

School Participation in Rural Pakistan: A Situation Analysis

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School Participation in Rural Pakistan: A Situation Analysis

ABSTRACT

The study highlights the major characteristics of schooling in rural Pakistan by providing a situation analysis in terms of access, equality and quality of education. A cohort-wise analysis for primary (5-9 age cohort) and secondary (10-14 age cohort) levels is carried out to look at the prevailing situation across provinces in terms of enrolment status, trends in participation and gender disparities. The relationship between poverty and education is also ascertained and factors obstructing entry to schooling in rural Pakistan are explored.

JEL Classification: 12, 13

Key Words: Rural Pakistan, Education Access, Education Inequality, Determinants of School Participation

1. INTRODUCTION

There is consensus among development economists that equitable access and learning is vital for sustained development. Education inequality in various dimensions results in asymmetrical growth that may relegate the already marginalised population and groups to unending poverty. One of the important dimensions of inequality is the urban-rural divide. It is estimated that a rural child is 32 percent less likely to go to school than an urban child. The relative disadvantage of rural areas compared to the urban becomes more discriminating at the secondary level and above.

The importance of education in improving individual lives in the rural context has been argued from various perspectives. From the narrow perspective of agricultural improvements, basic education improves farmer productivity, while from the somewhat broader perspective of rural development, it facilitates off-farm employment and the economic development of rural areas.

According to a World Bank research in 18 low-income countries on the relationship between primary education and annual farm output, it was concluded that “if a farmer had completed four years of elementary education, his productivity was, on the average, 8.7 percent higher than that of a farmer with no education”. The report also indicates that “in cases where complementary inputs were available, the annual output of a farmer who had completed four years of primary schooling was 13.2 percent higher, on the average, than that of a farmer who had not been to school”. The study also shows that “education is much more likely to have a positive effect in more progressive, modernising agricultural environments rather than in traditional ones” (Lockheed, Jamison, and Lau, 1980).

Other studies carried out in Korea, Malaysia, and Thailand indicate that the effects of education on the physical output of farmers are “positive, statistically significant, and quantitatively important” (Jamison and Lau, 1982). A meta-analysis of 14 empirical studies found a reasonably clear pattern of a positive relationship between schooling and agricultural productivity (Moock, 1994). Thus, the direct effect of basic education on agricultural productivity is well documented.

Studies on returns to investments in education usually come from urban labour market surveys, so there is little information on how education affects rural incomes. However, a World Bank study in Kenya that calculated rates of return to rural and urban education showed that the impact of education is greater on off-farm income than on farm income (Lanjouw, 1999). Lanjouw looked at the heterogeneity of off-farm labour. He found that the probability of employment of salaried workers in rural areas rises as education levels rise, though the same is not true for casual non-farm wage employment. Self-employment is most likely for those with some basic education but lower for those who are illiterate. In addition, the many youth and adults who migrate to urban areas are much more likely to find productive employment if they have attended school and learned basic skills.

Moreover, basic education may also help to protect the environment. Rural families with better educated parents and hence fewer children reduce demographic pressure on natural resources and the environment. Educated people can assimilate more information and employ means to protect the environment and better manage resources (World Bank, 2000).

Thus to highlight the major characteristics of schooling in rural Pakistan, this study presents a situation analysis through indicators of access, equality and quality of education. A cohort-wise analysis is carried out to look at the prevailing situation across provinces. The next section portrays statistics pertaining to the enrolment status, trends in participation and gender and provincial disparities for the primary (5-9 age cohort) and secondary (10-14 age cohort) stages of schooling. The findings regarding the relationship between poverty and education are furnished in the subsequent section. This section also presents the results of multivariate statistical exercise related to the determinants of school participation in rural Pakistan.

2. STATUS OF SCHOOL ENROLMENT

Access to education is generally gauged with reference to the gross and net enrolment rates, based on the relevant age group. Traditionally in Pakistan, enrolment rates are calculated on the basis of age group 5-9 years and 10-14 years

for primary and secondary levels of education respectively¹. Therefore, following the tradition, these age groups are preferred for documentation of the educational status of rural children in terms of enrolments in public, private or religious institutions. Access and equality indicators are derived from Pakistan Social and Living Standard Measurement (PSLM) surveys, while the available physical facilities in rural primary and secondary schools are ascertained from Pakistan Education Statistics.

2.1 Access to Rural Education

Table 2.1 displays the educational status of rural children for the 5-9 age group. Overall, about 36 percent (approximately 10 million) children of the primary age group were out of school in the year 2011. The lowest incidence (28.4 percent, approximately 4 million) of out-of-school children is observed in Punjab. As expected, a relatively dismal picture is evident with reference to out-of-school children in rural Balochistan and in rural Sindh where about half of rural children of primary age were not attending school.

	Pakistan	Punjab	Sindh	Khyber Pakhtunkhwa	Balochistan
Out of School	36.3	28.4	49.9	35.9	55.9
Enrolled in Public Schools	47.8	48.1	46.6	49.9	43.4
Enrolled in Private Schools	15.3	22.7	2.7	13.8	0.5
Enrolled in Religious Schools	0.4	0.6	0.2	0.3	0.1
Enrolled in Schools Run by NGOs	0.3	0.2	0.5	0.1	0.1

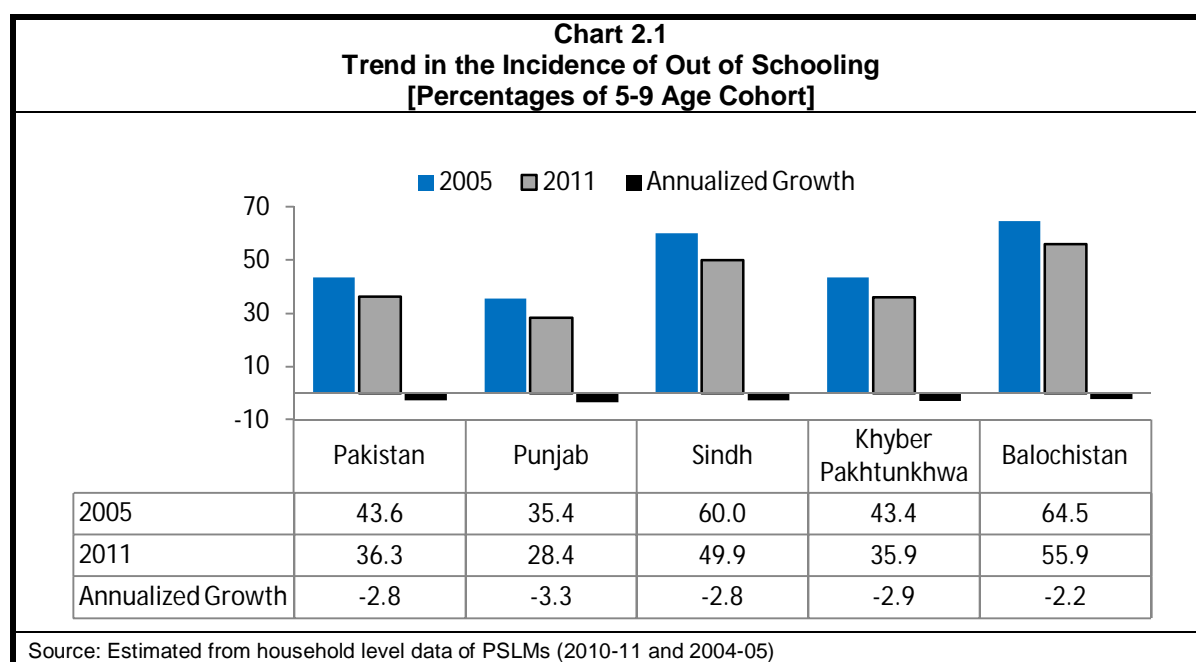
Source: Estimated from household level data of PSLM 2010-11

The private school phenomenon also does not exist significantly in rural Sindh and Balochistan. Overall, about 15 percent (approximately 4 million) rural children were enrolled in private institutions according to the estimates from household survey (PSLM, 2011). The highest (23 percent) prevalence of private school enrolment is observed in Punjab, followed by 14 percent in Khyber Pakhtunkhwa province.

¹ However, more recently, official statistical sources have also started reporting enrolment rates using the age group 6-10 years for primary school enrolments. Although, this age group has also been suggested by the National Education Policy (2009), the Policy has not yet been owned and implemented by any provincial government.

Moreover, the table indicates that less than 1 percent (approximately 200,000) rural children in the 5-9 age group were enrolled in religious schools or schools run by non-governmental organisations during the survey year of 2011. The incidence of religious school enrolment is, however, relatively more pronounced in rural Punjab and Khyber Pakhtunkhwa.

The trend in the incidence of out-of-school children at the primary level is highlighted in Chart 2.1. Overall, about an 8 percentage point decline is observed in the incidence of out-of-school children. Highest drop in the incidence of out-of-school children (and thus highest improvement in enrolment) is evident in Punjab with a 3.3 percent annualised reduction. The improvement in enrolment is more or less the same in the rural areas of Sindh and Khyber Pakhtunkhwa provinces, while about 9 percentage point (2.2 percent) annual decline in the incidence of out of school children is observed in rural Balochistan.



The phenomenon of private schooling is an increasingly important factor in education in Pakistan, particularly at the primary level. Contrary to popular belief, private schools are no longer an urban elite phenomenon. They are not only prevalent in rural areas but also are affordable to middle and even low income groups. While the rural-urban gap is enormous and still remains, the growth trends showed a marked improvement in rural private schooling.

Chart 2.2 presents the evidence of growth of enrolment during the period 2005-2011 in rural private schools across provinces. Instead of the official statistics regarding enrolment, these results are derived from district representative household surveys (PSLMs) and thus provide factual information in terms of demand for private schooling at the primary level. The magnitudes of growth clearly distinguish rural Punjab and Khyber Pakhtunkhwa provinces with respect to the enrolment in private schools. Incidentally, an annual growth rate of 6 percent in the share of private school enrolment is observed in both provinces during the period 2005-2011. Although the incidence of private school enrolment is minimal in Sindh, the highest (about 9 percent) annual growth in the province is evident in the chart.

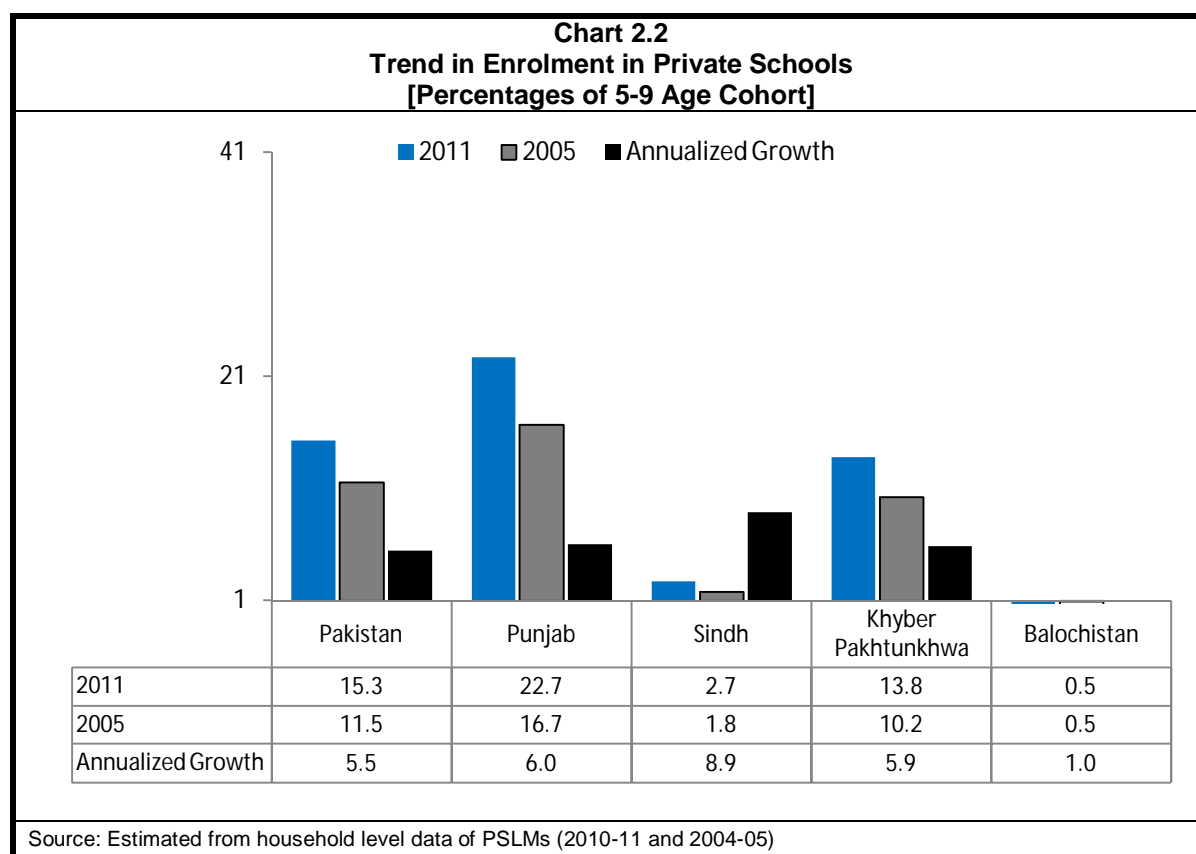


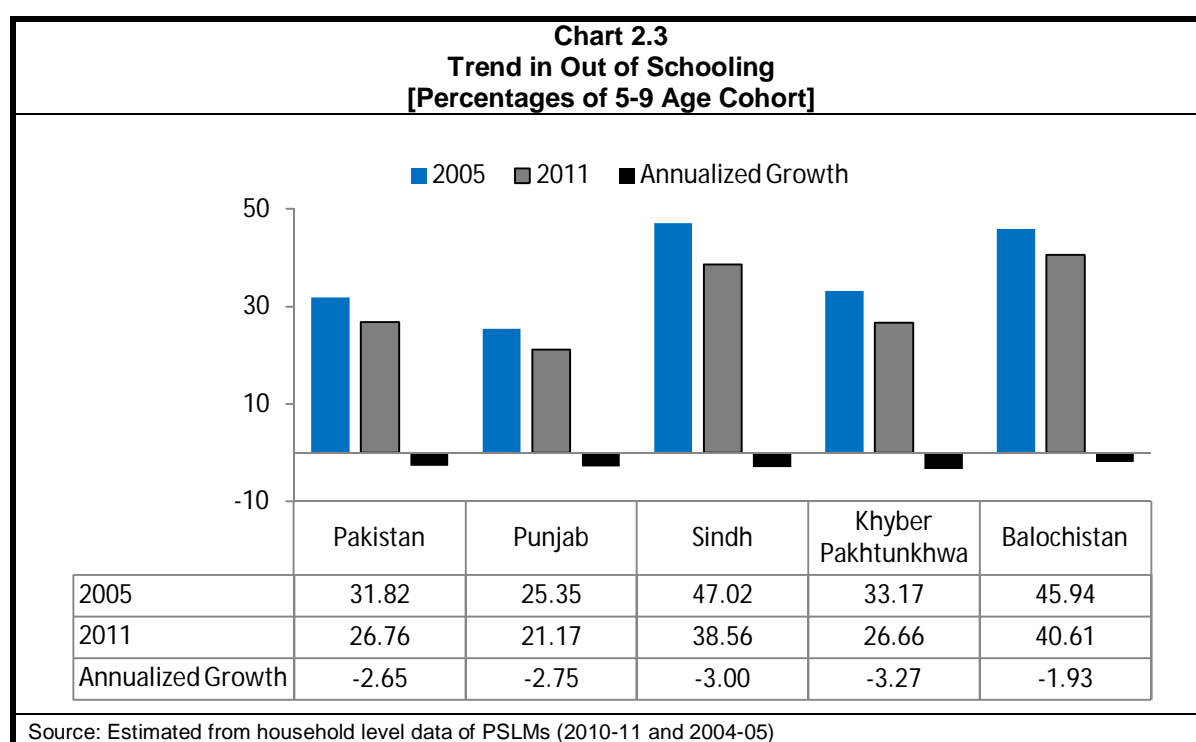
Table 2.2 documents the educational status of rural children in the 10-14 age group. Overall, about 27 percent (approximately 6 million) rural children of the 10-14 age cohort were not attending school during 2011. The provincial trends are more or less similar to the trends in primary schooling. Punjab and Khyber Pakhtunkhwa

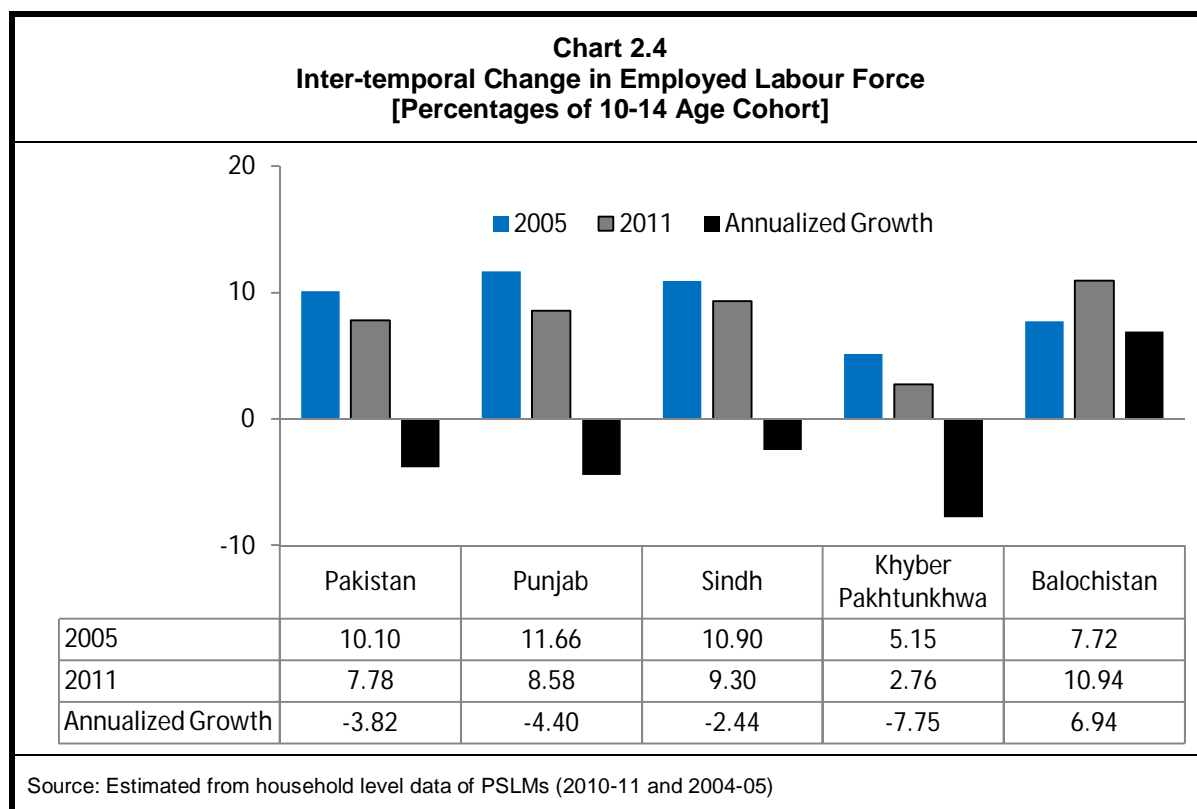
provinces have a clear edge over rural Sindh and Balochistan in terms of out-of-schooling and enrolment in private institutions.

An important aspect in the 10-14 age group, especially in the rural areas, is the participation of children in the labour market. About 8 percent (approximately 1.8 million) children of this age group were working in the labour force. Barring Khyber Pakhtunkhwa, the percentage of child labour is 9 to 11 across other provinces.

	Pakistan	Punjab	Sindh	Khyber Pakhtunkhwa	Balochistan
Out of School	26.8	21.2	38.6	26.7	40.6
Enrolled in Public Schools	52.0	51.6	48.6	58.3	47.3
Enrolled in Private Schools	12.1	17.0	2.3	11.2	0.7
Enrolled in Religious Schools	1.0	1.4	0.3	0.8	0.4
Enrolled in Schools Run by NGOs	0.3	0.2	0.9	0.2	0.1
In Employed Labour Force	7.8	8.6	9.3	2.8	10.9

Source: Estimated from household level data of PSLM 2010-11





The provincial trend in out-of-schooling for the secondary age group is portrayed in Chart 2.3. Overall, the ratio of out-of-school children decreased from 32 percent in 2005 to 27 percent in 2011. The least annual improvement was reflected in secondary school enrolment in Balochistan.

Chart 2.4 displays the trend in the child labour during the period 2005-2011. It is encouraging that barring Balochistan a declining trend is observed in the percentages of child labour in the 10-14 age cohort. Surprisingly, the trend is more distinct in Khyber Pakhtunkhwa with a declining rate of 8 percent per annum. Conversely, the province of Balochistan shows about 7 percent growth in child labour during the period.

2.2 Gender Disparities in Education

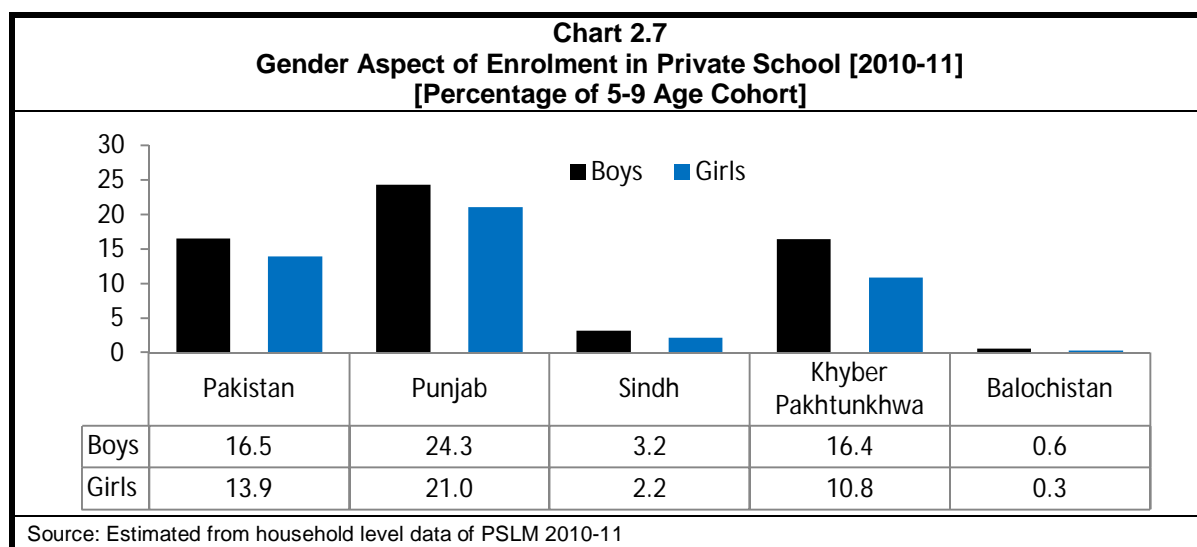
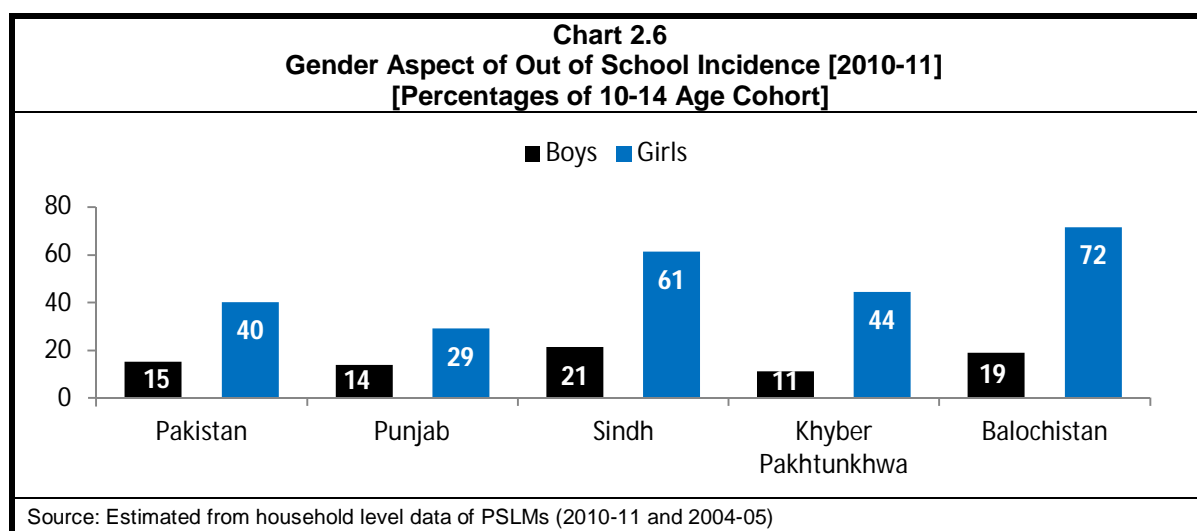
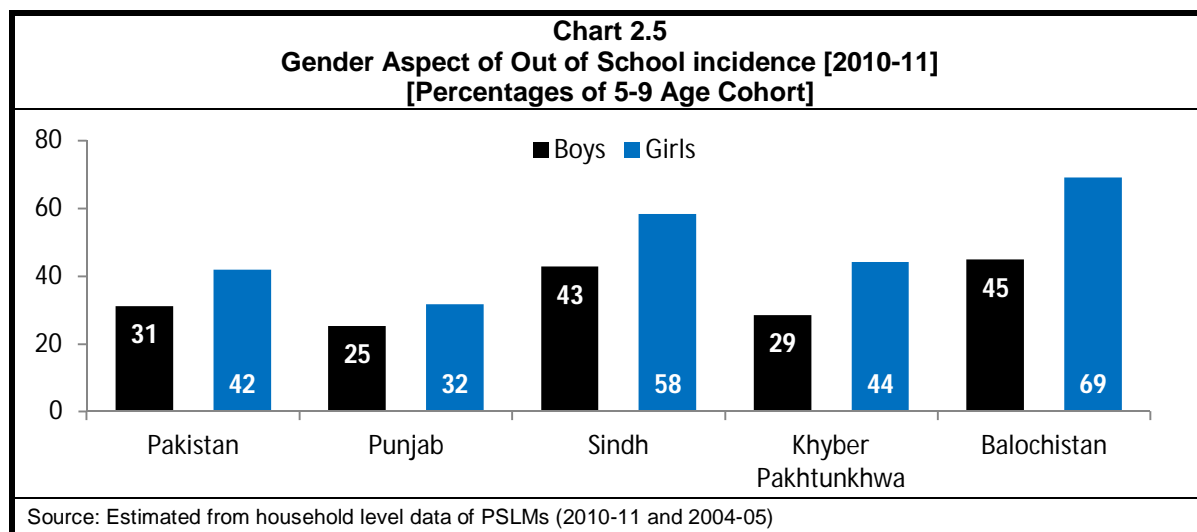
One of the target of MDG goals is to eliminate gender disparity in primary and secondary education, preferably by 2005, and in all levels of education no later than 2015. The government's policy also declares that "*The State shall provide free and*

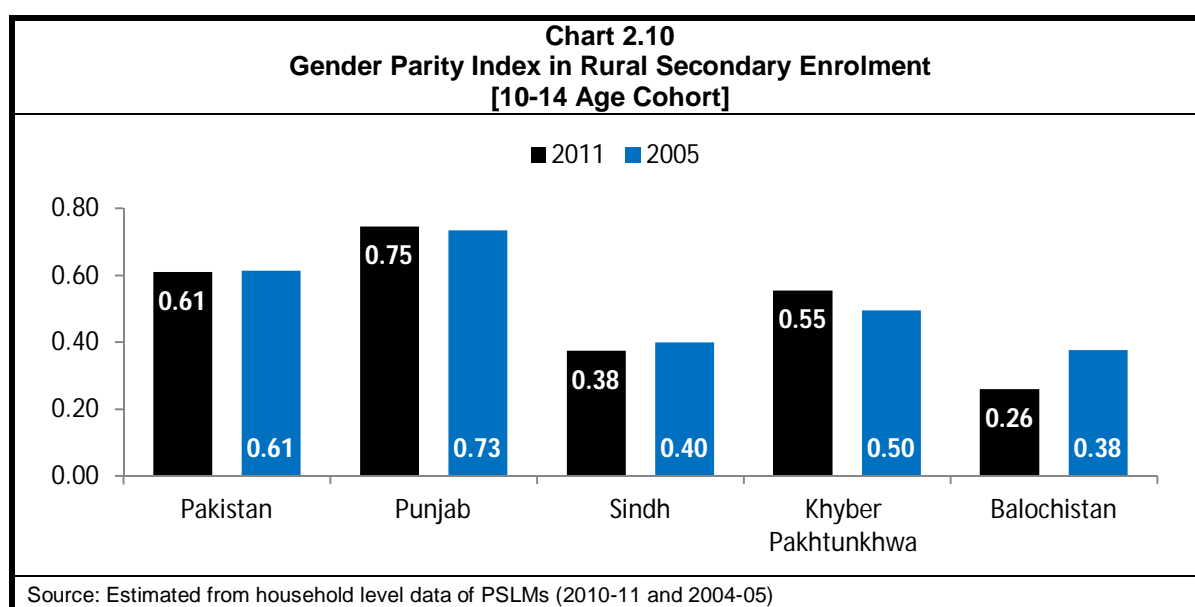
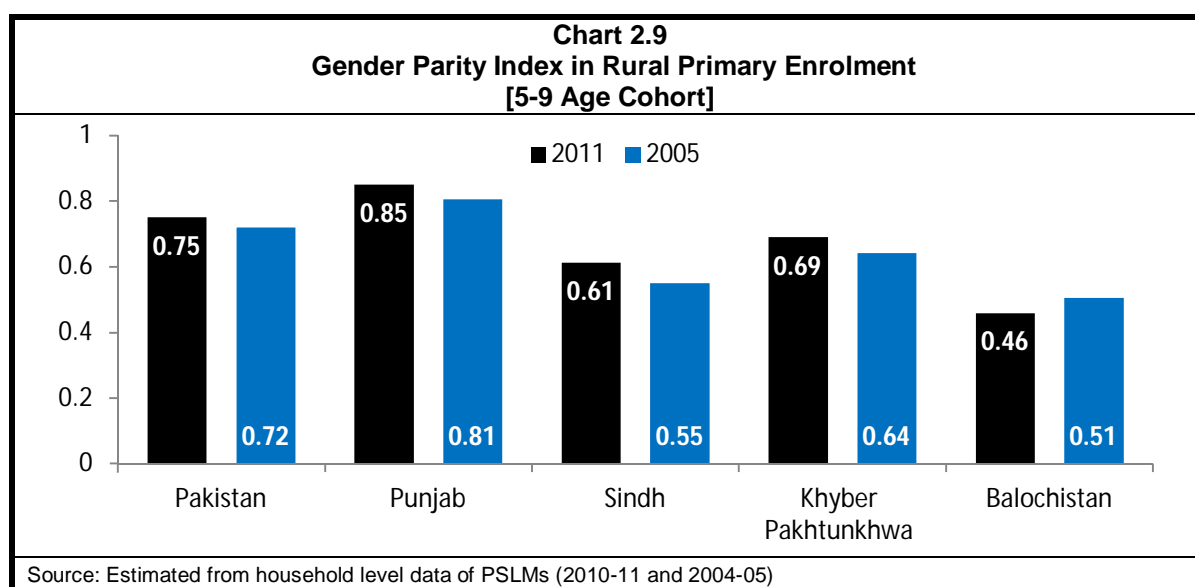
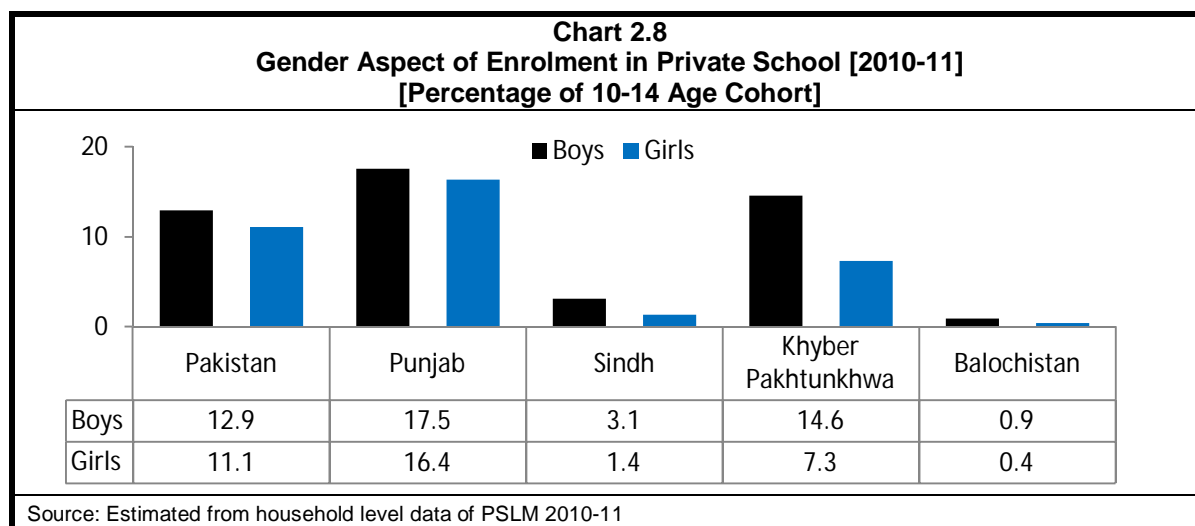
compulsory education to all children of the age of five to sixteen years in such manner as may be determined by law" (National Education Policy, 2009). However, in the context of rural Pakistan, it seems less likely to achieve the target unless concerted efforts are made. This section briefly describes gender differences in rural Pakistan with reference to enrolment, private schooling and child labour.

According to Chart 2.5 which highlights the gender dimension of out-of-school incidence of primary age children, the gender disparity in terms of enrolment is quite high in rural Balochistan where about 70 percent girls in the 5-9 age group were not attending school in the year 2011 as against 45 percent boys. Interestingly, the magnitude of gender difference in enrolment is almost identical in both rural Sindh and Khyber Pakhtunkhwa provinces. The lowest difference, as expected, is observed in rural Punjab. The pertinent information with respect to 10-14 age cohort is displayed in Chart 2.6. It is evident from the chart that except for Punjab the magnitude of disparity between education of girls and boys is enormously high as compared with the 5-9 age group.

Studies on the private school phenomenon show that private schools are mainly co-educational with a majority of female teachers, and have a high percentage of girls' enrolment. Charts 2.7 and 2.8 respectively display gender disparities in private school enrolment for the 5-9 and 10-14 age cohorts. The gender disparity in the primary age cohort is relatively low, as compared to the secondary age group. According to Chart 2.8, gender disparities are significantly high in all provinces, except Punjab.

A summary index "Gender Parity Index (GPI)" is commonly used to assess gender differences. It is the value of an indicator for girls divided by that for boys. A value of less than one indicates differences in favor of boys, whereas a value near one indicates that parity has been more or less achieved. Chart 2.9 and Chart 2.10 are developed to document the prevalence and inter-temporal changes in gender disparities in school enrolment during the period 2005-2011 for the children in primary and secondary age groups respectively.





As expected, the highest gender disparity is observed in Balochistan province for school enrolment in the 5-9 age cohort with GPI magnitude of 0.46. Barring Balochistan, all provinces show a moderate positive change of about 4 to 6 basis points in GPI of primary schooling during the period 2005-2011. However, the value of the index in Balochistan has dropped to 5 basis points which reveals increasing gender disparity in the province. Similarly, gender equality in secondary school enrolment is worsening in Sindh and Balochistan. In contrast, a slight improvement in GPI is evident in Punjab and Khyber Pakhtunkhwa in Chart 2.10.

2.3 Availability of Physical Facilities in Rural Schools

Despite the growing concern about the quality of education, its crystallised definition is somewhat difficult to gauge, largely due to a wide array of stakeholders and consumers along with the complexities of the teaching-learning process. Most people view quality of education as the learning outcomes of students, which is the primary concern of all stakeholders. However, quality education output cannot be expected without quality inputs.

According to a report, prepared for the Ministry of Education, Government of Pakistan in collaboration with UNESCO (GoP, 2003) a general picture of inputs in rural schools can be portrayed as under:

- ◆ Facilities in primary schools are very poor.
- ◆ Nearly 1/6th of the primary schools are shelter-less.
- ◆ The schools with buildings have insufficient accommodation - 2 rooms and a veranda.
- ◆ Students mostly sit on mats/tat.
- ◆ Average number of teachers per school is 2.35.
- ◆ In mosque schools the average number of teachers is 1.3 per school.
- ◆ Textbooks for teachers: Never provided.
- ◆ Teaching Kit: Supplied in mid seventies. Never updated or repaired.
- ◆ Copy of curriculum: Never provided.
- ◆ Resource Materials: Never provided.
- ◆ Community support is very low/ at the lowest ebb.

Due to data constraints in terms of various indicators of quality inputs, this section only describes the available physical facilities in rural schools, which is the most important pillar of quality input to education. These statistics are collated from the Pakistan

Education Statistics, 2010-11. However, the report categorically says that the data regarding the physical facilities is only available at public sector education institutions². School buildings, drinking water, boundary walls, electricity and toilets for students are considered basic facilities.

Tables 2.3 and 2.4 summarise the extent of available facilities across provinces for primary and secondary (including middle) levels of education respectively. Enormous differences exist across provinces in terms of facilities, especially with respect to electricity, drinking water and availability of latrines.

	Pakistan	Punjab	Sindh	Khyber Pakhtunkhwa	Balochista n
Boundary Wall Exists	62.56	79.32	49.27	68.40	26.93
Building Availability	89.68	97.96	75.97	98.26	91.74
'Pacca' Structure of Schools	82.03	92.17	72.22	87.79	63.25
Satisfactory Building Condition	39.43	56.10	23.73	46.11	13.67
Electricity Availability	37.26	55.10	17.99	47.27	14.25
Drinking Water Availability	66.71	86.73	46.34	62.95	72.77
Latrine Availability	63.78	80.30	52.57	71.55	14.48

Source: Pakistan Education Statistics, 2010-11

Overall, electricity is available in only 37 percent primary schools, while 60 percent primary schools buildings are in an unsatisfactory condition. About 10 percent primary schools in rural areas have no building, whereas about 30 percent run without boundary walls.

The situation in middle and high schools is however comparatively better. Electricity and drinking water are available in 78 and 86 percent schools respectively. About 90 percent school buildings have 'pacca' structure, while about 41 percent secondary school buildings are in satisfactory conditions.

² In Pakistan, there is a marked distinction between facilities in public and private schools as well as in schools in urban and rural areas. While government schools in urban areas are better equipped than those in rural areas, private schools have better provision of facilities than public schools.

	Pakistan	Punjab	Sindh	Khyber Pakhtunkhwa	Balochistan
Boundary Wall Exists	84.01	91.50	72.33	79.17	58.11
Building Availability	97.98	99.93	87.48	99.82	99.35
'Pacca' Structure of Schools	89.97	94.96	84.89	79.74	90.73
Satisfactory Building Condition	41.64	51.16	22.85	37.64	11.12
Electricity Availability	78.59	92.58	43.54	74.84	45.41
Drinking Water Availability	86.38	96.52	64.63	78.08	72.75
Latrine Availability	87.84	94.70	74.99	88.16	52.64

Source: Pakistan Education Statistics, 2010-11

3. CONSTRAINTS IN SCHOOL PARTICIPATION

Table 3.1 documents the reasons for not attending school. Interestingly, the results show significant differences in respondents' opinions among provinces. For instance, education is considered costly only by 7 and 6 percent of respondents in Sindh and Balochistan provinces, whereas the corresponding percentages are 17 and 16 for Punjab and Khyber Pakhtunkhwa provinces.

	Pakistan	Punjab	Sindh	Khyber Pakhtunkhwa	Balochista n
Economic Reasons					
Education is Costly	13.0	17.2	7.1	15.7	6.1
Helping in Work	10.9	10.4	11.4	7.9	16.3
Employed/Working	2.4	2.7	2.8	0.7	2.8
Child Specific Reasons					
Minor	12.5	12.9	8.7	17.0	13.8
Ill/incapacitated	2.8	4.0	1.5	3.2	0.6
Subjective Reasons					
Not Useful	3.9	2.2	5.6	4.5	6.2
Parents do not permit - Boys	6.1	7.2	4.4	7.8	3.4
Parents do not permit – Girls	31.6	30.7	28.7	33.5	40.0
Supply Side Reasons					
School is too far	13.3	16.0	10.3	11.1	13.5
Shortage of Teachers	3.4	0.9	8.0	3.0	2.4
Substandard School	2.5	1.0	5.3	2.6	1.3
Child not Willing	29.2	27.9	35.2	23.5	28.2

Source: Estimated from household level data of PSLM 2010-11

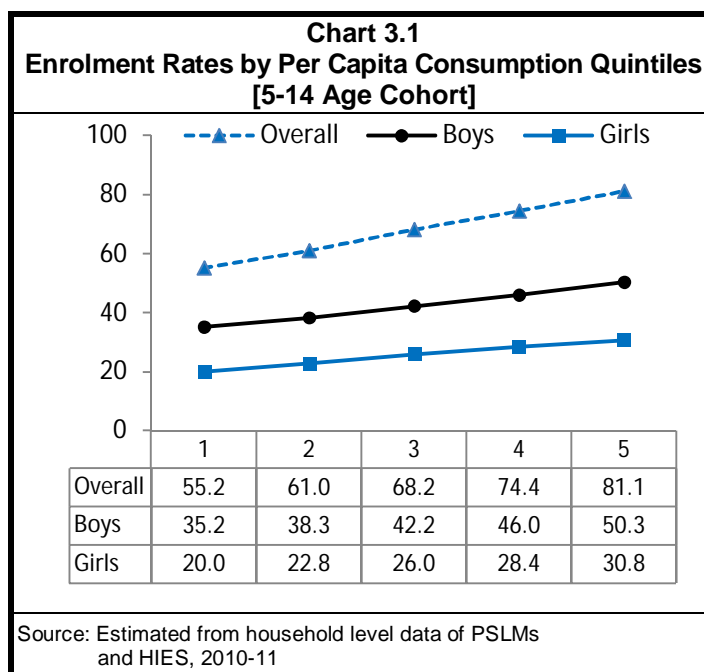
Overall, about 26 percent children were out of school due to economic reasons, while about 32 percent girls were not attending schools due to parents' refusal to

send them to schools. The highest percentage that recorded culture constraints regarding girls' schooling belong to Balochistan, followed by Khyber Pakhtunkhwa province. Supply side constraints which include distance to school, shortage of teachers and school quality in terms of physical facilities are reported by about 20 percent respondents. Another important reason, 'child not willing' is mentioned by about 29 percent respondents. This category is also included in supply side constraints as it reflects the failure of the education system in attracting children, perhaps due to deficiencies in quality.

3.1 Poverty and Education

While the contraction of resources for education constitutes a supply-side constraint, poverty constitutes a demand-side constraint. It is therefore important to examine the contribution of poverty in restricting school enrolment. This section highlights this relationship in terms of income/consumption quintiles and household poverty status³.

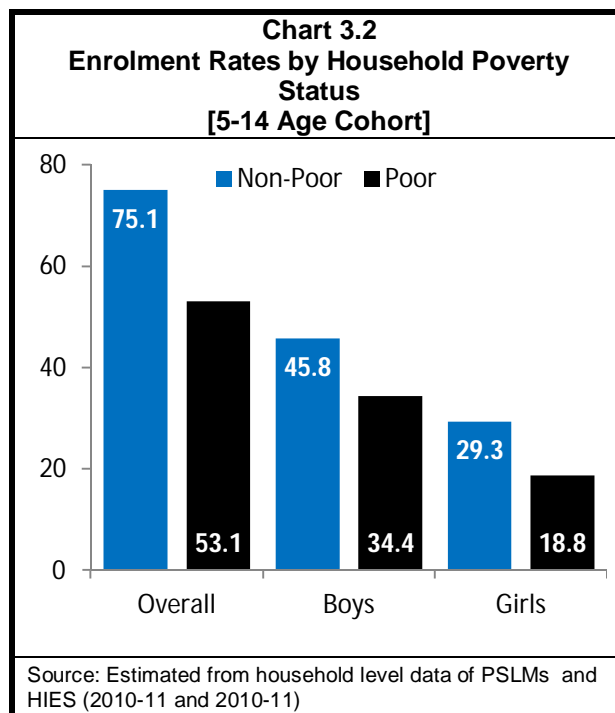
Chart 3.1 shows a progressive increase in rural primary school enrolment rates with the increase in consumption level. Overall, about 26 percentage point increase in the enrolment rate is evident as one moves forward from lowest to the highest quintile⁴. The chart also reveals that the lowest-to-highest quintile difference in the enrolment ratio is sharper for girls as compared with boys.



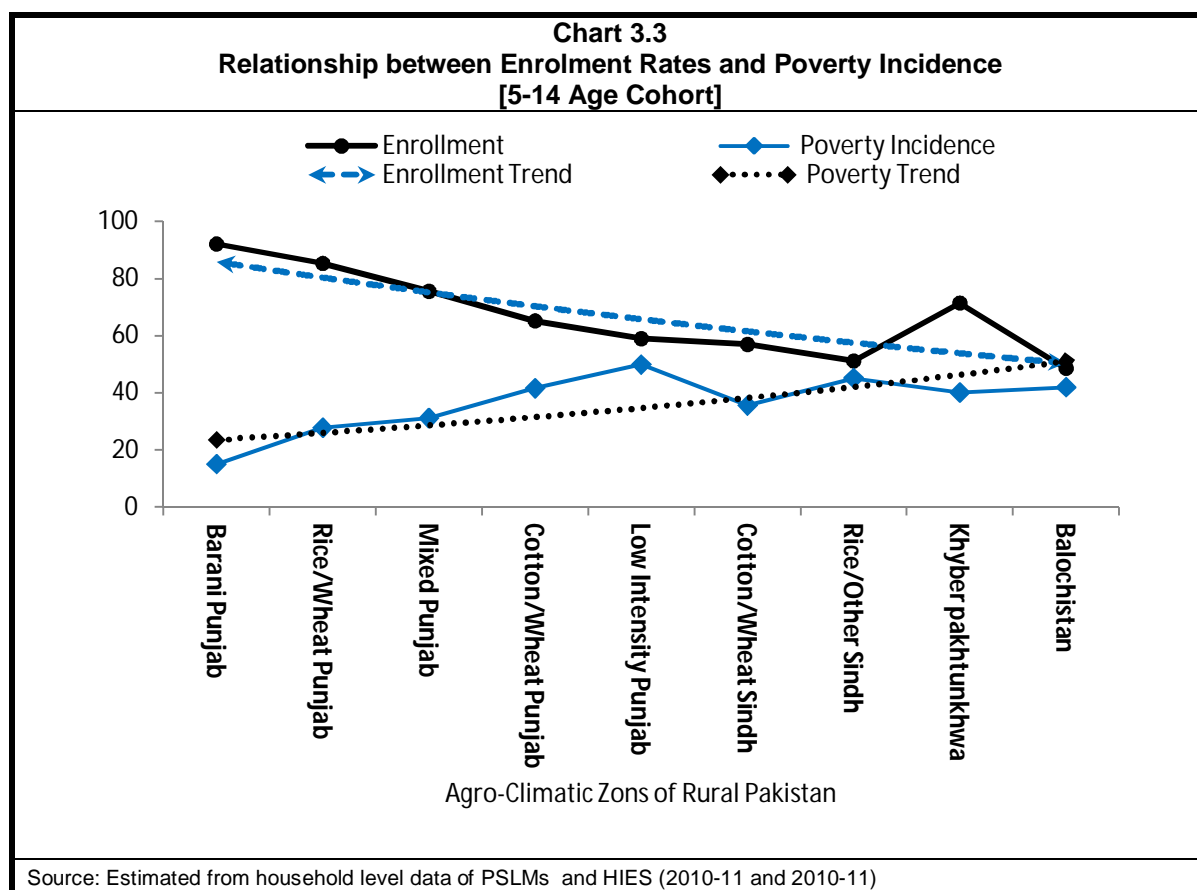
³ The enrolment rates are estimated from PSLM, 2010-11. However the PSLM does not collect income or consumption information. By combining consumption information from HIES, 2011 data and applying Small Areas Estimation Technique, predicted consumption is estimated for the PSLM data set. Thus this section provides evidence of relationship between school enrolment and predicted consumption and predicted poverty status. For methodological detail see Jamal (2013).

⁴ As expected, the lowest-to-highest quintile difference in case of private enrolment is quite large. The enrolment rate in private school is 6 percent in the lowest consumption quintiles, while about 25 percent children of 5-14 age cohort were enrolled in private schools.

Enrolment information with respect to household poverty status is portrayed in Chart 3.2. Overall, the enrolment rate in non-poor households is 75 percent as compared with 53 in poor households. About 10 to 11 percentage point difference between poor and non-poor households is evident in boys' and girls' enrolment rates. Chart 3.3 plots poverty incidence and enrolment rate of the 5-14 age cohort across Agro-Climatic Zones of rural Pakistan (see Appendix for classification of districts). An



understandable relationship between poverty incidence and enrolment rate is visible in the chart. The estimated magnitude of correlation coefficient is -0.85 which confirms statistically significant negative correlation between poverty and enrolment rate.



3.2 Factors Affecting School Participation

A multivariate analysis is carried out by estimating logistic regression function for school participation of 5-14 age cohort children. All potential correlates of school participation are included in the logistic function to assess the probability and marginal effect on the household decision to enroll their children in school. The logistic function incorporates head of household and spouse characteristics, besides pertinent demographic, social, economic and locational factors. The summary statistics of the logistic regression indicate a good-fit of the model with a high percentage (75 percent) of correct predictions and expected signs of all coefficients associated with variables. Table 3.2 displays estimated coefficients, level of significance and marginal effect with respect to probability to enroll. Model summary statistics are also provided in the table.

An important finding of this study is the significant role of female headed households in the decision to send children to school. The variable of female headship is appeared statistically significant with large marginal effect. Similarly, spouse education level is more effective than head of household in influencing decision to enroll.

All variables of household wealth (house ownership, RCC roofing, 'Pacca' wall structure, household asset scores and livestock ownership) are statistically significant with high marginal effect on probability to enroll. Among these the impact of RCC roofing is relatively substantial.

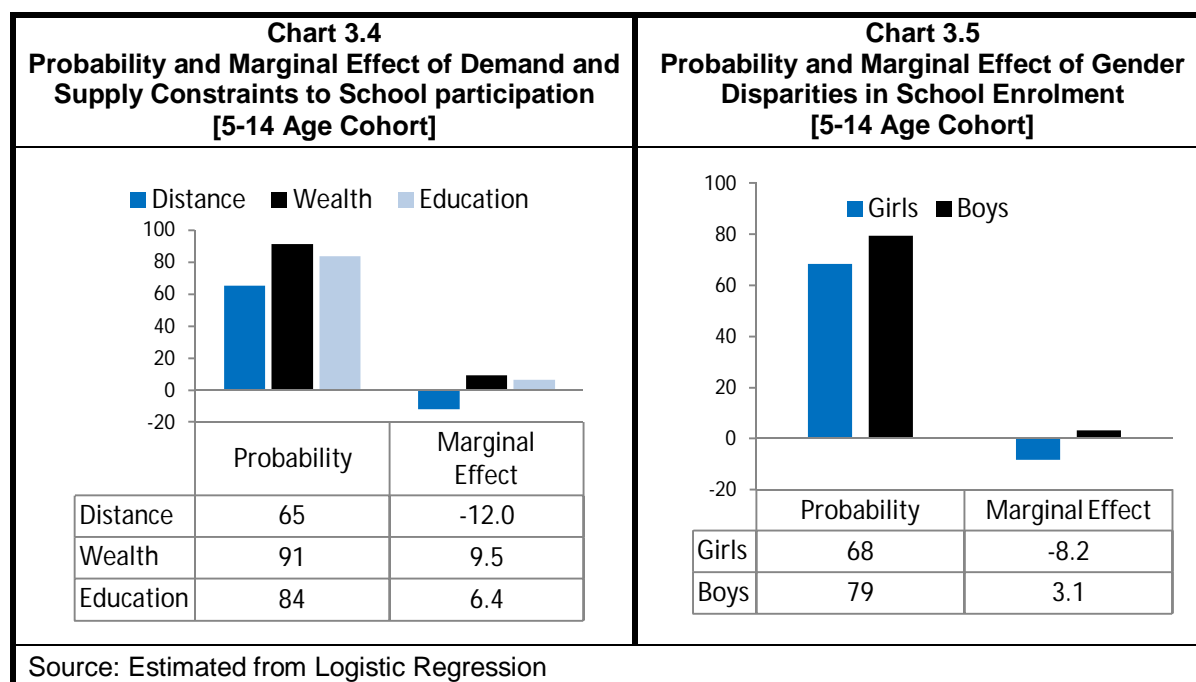
The supply side constraints are represented by distance to primary and middle school, while 'time to reach public transport' is used as a proxy for village remoteness. All these proxies are negatively correlated with the enrolment decision. The large negative marginal effect is associated with the variable 'Time to reach Primary School'.

To capture the provincial and regional differences in terms of population and level of rural development, locational (province and South Punjab agro-zones) dummy variables are incorporated in the model. All these appeared significant with signs according to a priori expectation. The negative coefficients with high marginal effect of rural Sind and Balochistan with reference to Punjab confirm the descriptive information presented above. Similarly, variables representing districts of south Punjab, which have relatively high percentage of poverty incidence, are showing large negative impact on the probability for school enrolment.

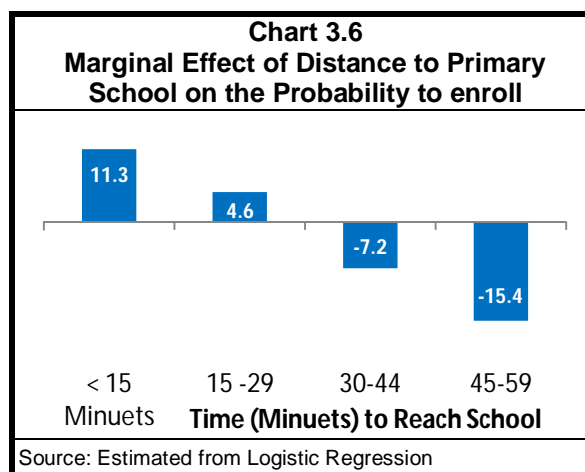
Table 3.2 Determinants of School Participation by Rural Population of 5-14 Age Cohort [Logistic Regression - Dependent Variable Enrolled=1, Out of School=0]			
	Estimated Coefficients	Level of Significance	Marginal Effect
GIRLS Participation	-1.26	0.00	-28.85
Family Size	-0.03	0.00	-0.59
Female Headship	0.52	0.00	9.34
Education Level of Head of Household	0.10	0.00	1.47
Education Level of Spouse	0.15	0.00	2.60
Head Occupation – NONFARM	-0.15	0.00	-2.82
Head Occupation – Share Cropper (Tenant)	-0.26	0.00	-4.79
House Ownership	0.22	0.00	3.52
RCC Roofing	0.27	0.00	4.78
'Pucca' Wall Structure	0.20	0.00	3.53
Household Asset Score	0.14	0.00	1.48
Livestock Ownership	0.05	0.02	0.82
Time to Reach Public Transport (Proxy of Remoteness)	-0.03	0.00	-0.64
Time to Reach Primary School	-0.27	0.00	-5.73
Time to Reach Middle School	-0.06	0.00	-1.08
Agro Climatic Zone 4 – Districts of South Punjab	-0.53	0.00	-9.89
Agro Climatic Zone 3 – Districts of South Punjab	-0.54	0.00	-10.15
Sindh	-1.03	0.00	-21.20
Khyber Pakhtunkhwa	-0.35	0.00	-6.57
Balochistan	-0.95	0.00	-19.09
Intercept [Constant]	1.16	0.00	
Model Summary: Chi-Square <div style="text-align: right;">Cox & Snell R-Square Nagelkerke R-Square</div> Percentage of Correct Prediction: <div style="text-align: right;">Participating Not Participating Overall</div>			
Source: Estimated from household level data of PSLM, 2010-11 Note: Zero or less than 0.05 near zero p-value indicates that the coefficient (β) is statistically significant and strongly rejects the null hypothesis that $\beta = 0$. The chi-square statistic is the difference in -2 log-likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0. The value of Chi-Square strongly rejects the null hypothesis.			

To compare the relative importance of demand and supply constraints, an effort is also made to assess probability and marginal effect of a combination of variables. Chart 3.4 displays these estimates. The probability associated with household wealth (Wealth), which is a combination of five variables, is estimated at 91 percent or 0.91 with a marginal effect of 9.5. In contrast, supply constraints (Distance) which is represented by three variables have a probability of 0.65 (65 percent) with marginal

effect of -12.5. Education levels of both head and spouse have a combined marginal effect of 6.4 percent with a probability of 0.84 (84 percent). From the logistic regression results, the probability and marginal effect of boys and girls to enroll in school are also estimated. According to Chart 3.5, the probability of girls to enroll is significantly less than that of boys with a negative marginal effect of -8.2 percent.



An interesting exercise is also carried out from the logistic regression analysis to estimate the marginal effect of distance to primary school in terms of time to reach on the probability to enroll. For this purpose, an additional logistic model is estimated by incorporating separate dummy variables for different categories of time to reach school. Chart 3.6 reports



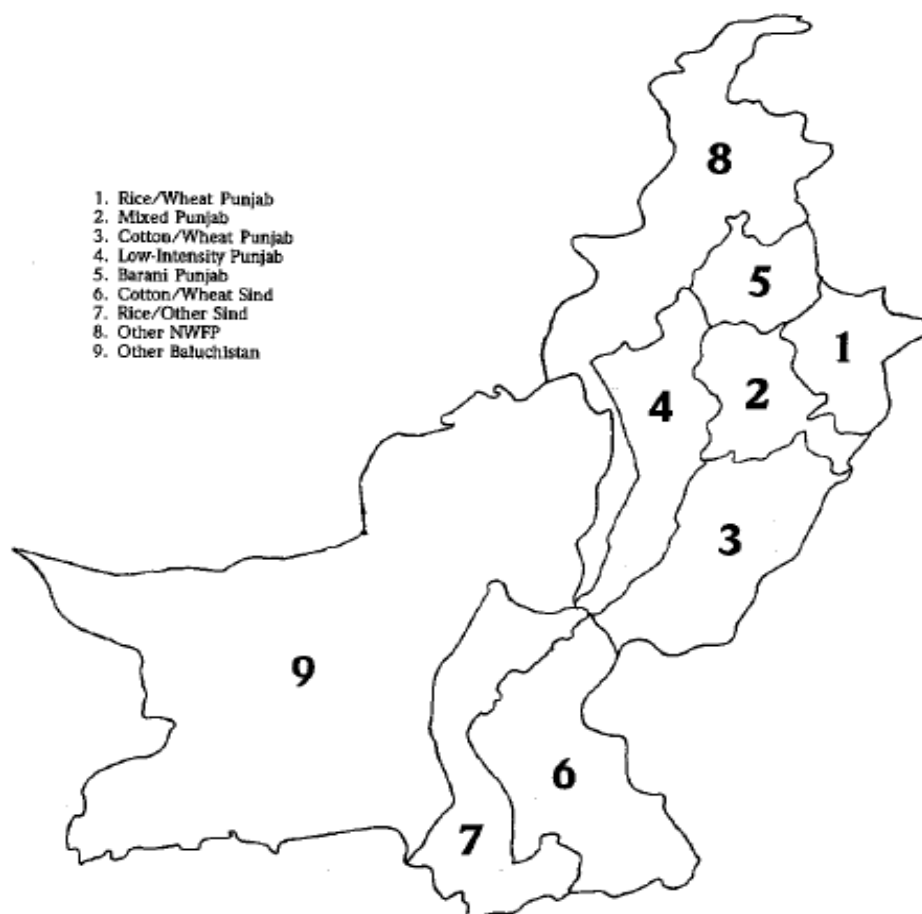
the impact of distance on school participation with respect to these categories. The chart clearly shows a cut-off point of 'half an hour' from where the negative marginal effect on probability to enroll commences. The highest marginal effect of 11.3 percent is observed in the category of less than 15 minutes followed by the category of 15-29 minutes with marginal effect of 4.6 percent.

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Appendix Pakistan Agro-Climatic Zones

Agro-climatic Zones		Districts
1	Rice/Wheat Punjab [Middle Punjab]	Sialkot, Gujrat, Gujranwala, Sheikhupura, Lahore, Kasur, Narowal, Mandi Bahauddin, Hafizabad
2	Mixed Punjab [Middle Punjab]	Sargodha, Khushab, Jhang, Faisalabad, Toba Tek Singh, Okara
3	Cotton/Wheat Punjab [South Punjab]	Sahiwal, Bahawalnagar, Bahawalpur, Rahimyar Khan, Multan,
4	Low Intensity Punjab [South Punjab]	Dera Ghazi Khan, Rajanpur, Muzaffargarh, Layyah, Mianwali, Bhakkar and Dera Ismail Khan of Khyber Pakhtunkhwa
5	Barani Punjab [Upper Punjab]	Attock, Jhelum, Rawalpindi, Islamabad, Chakwal
6	Cotton/Wheat Sindh [Upper Sindh]	Sukkur, Khairpur, Nawabshah, Hyderabad, Tharparkar, Nowshero Feroz, Ghotki, Umerkot, Mirpur Khas, Sanghar
7	Rice/Other Sindh [Lower Sindh]	Jacobabad, Larkana, Dadu, Thatta, Badin, Shikarpur, Karachi
8	Khyber Pakhtunkhwa	All Khyber Pakhtunkhwa except Dera Ismail Khan
9	Baluchistan	All Balochistan



Source: Pickney, Thomas C. 1989. "The Demand for Public Storage of Wheat in Pakistan", Research Report 77, International Food Policy Research Institute (IFPRI)
<http://www.ifpri.org/sites/default/files/publications/rr77.pdf>



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