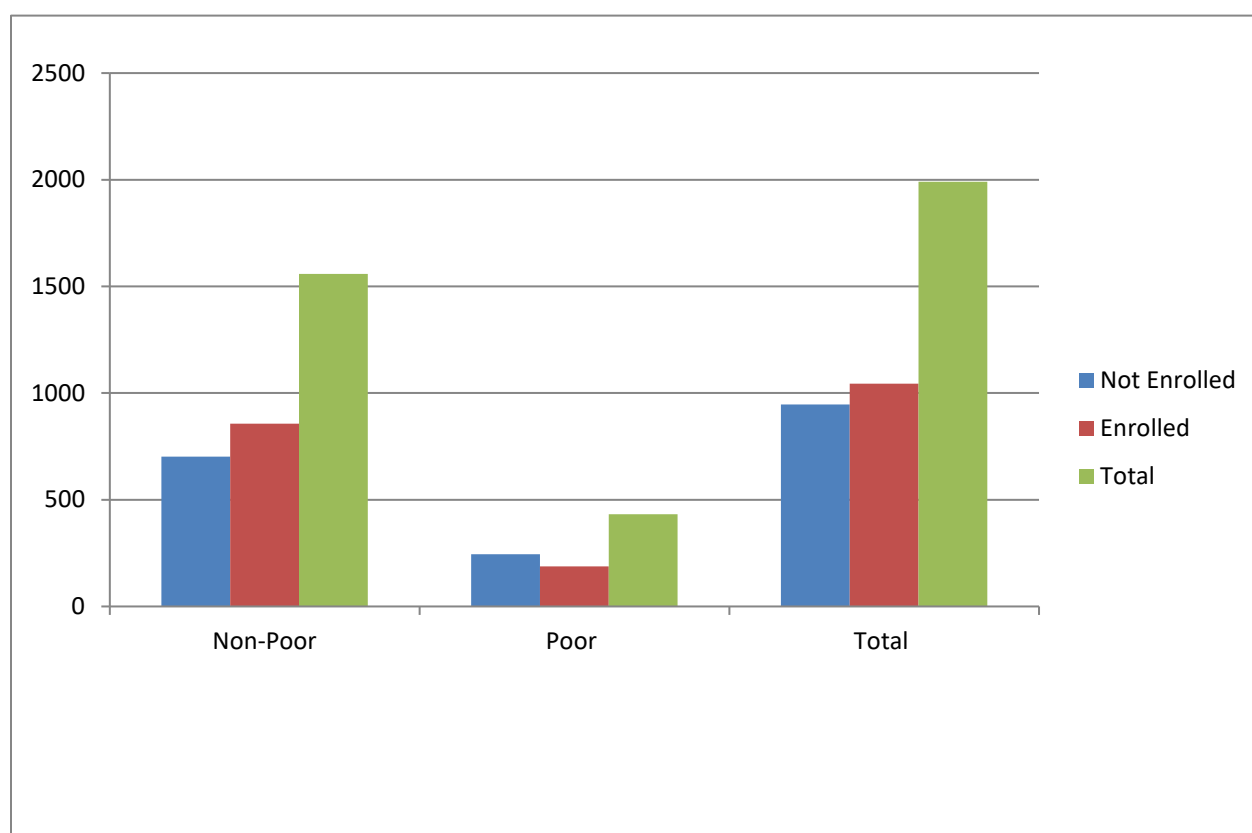
Figure-1
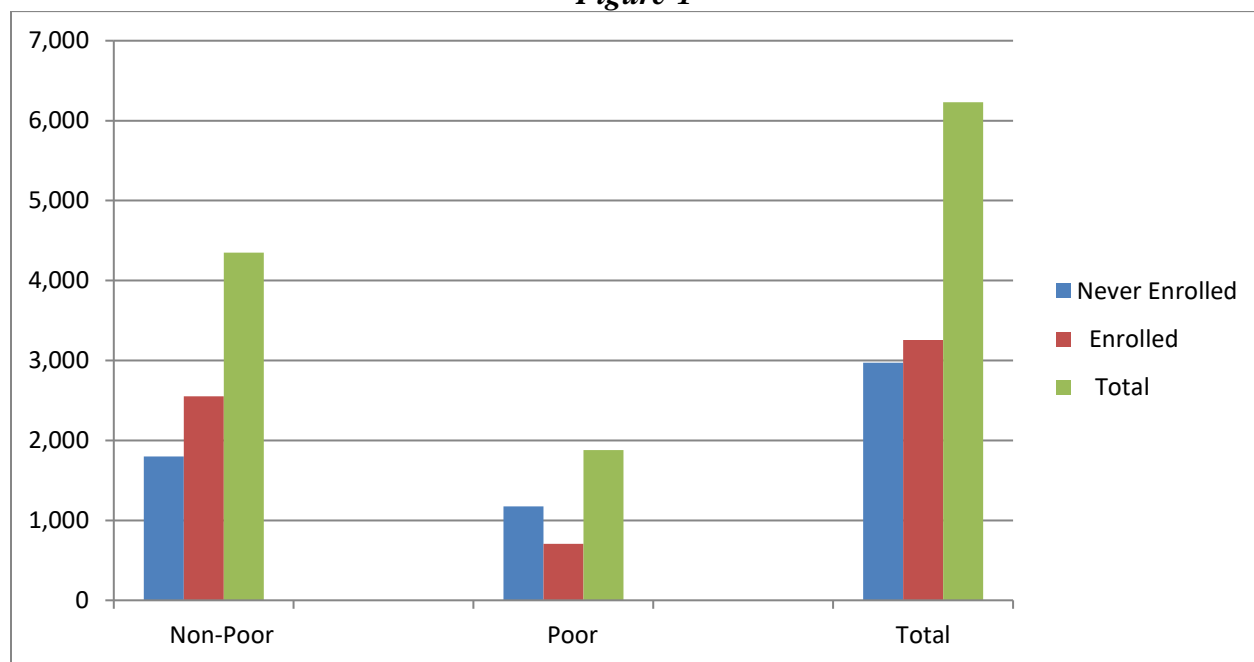
Source: Pakistan Rural Household Survey 2010

Figure-2:   Poverty and Enrollment in 2004 Figure-2 is drawn for 2004 to show the number of children enrolled and not enrolled who belong to poor or non-poor households. The graph shows that in 2004 in rural Punjab and Sindh, 45.06 children from non-poor families were out of school and 56.58 percent of children from poor families were out of school.
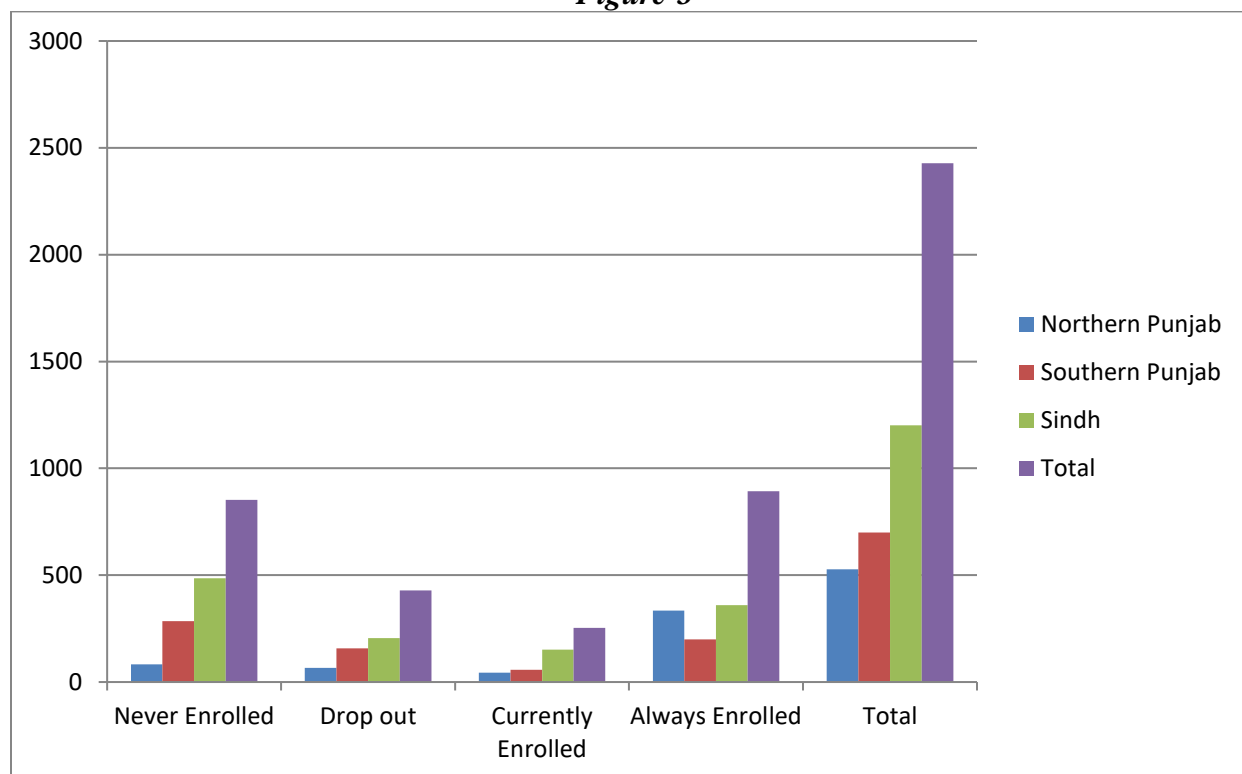
Figure-2

Source: Pakistan Rural House-hold survey 2004

Figure-3: **Dynamics of Enrolment in Punjab and Sindh**

According to Figure 3 enrollment data, it reveals that North Punjab has 121567 students enrolled in addition to 68558 non-enrolled students and 22667 dropouts and 97858 students who never enrolled while South Punjab has 277645 students enrolled with 76758 non-enrolled students and 99823 dropouts and 4065 who never enrolled. Furthermore, Sindh has 740945 students enrolled with 91204 non-enrolled students and 68063 dropouts and 34714 who never enrolled. It is noted that 15.75 percent of children in North Punjab never attended school in the two rounds of PRHS 2010 and 2004. 40.71 percent from South Punjab and 40.38 percent from Sindh never attended school between the two periods. 12.52 percent of North Punjab, 22.57 percent of South Punjab and 7.07 percent of Sindh suffered damage. 8.35 percent of children in North Punjab, 8.29 percent in South Punjab, and 12.57 percent in Sindh were currently enrolled in 2004 and 2010. 63.38 percent of children from North Punjab attended school in Sindh in 2004 and 2010.

Figure-3

Source: Pakistan Rural Household Survey 2004-2010

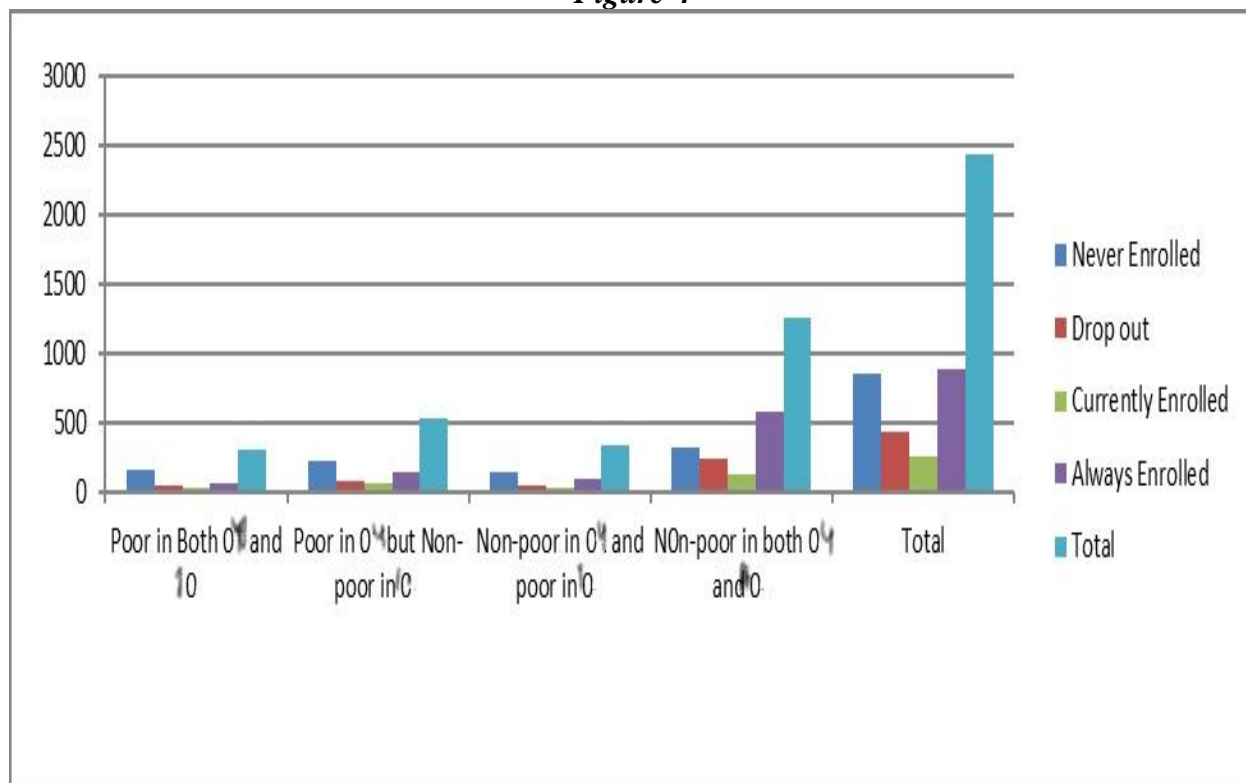**Figure-4: Dynamics in Poverty and Child Enrolments Movements**

The dynamics of poverty and enrollment migration in the combined data set of the PRHS for 2004 and 2010 are examined in Figure 4. In both rounds, there are 2458 children. According to the figure, 51.62 percent of children who never attended school were poor in both 2004 and 2010, 43.47 percent of those who never enrolled were poor in 2004 but not in 2010, and 43.20 percent were not poor in 2004 but in poverty in 2010. Throughout both rounds, 25.39 percent of children who were not enrolled in school were not considered impoverished.

In both 2004 and 2010, 14.29 percent of children who dropped out were impoverished; 16.10 percent were poor in 2004 and not poor in 2010; 16.62 percent were not poor in 2004 and poor in 2010; and 19.43 percent were not poor in both rounds.

 In both the 2004 and 2010 rounds, 11.69 percent of currently enrolled children were poor, 11.55 percent were poor in 2004 and not poor in 2010, 9.97 percent were not poor in 2004 and not poor in 2010, and 9.75 percent were not poor in both rounds.

While 45.44 percent of children who were not poor in both rounds were ever enrolled in 2004 and 2010, 22.40 percent of children who were poor in both 2004 and 2010 were always enrolled, 28.60 percent of ever enrolled children were poor in 2004 and non-poor in 2010, and 30.21 percent were not poor in 2004 and poor in 2010.

Figure-4

Source: Pakistan Rural Household Survey 2004 and 2010

Determinants of Dynamics in Poverty and Child Enrolments (Multivariate Analysis)
(i) Poor in both PRHS rounds or "always poor," (ii) poor in round I and non-poor in round II (out of poverty), (iii) non-poor in round I and poor in round II (becoming poor), and (iv) non-poor in both rounds are the four categories into which households can be separated in order to discuss the evolution of poverty and child participation as well as other determinants of child participation in section 3.2. Additionally, there are four movements listed in the child's enrollment: (i) enrolled in both PRHS rounds or "always registered," (ii) enrolled in round I but not in round II (dropping out), (iv) never enrolled in round I and registered in round II (currently registered), and (iv) not enrolled in both rounds (still registered). Table 1 displays the findings of the estimation of the multinomial logistic model for a sample of 1,614 families with 2,458 children in both rounds. The following is an estimated equation of the components that determine children's participation movements.
Male dropout rates are higher than female dropout rates in Pakistan's rural areas, although female enrollment is twice as high. According to the data, the number of students enrolled in Punjab and Sindh is five times more than the number of people who never go to school. Additionally, compared to children of normal age, older children are less likely to attend school and participate in manual labor.
Parent education also affects child enrollment, and it has been shown that children from educated families receive higher levels of schooling than children from illiterate parents. The data also indicate that the chance of enrollment is 1.257 times higher for households that escape poverty than for our reference group of chronically poor children (poor in both rounds). Children who are always enrolled are 1.517 times more likely to be in transitory poor homes (those that were not poor in 2001 and poor in 2004) than children who are never enrolled or who come from chronically poor households. Compared to children from chronically impoverished households, children from

non-poor households attend school more often and drop out at a lower rate. The result shows the chances of enrolment is more than two times for children belonging to non-poor household and the chance of drop-out decreases at the same ratio.

Child enrollment is also impacted by the dependency ratio. Compared to families with minimal dependency, dropout rates are 1.243 times higher when the dependency ratio changes. According to the current enrollment result, current enrollment falls 0.94 times when the dependency ratio fluctuates in comparison to those when it stays constant. Enrollment consistently exhibits a similar pattern. Research has shown that children from households with high dependency ratios are 0.984 times less likely to be enrolled than children from households with low dependency ratios.
A change in household size reduces current enrollment by 0.946 times and increases the likelihood of dropout by 1.001 times compared to individuals whose home size remains unchanged. As household size changes, the odds of always enrolling rise by a factor of 1.001. The findings also indicate that the likelihood of dropping out, being enrolled, and ever enrolling increases by 1.004, 1.010, and 1.009 times, respectively, with an increase in land ownership.

Punjab and Sindh are the two provinces that make up the region. Northern Punjab serves as our reference category in this instance. Punjab is further divided into Northern Punjab and Southern Punjab. The findings indicate that a youngster from southern Punjab will have a 0.69-fold higher likelihood of dropping out than a child from northern Punjab. Similarly, compared to the reference group, enrollment always drops by 0.15 times and current enrollment drops by 0.37 times.

According to the results for Sindh, the dropout rate is 0.51 times lower for children who live in Sindh province than in northern Punjab. In comparison to the reference group, enrollment always declines by 0.191 times and current enrollment declines by 0.63 times.
Explanation of Key variables are given in Appendix A

Table 1: Multinomial Logistic Regression Model

Regressors	Dropped Out		Currently Enrolled		Always Enrolled	
	RRR	*Std. Err.*	*RRR*	*Std. Err.*	*RRR*	*Std. Err.*
Child Characteristics						
Gender of Child (Male=1)	3.010*	0.394	2.076*	0.325	5.245*	0.615
Age of Child (In Years)	2.006*	0.371	0.834	0.177	2.002*	0.274
Age Square	0.978**	0.008	0.988	0.012	.959*	0.007
House Hold Characteristics						
Household Head's Education (Years of Schooling)	1.175*	0.023	1.117*	0.027	1.257*	0.022
Poor 2004, Non Poor in 2010 (Poor in Both 2004 and 2010 is the Reference Category)	1.189	0.270	0.962	0.243	1.373	0.276
Non Poor in 2004, Poor in 2010	1.335	0.330	0.930	0.266	1.517***	0.333
Non Poor in Both 2004 and 2010	2.100*	0.426	1.654**	0.381	2.900*	0.526
Change In Dependency Ratio	1.243**	0.125	0.946	0.106	0.984	0.084
Change In Household Size	1.001	0.024	0.998	0.030	1.008	0.022
Change In Land Ownership	1.004	0.010	1.013	0.010	1.009	0.008
Regional Characteristics (Northern Punjab is Base Category)						
Southern Punjab	0.693***	0.138	0.375*	0.093	.155*	0.026
Sindh	0.510*	0.099	0.633**	0.143	.191*	0.031
Number of Observations	2458					
LR chi^2(36)	1307.940					
Pseudo R^2	0.208					
Log likelihood	-2492.088					

*Significant at 1%, **Significant at 5 %, ***Significant at 10 %

 Note: Never attended is the base outcome

Conclusion and Recommendation

Conclusion
The paper focuses on studying poverty effects on student attendance patterns across educational institutions. Children from families who lack adequate means tend to fail to receive education even though non-poor families enroll their children in educational programs. The period of 2004 to 2010 witnessed a noteworthy reduction of students attending school notably in rural areas because children switched from being students to developing career skills when reaching adulthood. Data reveals that household leader education affects child enrollment rates because each additional year of education increases child enrollment chances by 1.173 times.

Enrollment statistics from 2010 demonstrated that both southern Punjab and Sindh regions maintained lower enrollment figures, but KPK showed higher enrollment in 2004 followed by consistent low child enrollment in Baluchistan. Statistical analyses conducted at both bivariate and multivariate levels confirm that poverty acts as the principal factor which leads to low enrollment numbers specifically in rural districts. Government leaders together with NGOs must implement specific interventional methods to overcome this issue.

Policy Recommendations
- Economically disadvantaged households should get financial incentives from the government to promote school enrollment. To guarantee efficient use and accountability, these incentives ought to be distributed via school administrations.
- To reduce birth rates, a thorough family planning program had to be implemented in rural regions. By easing financial strain on families, controlling family size and lowering the dependency ratio can have a good effect on child enrollment.
- Extremely impoverished areas should adopt targeted poverty reduction measures. Subsidies for agricultural inputs like seeds, fertilizer, and pesticides can boost income levels, improve agricultural output, and eventually end the cycle of poverty in rural regions.

The government and interested parties can endeavor to raise child enrollment rates and guarantee equal educational opportunities for all children, irrespective of their socioeconomic background, by putting these policies into effect.

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Appendix A

Summary Statistics of Some Key Variables (2004-2010)

Variable	Mean	Std. Dev.	Min	Max
School Dynamics	2.478	1.295	1	4
Gender of Child (Male=1)	0.529	0.499	0	1
Age of Child (In Years)	9.644	3.065	5	15
Household Head's Education (Years of Schooling)	2.82	3.804	0	21
Poor in Both 2004 and 2010	0.126	0.332	0	1
Poor 2004, Non-Poor in 2010	0.215	0.411	0	1
Non-Poor in 2004, Poor in 2010	0.135	0.342	0	1
Non-Poor in Both 2004 and 2010	0.522	0.499	0	1
Change In Dependency Ratio	0.265	0.673	-3.25	5.34
Change In Household Size	-0.165	2.608	-29	17
Change In Land Ownership	0.09	7.597	-87.5	75
Southern Punjab	0.286	0.452	0	1
Northern Punjab	0.221	0.415	0	1
Sindh	0.491	0.5	0	1

Note: Observations are 2458

Author's estimation from Pakistan Rural Household Survey (2004-2010)