



Research Report No. 9

**CONTINUATION RATES IN
PRIMARY EDUCATION:
A STUDY OF PAKISTAN**

SOCIAL POLICY AND DEVELOPMENT CENTRE

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**Continuation Rates in Primary
Education: A Study of Pakistan**

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ABSTRACT

The level of literacy in Pakistan is perceptively lower than in the rest of the region. This is perhaps due to the high level of drop-outs from the educational system at the primary level. Despite a substantial growth in the availability of primary schools there are considerable differences in completion rates between provinces and genders, 'this paper attempts to measure and explain these differentials between 1972 and 1993. It examines the relationship between rates of continuation class-wise for males and females and five factors: school availability, teacher availability, rate of urbanisation, per capita income and female literacy. School and teacher availability are found to be the strongest factors influencing continuation across genders, classes and provinces. In addition, per capita income appears to be a stronger influence for females to complete primary schools.

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Continuation Rates in Primary Education: A Study of Pakistan

Introduction

The efficiency of a schooling system is dependant on a number of external and internal factors. External efficiency may be judged by how well the cognitive skills of students have been developed in relation to market demand. In contrast, internal efficiency is dependant on the relationship between inputs and outputs within either the system or individual institutions. As internal efficiency is measured with respect to the objectives of policy, one way to measure this may be by the way output from education is defined.. This should include both quality and quantity considerations. Measuring output by the number of students successfully completing course may provide a good first approximation, and comparing this to the average number of years is enough to indicate that low continuation and high repetition rates are indicative of low efficiency. One consequence of low continuation rates, particularly in the first grade, is that the Effective cost of producing one graduate from the primary schooling system increases. It is argued that increases in the average length of stay for completion denies access to other potential students thus requiring governments to expand the physical infrastructure to meet the potentially frustrated demand so that the goals of Universal Primary education (UPE) are met.

A comparison of education indicators in some of the countries of South Asia and South-East Asia from the data available from publications by some of the organisations of the United Nations Pakistan compares favourably with respect to economic development if tills is measured as GNP per capita. However, this is not reflected in its performance with respect to [he development of education or the skill endowment of it population. Table 1 shows that Pakistan has the poorest performance in each of the indicators, which reflect these. Only with respect to the primary school completion rate for Bangladesh does Pakistan perform better, hut his is only marginally so. It would appear from the data that while the overall performance of Pakistan is poor. Pakistan's performance with respect to females is even worse.

**TABLE I
QUALITY PROFILE OF EDUCATION**

Countries	Per Capita GNP (\$) 1993	First Grade Intake Rate 1990	Primary School Enrollment Rate 1993		Primary School Completion Rate 1990	Mean Years of Schooling (25+) 1992	
			Total	Female		Female	Male
Pakistan	430	77%	46%	31%	48%	0.7	2.9
Bangladesh	220	98%	77%	71%	47%	0.9	3.1
China	490	100%	121%	116%	85%	3.8	6.3
India	300	n.a	106%	93%	62%	1.2	3.5
Indonesia	740	100%	115%	113%	77%	3.1	5.3
Malaysia	3,140	88%	93%	94%	96%	5.2	5.9
Nepal	190	n.a	102%	81%	n.a	1.0	3.2
Singapore	19,850	n.a	107%	107%	100%	3.2	4.8
Srilanka	600	99%	107%	105%	97%	6.3	8.0

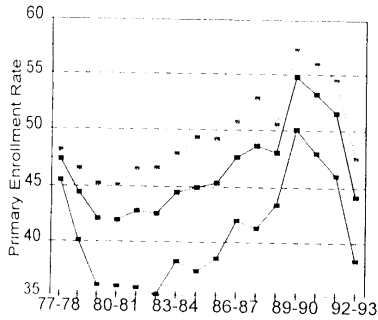
Source: Human Development Report 1994, United Nations Development Programme, New York 1994; World Education Report 1993, United Nations Educational, Social and Cultural Organisation; Paris 1994; Social Indicators of Development 1995, The World Bank; Washington, D.C.; 1996

Source: *Human Development Report 1994*, United Nations Development Programme, New York 1994; World Education Report 1993, United Nations Educational, Social and Cultural Organisation; Paris 1994; Social Indicators of Development 1995, The World Bank; Washington, D.C.; 1996

Research has shown that completed primary education helps in alleviating poverty, increase paid employment, improve earning levels and productivity, reduce fertility and morbidity and generically inculcate "modern" attitudes of both genders. Adults with completed primary education are more likely to send their children to schools and keep them there. In the developed and newly industrialised countries there has been a substantial increase in investment in education which has created a population with an increased level of cognitive and problem solving skills. The developing countries, however, have been unable to enroll, keep and teach comparable proportions of children in primary schools. Despite increasing gross enrollment rates, fewer than 60 percent of children enrolling in primary schools in the low-income countries and not more than 70 percent in the middle-income countries continue with their education to complete primary schooling. Moreover, these completion rates have declined over the past decade, and most of the drop-outs occur in the initial years of schooling. The problem appears to be more acute for girls [Lockheed, 1991].

All of these general observations are also valid for Pakistan. Figure I, for instance shows

Figure 1
Continuation Rates for Completion
of Primary Schooling



onwards have been increasing until 1989-90 and have since then declined for both boys and girls. Table 2 reflects this pattern of continuation from Class I to Class II. The average continuation rate seen in Table 2 after the First year of schooling for Pakistan as a whole in 1974-75 was 69.9 percent and by the end of the cohort's entrance to Class V an additional 18.4 percent of the enrolled students had completed their primary school education. In subsequent years continuation with primary schooling appears to have improved to reach a

peak in 1988-89 after which a decline is observed. Causes for the decline may be numerous. Literature suggests that the principal causes of decline may be attributed to (a) accessibility, particularly in the rural areas [Lockheed, 1991; Anderson, 1988], (b) a general lack of resources, including teachers, equipment, materials, (c) household and production chores, and (d) distance from residence linked to availability of transport [CERID/WEI, 1984; ICLD, 1974]. It has also been argued that repetition and dropping out can result from family and student characteristics that affect the demand for education and policies that are ineffective [Lockheed, 1991].

Table 2
**(bender-wise Continuation Ratios from Class I to Class II ami Cohort
 Completion Rates for Pakistan and its Provinces**

Intake Year	Pakistan	Punjab	Sindh	NWFP	Balochistan
Overall					
1973-74	69.9 (47.4)	70.7 (50.9)	70.8 (46.9)	70.9 (37.8)	46.0 (27.5)
1987-88	71.8 (51.5)	81.4 (57.3)	75.5 (61.2)	52.8 (35.9)	37.5 (20.0)
1991-92	62.0	61.5	78.5	56.9	28.8
Boys					
1973-74	71.1 (48.2)	73.2 (55.5)	69.9 (42.2)	71.9 (37.9)	46.7 (29.4)
1987-88	74.6 (54.5)	97.3 (68.5)	72.7 (62.9)	49.0 (33.4)	36.9 (20.0)
1991-92	65.0	72.3	77.9	47.4	29.0
Girls					
1973-74	67.1 (45.5)	66.2 (42.5)	73.8 (62.4)	65.7 (37.3)	43.4 (20.9)
1987-88	66.6 (46.0)	63.6 (44.7)	83.4 (56.4)	70.4 (47.8)	40.5 (20.3)
1991-92	57.0	50.0	80.4	92.4	28.5

Note : Figures in parenthesis are cohort completion rates

Source : Government of Pakistan, Federal Bureau of Statistics; Pakistan Statistical Yearbook (several issues); Governments of the Punjab, Sindh, NWFP and Balochistan; Development Statistics (several issues from each province).

Traditionally continuation rates have been used to estimate rates of return from schooling (Behrman, 1991; Psacharopoulos, 1985). Subjective research on explaining the influence of specific factors on continuation at the primary level has only been undertaken in only a very few instances [Lockheed, 1991; Anderson, 1988, CERID/WEI, 1984; ICED, 1974]. Recent research on enrollment, continuation and completion in Pakistan is scarce and the most recent study [Khan, 1987] shows that during the period 1977-78 to 1982-83 completion rates are generally lower for girls in relation to boys and in rural areas compared to urban areas, except for urban Sindh where the completion rate for girls exceeded that for boys the lowest completion rate for girls was in both urban and rural Sindh and the highest completion rate was observed in the case of boys in the Punjab. However, no clear trend emerges from a study of the continuation rates. An analysis of class-wise completions shows the highest level of attrition in the transition from Class I to Class II. One possible explanation for this may be the result of an exaggeration in the enrollment levels for Class I, resulting from the inclusion of pro-school age children who are

temporarily allowed to audit classes with a view to acclimatize them and as a proxy for relieving over-worked parents of child care.

In this paper we present an analysis of the causative (actors affecting continuation of education at the primary level using data from the four provinces of Pakistan. Section 2 presents the methodology used to arrive at the estimates of continuation and the specifications of the model used to explain the causes of continuation. Section 3 presents an overview of the availability of data on primary education, its shortcomings and the way in which we have corrected for some of these shortcomings. Section 4 presents the results of the model and Section 5 draws conclusions from the analysis and suggests (lie policy implications.

2 Methodology

Continuation rates for children completing primary schooling is defined as that proportion of children of an entry cohort who complete the final year (in Pakistan 5 years after entering) of primary level classes. The continuation rate for each level in primary school education by a cohort may, therefore, be computed from the following:

$$C_i = \text{Continuation Rate in the } i\text{th class}$$

where

$$i = 2, 3, 4, 5.$$

And if we take a cohort of children who entered the schooling system in year t , then the continuation rate is:

$$\text{overall continuation ratio} = C_{t+1}^2 * C_{t+2}^3 * C_{t+3}^4 * C_{t+4}^5 \quad (1)$$

.

We may, therefore, estimate the probability of exiting from each of the five classes which cumulatively constitute primary schooling.

The probability of exit in Class 1 after 1 year's of schooling is:

$$P_1 = (1 - C_2)$$

The probability of exit in Class 2 after 2 years' of schooling is:

$$P_2 = C_2 * (1 - C_3)$$

The probability of exit in Class 3 after 3 years' of schooling is:

$$P_3 = C_2 * C_3 * (1 - C_4)$$

The probability of exit in Class 4 after 4 years' of schooling is:

$$P_4 = C_2 * C_3 * C_4 * (1 - C_5)$$

The probability of exit in Class 5 after 5 years' of schooling is:

$$P_5 = C_2 * C_3 * C_4 * C_5$$

Using these estimates of probability we compute that the:

$$\text{verage Length of School Stay by a Cohort} = 1 * P_1 + 2 * P_2 + 3 * P_3 + 4 * P_4 + 5 * P_5 \quad (2)$$

and also are able to compute the elasticity of completion, ϵ_c , from

$$d(\ln P_c) = d(\ln C_2) + d(\ln C_3) + d(\ln C_4) + d(\ln C_5) \quad (3)$$

\Rightarrow

$$\epsilon_{P_c} = \epsilon_{C_2} + \epsilon_{C_3} + \epsilon_{C_4} + \epsilon_{C_5}$$

Therefore, the elasticity of completion of school is simply equal to the sum of the elasticities of class-wise continuation probabilities.

Earlier studies on the relationship between education, development and returns from investment into education have identified a number of factors, which may explain why children do not complete primary education. These include, but are not limited to, accessibility and availability of schools, lack of teachers, equipment and materials, family income, and a basket

of sociological factors such as general levels of literacy of heads of household and location of schools. These may be expressed in the following functional form:

$$\frac{E_t^n}{E_{t-1}^{n-1}} = f \left(\frac{S_{t-1}}{E_{t-1}^{n-1}}, \frac{T_{t-1}}{S_{t-1}}, Z_t \right) \quad (4)$$

where E represents the enrollment of students and S, and T are the supply side factors, namely, schools and teachers respectively, and Z is a vector of exogenous variables.

Specifying equation (4) in logs, we have:

$$\ln \left(\frac{E_t^n}{E_{t-1}^{n-1}} \right) = \beta_0 + \beta_1 Z_{t-1} + \beta_2 \ln \left(\frac{S_{t-1}}{E_{t-1}^{n-1}} \right) + \beta_3 \ln \left(\frac{T_{t-1}}{S_{t-1}} \right) + \epsilon_t \quad (5)$$

where the ratios S/E and T/S are the school to enrollment and teachers to school ratios respectively.

The vector of exogenous variables Z consists of the following:

- U = extent of urbanisation, (hat is. share of urban population in total population of the province,
- FL = female literacy rate of the province, and
- Y = per capita Gross Regional Product of the province [Bengali 1995).

3 Data and Constraints Data on enrollments, numbers of schools and the availability of teachers is compiled initially by the Directorates of Education in each of the provinces of Pakistan. This is published erratically by the Directorates and the level of desegregation by gender and by locality is inconsistent both inter-provincially and within each province. This appears to be the result of the varying policies adopted by each of the Directors who change frequently. A more consistent time series is, however, published by each of the Bureaus of Statistics of (the provinces, and by the Central Bureau of Education of the Ministry of Education, Government of Pakistan. The data from the Central Bureau of Education is available for the period 1972-73 to 1

We have adjusted the available data to arrive at a closer estimate of the number of primary schools and primary school teachers rather than use the published data for the reasons stated later. The total number of schools are reported separately (or primary (Classes I to V), middle (Classes 1 to VII), and high (Classes 1 to X). Thus there appears to be an overlap in the definition of schools. To arrive at a closer estimate of the number of primary level institutions, we have aggregated the three categories of schools as each contain the primary school level classes. A similar situation exists where number of teachers are reported. We have adjusted for the availability of teachers by first deriving the number of teachers per school. If the number of teachers available exceeded 8 for middle schools and 10 for high schools, we have assumed that the full complement of Five teachers were available for primary level classes in these schools. The product of 5 and the respective numbers of schools was then added to the published statistics on primary school teachers. This was confirmed by discussions with several directors of education. Where the number was lesser than this threshold level, we have then derived the teacherclass ratios for each of these two latter categories of schools and applied this ratio to the live primary classes. Thus the cross product of this ratio, the number of primary classes and the number of respective schools gave us a truer estimate of the number of primary level school teachers in these categories of schools.

Estimates of female literacy are issued by the Planning and Development Departments of each of the provinces and have been assumed to be correct. Urbanisation has been assumed to be the proportion of urban population in total population. We have estimated annual population by assuming the growth to be equal to the inter-censal growth rate for the period from 1972 and 1981 and thereafter have used the population growth estimates produced by the

4 Results

In order to understand what has been happening to continuation out rates in the primary schooling system in Pakistan, the pattern of continuation over the years needs to be studied at length. Table 3 presents the average continuation rates (or Pakistan's provinces and the pattern with emerges from a perusal of this data shows that the continuation rate for boys in Sindh has increased over the period and in Balochistan has remained relatively constant. In the context of girls' the continuation rates have declined in the earlier years, but have since been increasing.

Table 3
Average Continuation Rates by Province by Gender

Entry Year	GIRLS				BOYS			
	Punjab	Sindh	NWFP	Balochistan	Punjab	Sindh	NWFP	Balochistan
1974-75	86	83	80	73	78	85	83	73
1975-76	86	82	80	72	81	91	88	73
1976-77	87	83	75	55	78	90	79	66
1977-78	88	80	63	77	78	87	71	71
1978-79	86	80	79	71	76	87	64	72
1979-80	89	80	77	71	79	86	58	73
1980-81	87	80	75	71	75	86	78	74
1981-82	87	80	77	72	77	85	69	75
1982-83	87	80	81	71	77	84	73	83
1983-84	89	82	76	73	84	87	72	83
1984-85	94	80	78	74	79	84	82	70
1985-86	86	83	82	71	78	73	81	77
1986-87	93	79	84	69	83	82	85	70
1987-88	91	87	85	69	86	90	88	72
1988-89	97	86	86	75	88	87	86	83
1989-90	88	91	91	66	84	85	91	68
1990-91	86	89	74	65	78	85	83	68
1991-92	86	89	72	75	79	87	84	70
1992-93	85	90	81	77	79	87	97	69

Computing the continuation rates by gender and by province from (lie methodology stated in section 3, we sec from the averages presented in Table 4 that Punjab has the highest average continuation rates from each class and Balochistan the lowest, for both hoys and girls. In the Punjab, the peak is achieved in the continuation rate from Class III for both boys and girls Tills is also true for NWT' and Balochistan. In Sindh, however, the average continuation rate; increases as students, both boys and girls, complete each successive ladder in (lie schooling cycle.

TABLE 4
Continuation Rates by Class by Province and by Gender
(Average for the Period)

Class	Punjab	Sindh	NWFP	Balochistan
Boys				
I-II	78.3	71.8	49.8	43.7
II-III	89.9	84.0	86.7	82.3
III-IV	94.5	86.1	88.8	85.6,
IV-V	89.8	91.6	87.5	81.8
Girls				
I-II	55.0	77.9	60.5	43.9
II-III	89.5	86.6	85.3	82.0
III-IV	90.6	87.1	86.7	84.2
IV-V	86.4	93.5	86.0	82.6

In table 5 we present the estimate of the proportion or children of different cohorts completing primary schools both by province and by gender. Once again no consistent pattern emerges. In the context of girls, both Punjab and NWFP show a decline in the initial years and (hen an increase. The reverse appears to be the case in Balochistan. In Sindh we see a gradual declining trend line. In the context of the boys the Punjab shows a reversal from the pattern from that for girls, that is, there is an increase in the initial years and a decline, thereafter. The completion rates for boys in the Sindh would appear to show an increasing trend over time. This is, however, reversed in the context of the boys in both NWFP and Balochistan.

Results from the estimation for probability of completion and the computing for the Average years of schooling are also shown in Table 5. The results indicate that the probability completion has been improving generally over time until the mid 1980s, after which these probabilities irrespective of gender and province have been declining except in the case of girls Sindh. The average length of stay in primary schools reveals a mixed trend. In Punjab the number of years spent by both boys and girls has declined from the cohort starting in 1973-74 until the one which entered in 1982-83. After this the average stay in schools has increased to beyond the initial years. The average stay of boys in Sindh has seen a sharp increase in the late 1980s. The pattern for girls stay in schools in Sindh follows the same pattern shown by Punjab. The results for both boys and girls from NWFP shows the same pattern. In Balochistan, however, the average stay has peaked around the early 1980s and has since then declined.

TABLE 5
PROBABILITY OF COMPLETION AND AVERAGE STAY IN SCHOOLS

Year	PUNJAB				SINDH				NWFP				Balochistan			
	Percentage Completing Schools		Average Years of Schooling		Percentage Completing Schools		Average Years of Schooling		Percentage Completing Schools		Average Years of Schooling		Percentage Completing Schools		Average Years of Schooling	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
1973-74	55.5	42.5	3.5	3.1	42.2	62.4	3.1	3.7	37.9	37.3	3.3	3.2	29.4	20.9	2.5	2.3
1974-75	53.2	36.2	3.6	3.1	41.8	60.8	3.1	3.8	37.5	32.2	3.2	3.3	28.8	22.0	2.6	2.3
1975-76	53.5	33.3	3.6	2.9	40.1	55.8	3.1	3.6	33.9	19.1	2.7	2.4	28.7	23.4	2.7	2.4
1976-77	55.9	32.6	3.6	2.8	39.8	54.7	3.1	3.6	29.7	23.3	2.5	2.5	25.3	22.8	2.5	2.4
1977-78	56.5	32.6	3.7	2.7	39.8	53.3	3.1	3.5	34.9	24.1	2.7	2.4	24.0	23.5	2.4	2.5
1978-79	57.4	31.5	3.8	2.6	39.7	51.9	3.1	3.5	32.8	26.3	2.6	2.4	27.4	34.1	2.5	2.7
1979-80	58.1	35.9	3.7	2.8	41.5	53.1	3.1	3.5	35.0	24.7	2.7	2.3	28.4	36.4	2.5	2.7
1980-81	62.3	35.0	3.8	2.8	40.8	51.6	3.1	3.5	34.3	25.9	2.6	2.2	28.3	42.5	2.6	2.9
1981-82	61.9	37.0	3.8	2.7	42.8	49.0	3.2	3.5	33.5	28.2	2.5	2.3	29.0	40.9	2.7	3.0
1982-83	65.2	40.5	3.9	2.7	43.1	52.1	3.2	3.5	34.7	34.0	2.5	2.5	28.4	34.7	2.6	2.6
1983-84	69.6	39.7	4.2	3.0	44.9	52.2	3.2	3.5	35.7	36.4	2.5	2.6	27.9	25.8	2.6	2.3
1984-85	60.3	42.6	3.6	3.0	44.9	51.9	3.2	3.4	40.0	40.0	2.6	2.8	27.5	21.8	2.4	2.2
1985-86	74.9	51.0	4.3	2.9	53.7	53.4	3.4	3.5	40.2	46.7	2.7	3.1	21.1	20.9	2.1	2.1
1986-87	69.9	47.9	4.2	3.1	61.9	56.0	3.7	3.7	36.1	43.7	2.7	3.2	20.1	20.6	2.1	2.1
1987-88	68.5	44.7	4.3	3.1	62.9	56.4	3.7	3.7	33.4	47.8	2.6	3.4	20.0	20.3	2.1	2.2
1988-89	53.0	34.6	3.5	3.1	65.4	53.2	3.8	3.5	30.4	59.3	2.5	3.7	18.8	17.3	1.9	2.1

In equation (5) we had suggested the possible factors which may explain these variations in continuation rates. Table 6 presents the class-wise results of the analysis of the methodology to explain the impact of the dependant variables using the pooled data for the four provinces.

Table 6 Regression Results (Dependant variable is class-wise continuation rate)

Indicator	Class II	Class III	Class IV	Class V
Boys				
School Availability	0.705 (7.77)*	0.238 (3.78)*	0.062 (1.11)	0.145 (2.76)*
Teachers Availability	1.170 (8.61)*	0.505 (4.73)*	0.251 (2.41)*	0.465 (4.29)*
Urbanisation	0.781 (2.43)*	-0.226 (-1.27)	-0.176 (-1.11)	0.103 (0.60)
Per Capita Income	-0.00008 (- 2.16)*	0.00002 (0.93)	0.000002 (0.11)	0.00003 (1.60)
Female Literacy	0.009 (2.45)*	0.004 (2.01)*	0.003 (1.60)	-0.002 (-0.85)
R²	0.84	0.30	0.14	0.44
F-Statistic	50.11	6.83	3.33	9.92
Girls				
School Availability	0.648 (9.67)*	0.114 (1.54)	0.014 (0.25)	0.123 (1.81)
Teachers Availability	0.605 (7.22)*	0.148 (1.95)	-0.005 (-0.07)	0.158 (2.11)*
Urbanisation	-0.837 (-2.31)*	-0.644 (-2.55)	-0.15 (-0.70)	-0.329 (-1.23)
Per Capita Income	0.0001 (2.74)*	0.000014 (0.54)	0.000004 (0.86)	0.00006 (2.22)*
Female Literacy	0.007 (2.11)*	0.009 (3.87)*	0.004 (2.18)*	0.004 (1.39)
R²	0.80	0.18	0.01	0.27
F-Statistic	56.64	3.95	1.17	5.98

Note: In all cases number of observations = 20

It would appear that highest impact on continuation appears to be by the availability of teachers generally in the context of boys and the magnitude is the highest in the first year of schooling. In the case of girls, the availability of schools would appear to have the most positive impact on the continuation of schooling. This is, however, offset by the negative impact of urbanisation. As in the case for boys, the magnitude of the impact of the variables is highest in

The first year of schooling. For both boys and girls the significance of the impact of each of the demand side factors are, that is urbanisation, per capita income and female literacy, is very high in the decision of families to permit continuation beyond the first year, even though their contribution may be small in comparison to the supply side factors, namely the availability of schools and teachers.

To arrive at the elasticity of the continuation ratios, we multiply the coefficients of the exogenous demand factors by the average value for the country. These elasticities are shown in Table 7. The highest elasticity is for the availability of teachers in the case of boys. In other words increasing the number of teachers per student leads to a leads to an increase in the probability for completing each class. However, in (the case of girls, the highest elasticity is the availability of schools generally, except in the case of girls in Class V where the per capita income appears to have the highest elasticity. The aggregate elasticity for completing primary schooling appears to be highest for the availability of teachers for both genders, followed by that

Table 7
Elasticities of Continuation Ratios

Indicator	Class II	Class III	Class IV	Class V	Elasticity of Probability of Completing School
Boys					
School Availability	0.705*	0.238*	0.062	0.145*	2.150
Teacher Availability	1.170*	0.505*	0.251**	0.466*	2.392
Urbanisation	0.226**	-0.066	-0.051	0.030	0.079
Per Capita Income	-0.278**	0.065	0.007	0.110	-0.096
Female Literacy	0.119**	0.053**	0.040	-0.023	0.189
Girls					
School Availability	0.648*	0.114	0.014	0.123	0.899
Teacher Availability	0.605*	0.148	-0.005	0.159**	0.907
Urbanisation	-0.243**	-0.187**	-0.044	-0.096	-0.570
Per Capita Income	0.350*	0.047	0.013	0.207**	0.617
Female Literacy	0.098**	0.124*	0.060**	0.049	0.331

* Significant at the 1 % level ** Significant at the 2% level

5 Conclusions and Policy Implications

The results imply that the main impediment to education appears to be enrolling and keeping the child in the Class I. Once this has occurred, the likelihood of continuing appears to be driven by other endogenous factors. This would, therefore, suggest that a reduction in the size of classes would lead to an improvement in the continuation rate of boys from Class I to Class II. This would also appear to hold true for encouraging completion of primary schooling by boys. Translated into policy action this would require that there should be at least one teacher available for teaching Class I students in all schools, particularly where multi-grade classes are held. On the other hand, the policy for improving the continuation of girls from Class I to Class II would appear to be a mixture of the policy to introduce one teacher specifically devoted for Class I teaching coupled to an increase in the number of schools available.

The estimates of elasticities provide us with a better understanding of the mix of costs between teachers and schools. If the objective is to maximise the benefits within an environment of budgetary constraints, then the results would suggest that the input choices could also include improvements in continuation rates.

The elasticity for the teacher:student ratio is about 2.5 times higher for boys' continuation than that for girls'. It, therefore, emerges from the analysis that the policy should be that, on the margin, the recruitment of teachers for boys' schools would maximise gains in continuation.

The results show that the opportunity cost for boys' education, measured through the per capita income, is much higher in the case of boys than for girls. If the objective is to attain the goal of Universal Primary Education, then effective legislation must be introduced to encourage employers to create opportunities for providing schooling to the children they employ, particularly for the boys.

The very low completion ratios of boys from NWFP and both sexes in Balochistan in comparison to the rates prevailing in the other provinces indicates that both the former provinces should concentrate on creating an environment where continuation within the primary schooling system is encouraged and improved. In the other provinces, the policy for improvement would be as suggested earlier.

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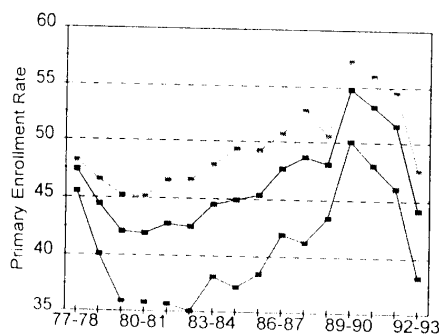
Continuation Rates in Primary Education

A Study of Pakistan

I Introduction

Research into the causes of economic and social development has clearly established that education is a cornerstone and that primary education is its foundation. Completed primary education helps in alleviating poverty, increase paid employment, improve earning levels and productivity, reduce fertility and morbidity and generally inculcate "modern" attitudes of both genders. Adults with completed primary education are more likely to send their children to schools and keep them there [Lockheed, 1991]. The correlation between economic growth and investment in education is striking. In the developed and newly industrialised countries there has been a substantial increase in investment in education which has created a population with an increased level of cognitive and problem solving skills. The developing countries, however, have been unable to enroll and teach comparable proportions of the children. Despite increasing gross enrollment rates, lower than 60 percent of children enrolling in primary schools in the low-income countries and not more than 70 percent in the middle-income countries complete primary education. Moreover, these completion rates have declined over the past decade, and most of the drop-outs occur in the initial years of schooling. The problem appears to be more acute for girls. All of these general observations are also valid for Pakistan. Figure 1, for instance shows that

Figure 1
Completion Ratios



the completion ratios for annual intakes from 1973-74 onwards have been increasing until 1989-90 and have since then declined for both boys and girls. Table I reflects this pattern of continuation from Class I to Class II. The average drop-out, see Table 1, after the first year of schooling for Pakistan as a whole in 1974-75 was 30.1 percent and by the end of the cohort's entrance to Class V an additional 18.4 percent of the enrolled students had dropped-out. In subsequent years continuation with primary schooling appears to have improved to reach a peak in 1988-89 after which a decline is observed. Causes for the decline may be numerous. Literature suggests

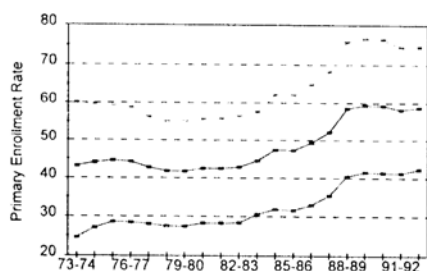
that the principal causes of decline may be attributed to (a) accessibility, particularly in the rural areas [Lockheed, 1991; Anderson, 1988], (b) a general lack of resources, including teachers, equipment, materials, (c) household and production chores, and (d) distance from residence linked to availability of transport [CLRID/WE1, 1984; ICLD, 1974]. It has also been argued that repetition and dropping out can result from family and student characteristics that affect the demand for education and policies that are ineffective [Lockheed, 1991].

Intake Year	Pakistan	Punjab	Sindh	NWFP	Balochistan
Overall					
1973-74	69.9 (47.4)	70.7 (50.9)	70.8 (46.9)	70.9 (37.8)	46.0 (27.5)
1987-88	71.8 (51.5)	81.4 (57.3)	75.5 (61.2)	52.8 (35.9)	37.5 (20.0)
1991-92	62.0	61.5	78.5	56.9	28.8
Boys					
1973-74	71.1 (48.2)	73.2 (55.5)	69.9 (42.2)	71.9 (37.9)	46.7 (29.4)
1987-88	74.6 (54.5)	97.3 (68.5)	72.7 (62.9)	49.0 (33.4)	36.9 (20.0)
1991-92	65.0	72.3	77.9	47.4	29.0
Girls					
1973-74	67.1 (45.5)	66.2 (42.5)	73.8 (62.4)	65.7 (37.3)	43.4 (20.9)
1987-88	66.6 (46.0)	63.6 (44.7)	83.4 (56.4)	70.4 (47.8)	40.5 (20.3)
1991-92	57.0	50.0	80.4	92.4	28.5

Note: Figures in parenthesis are cohort completion rates

SOURCE: Government of Pakistan, Federal Bureau of Statistics; Pakistan Statistical Yearbook (several issues); Governments of the Punjab, Sindh, NWFP and Balochistan; Development Statistics (several issues from each province).

Figure 2
Primary Enrollment Rates



Pakistan has one of the poorest indicators of educational development in the South and South-East Asian countries. Illiteracy is high estimated to be 65 percent in 1992-93 and primary enrollment rates are substantially lower than in the region. Hasan, 1996: UNICFC'. 1995J even though there has been a substantial expansion in infrastructure in recent years. Estimates of primary enrollment indicate that it is increasing at a faster pace than the growth in population of the relevant age cohort (5-9 years) and the number of primary level educational

institutions and that this is true for both boys and girls (Table 2) but the growth rates for primary enrollment is generally higher for girls than it is for boys, except in the province of Sindh. However, from the data presented in Figure 2 it would appear that the primary enrollment rate has peaked in the late eighties and has since more or less remained constant. This would tend to indicate that enrollment has been driven traditionally by supply factors and only lately have demand factors become a part of the decision process to enroll children and permit them to complete their education at the primary level.

Table 2
Annual Growth Rates in Primary Enrollment and Cohort Population
1973-74 to 1992-93

	Pakistan	Punjab	Sindh	NWFP	Balochistan
Primary Enrollment Rate					
Average	4.94	4.89	4.00	5.85	8.77
Boys	4.51	4.16	4.06	5.35	8.64
Girls	5.87	6.09	3.83	7.76	9.30
Cohort Population					
Total	2.98	2.15	3.42	3.46	7.22
Boys	2.92	2.14	3.16	3.60	7.28
Girls	3.05	2.16	3.79	3.30	7.16
Number of Schools					
Total	4.39	4.09	3.25	6.39	7.20
Boys	4.37	4.00	2.93	6.45	7.87
Girls	4.44	4.23	4.60	6.14	3.10

.Source: Government of Pakistan, Federal Bureau of Statistics; Pakistan Statistical Yearbook (several issues); Governments of Punjab, Sindh, NWFP and Balochistan: Development statistics (several issues from each province).

Traditionally drop-out rates have been used to estimate rates of return from schooling [Behrman, 1991; Psacharopoulos, 1985]. Subjective research on explaining the influence of specific factors on drop-out or continuation at the primary level has only been undertaken in only a very few instances [Lockheed, 1991; Anderson, 1988, CERID/WEI, 1984; ICED, 1974]. Recent research on enrollment and completion in Pakistan is scarce and the most recent study [Khan, 1987] shows that during the period 1977-78 to 1982-83 drop-out rates are higher generally for girls in relation to boys and in rural areas compared to urban areas. *except* for urban Sindh where the drop-out for boys exceeded that for girls. The highest drop-out for girls was in both urban and rural Sindh and the lowest drop-out across gender and residence was observed in the case of boys in the Punjab. However, no clear trend emerges from a study of the drop-out rates. An analysis of class-wise drop-outs shows the highest level of attrition in the transition from Class I to Class II. *One* possible explanation for this may be the result of an exaggeration in the enrollment levels for Class I, resulting from the inclusion of pre-school age who are temporarily allowed to audit classes with a view to acclimatise them and as a proxy for relieving over-worked parents of child care.

This paper attempts to present an analysis of the causative factors affecting continuation of education at the primary level using data from the four provinces of Pakistan. Section 2 presents the methodology used to arrive at the estimates of continuation and the specifications of the model used to explain the causes of continuation. Section 3 presents the data on primary education and its shortcomings. Section 4 presents the results of the model and Section 5 draws conclusions from the analysis and suggests the policy implications.

2 Methodology

Continuation rates for children completing primary schooling is defined as that proportion of children of an entry cohort who complete the final year (in Pakistan 5 years after entering) of primary level classes. The continuation rate for primary school education by a cohort may therefore, be computed from the following:

where C_i = Continuation Rate in the i th class
 $i = 2, 3, 4, 5$

If we take a cohort of children who entered the schooling system in year t , then the continuation rates are:

$$\text{overall continuation ratio} = C_{t+1}^2 + C_{t+2}^3 + C_{t+3}^4 + C_{t+4}^5 \quad (1)$$

We may, therefore, estimate the probability of exiting from each of the five classes which cumulatively constitute primary schooling.

The probability of exit in Class 1 after 1 year's of schooling is:

$$P_1 = (1 - C_2)$$

The probability of exit in Class 2 after 2 years' of schooling is:

$$P_2 = C_2 * (1 - C_3)$$

The probability of exit in Class 3 after 3 years' of schooling is:

$$P_3 = C_2 * C_3 * (1 - C_4)$$

The probability of exit in Class 4 after 4 years' of schooling is:

$$P_4 = C_2 * C_3 * C_4 * (1 - C_5)$$

The probability of exit in Class 5 after 5 years' of schooling is:

$$P_5 = C_2 * C_3 * C_4 * C_5$$

Using these estimates of probability we compute that the:

$$\text{verage Length of School Stay by a Cohort} = 1 * P_1 + 2 * P_2 + 3 * P_3 + 4 * P_4 + 5 * P_5 \quad (2)$$

and also are able to compute the elasticity of completion, ϵ_c , from

From Equation 5 we can identify the output elasticities - α , β , γ - and test for constant returns to scale.

The vector of exogenous variables Z can consist of the following:

- U = extent of urbanisation, that is, share of urban population in total population of the province,
- FL = female literacy rate of the province, and
- Y = per capita Gross Regional Product of the province [Bengali 1995].

3 Data and Constraints

Data on enrollments, numbers of schools and the availability of teachers is compiled initially by the Directorates of Education in each of the provinces Pakistan. This is published erratically by the Directorates and the level of disaggregation by gender and by locality is inconsistent both inter-provincially and within each province. This appears to be the result of the varying policies adopted by each of the Directors who change frequently. A more consistent time series is, however, published by each of the Bureaux of Statistics of the provinces, and by the Central Bureau of Education of the Ministry of Education, Government of Pakistan. The data from the Central Bureau of Education is available for the period 1972-73 to 1

We have adjusted the available data to arrive at a closer estimate of the number of primary schools and primary school teachers rather than use the published data for the reasons stated later. The total number of schools are reported separately for primary (Classes 1 to V) middle (Classes 1 to VII), and high (Classes 1 to X). Thus there appears to be an overlap in the definition of schools. To arrive at a closer estimate of the number of primary level institutions, we have aggregated the three categories of schools as each contain the primary school level classes. A similar situation exists where number of teachers are reported. We have adjusted for the availability of teachers by first deriving the number of teachers per school. If the number exceeded 8 for middle schools and 10 for high schools, we have assumed that the full complement of five teachers were available for primary level classes in these schools. The product of 5 and the respective numbers of schools was then added to the published statistics on primary school teachers. This was confirmed by discussions with several directors of education. Where the number was lesser than this threshold level, we have then derived the teacherclass ratios for each of these two latter categories of schools and applied this ratio to the five primary classes. Thus the cross product of this ratio, the number of primary classes and the number of respective schools gave us a truer estimate of the number of primary school level teachers in these categories of schools.

Estimates of female literacy are issued by the Planning and Development Departments of each of the provinces and have been assumed to be correct.

4 Results

In order to understand what has been happening to drop-out rates in the primary schooling system in Pakistan, the pattern of drop-outs over the years needs to be studied at length. Table 3 presents the average drop-out rates for Pakistan's provinces and the pattern which emerges from a perusal of this data shows that the drop-out rate for boys in Sindh has declined over the period and in Balochistan has remained relatively constant. In the context of girls' drop-out rates have increased in the earlier years, but has since been declining.

Table 3 Average Drop-out rates by Province by Gender

%

Entry Year	GIRLS				BOYS			
	Punjab	Sindh	NWFP	Balochistan	Punjab	Sindh	NWFP	Balochistan
1974-75	14	17	20	27	12	15	17	27
1975-76	14	18	20	28	19	9	12	27
1976-77	13	17	25	15	22	10	21	34
1977-78	12	20	37	23	22	13	29	29
1978-79	14	20	21	29	24	13	36	28
1979-80	11	20	23	29	21	14	42	27
1980-81	13	20	22	29	25	14	22	26
1981-82	13	20	23	28	23	15	31	25
1982-83	13	20	19	19	23	16	27	17
1983-84	11	18	24	27	16	13	28	17
1984-85	6	20	22	26	21	16	18	30
1985-86	14	17	18	29	22	17	19	23
1986-87	7	21	16	31	17	18	15	30
1987-88	9	13	15	31	14	10	12	28
1988-89	3	14	14	22	12	13	14	17
1989-90	12	9	19	34	16	15	9	32
1990-91	14	11	26	32	22	15	17	32
1991-92	14	11	28	25	21	13	16	30
1992-93	15	10	19	23	21	13	3	31

Computing the continuation rates by gender and by province from the methodology stated in section 3, we see from the averages presented in Table 4 that Punjab has the highest average completion rates for each class and Balochistan the lowest, for both boys and girls. In the Punjab, the peak is achieved in the completion rate for Class III for both boys and girls. This is also

rue for NWFP and Balochistan. In Sindh, however, the average completion rate increases as students, both boys and girls, complete each successive ladder in the schooling cycle.

TABLE 4
Continuation Rates by Class by Province and by Gender
Average for the Period

Class	Punjab	Sindh	NWFP	Balochistan
Boys				
I-II	78.3	71.8	49.8	43.7
II-III	89.9	84.0	86.7	82.3
III-IV	94.5	86.1	88.8	85.6
IV-V	89.8	91.6	87.5	81.8
Girls				
I-II	55.0	77.9	60.5	43.9
II-III	89.5	86.6	85.3	82.0
III-IV	90.6	87.1	86.7	84.2
IV-V	86.4	93.5	86.0	82.6

In Table 5 we present the estimate of the proportion of children of different cohorts. unpleting primary schools both by province and by gender. Once again no consistent pattern emerges. In the context of girls, both Punjab and NWFP show a decline in the initial years and ten an increase. The reverse apperas to be the case in Balochistan. In Sindh we see a gradual declining trend line. In the context of the boys, the Punjab shows a reversal from the pattern from that for girls, that is, there is an increase in the initial years and a decline, thereafter. The completion rates for boys in the Sindh would appear to show an increasing trend over time. This is, however, reversed in the context of the boys in both NWFP and Balochistan.

Table 5

Proportion of Children of Different Cohorts Completing Primary Schooling

Entry Year	GIRLS				BOYS			
	Punjab	Sindh	NWFP	Baluchistan	Punjab	Sindh	NWFP	Balochistan
1973-74	43	62	37	21	55	42	38	29
1974-75	36	61	32	22	53	42	38	29
1975-76	33	56	19	23	54	40	34	29
1976-77	33	55	23	23	56	40	30	25
1977-78	33	53	24	23	57	40	35	24
1978-79	32	52	26	34	57	40	33	27

1979-80	36	53	25	36	58	41	35	28
1980-81	35	52	26	4.3	62	41	34	28
1981-82	37	49	28	41	62	43	33	29
1982-83	40	52	34	35	65	43	35	28
1983-84	40	52	36	26	70	45	36	28
1984-85	43	52	40	22	60	45	40	27
1985-86	51	53	47	21	75	54	40	21
1986-87	48	56	44	21	70	62	36	20
1987-88	45	56	48	20	68	63	33	20
1988-89	35	53	59	17	53	65	30	19

Results from the estimation for probability of completion and the computing for the average years of schooling shown in Table 6. The results indicate that the probability of completion has been improving generally over time until the mid 1980s, after which these probabilities irrespective of gender and province have been declining except in the case of girls in Sindh. The average length of stay in primary schools reveals a mixed trend. In Punjab the number of years spent by both boys and girls has declined from the cohort starting in 1973-74 until the one which entered in 1982-83. After this the average stay in schools has increased to or beyond the initial years. The average stay of boys in Sindh has seen a sharp increase in the late 19⁸⁰s. The pattern (or girls stay in schools in Sindh follows the same pattern shown by Punjab the results for both boys and girls from NWFP shows the same pattern. In Balochistan, however, the average stay has peaked around the early 1980s and has since then declined.

In equation (5) we had suggested the possible factors which may explain these variations in continuation rates. Table 7, presents the class-wise results of the application of the equation to the pooled data for the four provinces. It would appear that highest impact on continuation appears to be by the availability of teachers generally in the context of boys and the magnitude is the highest in the first year of schooling. In the case of girls, the availability of schools would appear to have the most positive impact on the continuation of schooling. This is, however, offset by the negative impact of urbanisation. As in the case for boys, the magnitude of the impact of the variables is highest in the first year of schooling. For both boys and girls the significance of the impact of each of the demand side factors are, that is urbanisation, per capita income and female literacy, is very high in the decision of families to permit continuation beyond the first year, even though their contribution may be small in comparison to the supply side factors, namely the availability of schools and teachers.

TABLE 6
PROBABILITY OF COMPLETION AND AVERAGE STAY IN SCHOOLS

Year	PUNJAB				SINDH				NWFP				Balochistan			
	Probability of Completing Schools		Average Years of Schooling		Probability of Completing Schools		Average Years of Schooling		Probability of Completing Schools		Average Years of Schooling		Probability of Completing Schools		Average Years of Schooling	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
1973-74	55.5	42.5	3.5	3.1	42.2	62.4	3.1	3.7	37.9	37.3	3.3	3.2	29.4	20.9	2.5	2.3
1974-75	53.2	36.2	3.6	3.1	41.8	60.8	3.1	3.8	37.5	32.2	3.2	3.3	28.8	22.0	2.6	2.3
1975-76	53.5	33.3	3.6	2.9	40.1	55.8	3.1	3.6	33.9	19.1	2.7	2.4	28.7	23.4	2.7	2.4
1976-77	55.9	32.6	3.6	2.8	39.8	54.7	3.1	3.6	29.7	23.3	2.5	2.5	25.3	22.8	2.5	2.4
1977-78	56.5	32.6	3.7	2.7	39.8	53.3	3.1	3.5	34.9	24.1	2.7	2.4	24.0	23.5	2.4	2.5
1978-79	57.4	31.5	3.8	2.6	39.7	51.9	3.1	3.5	32.8	26.3	2.6	2.4	27.4	34.1	2.5	2.7
1979-80	58.1	35.9	3.7	2.8	41.5	53.1	3.1	3.5	35.0	24.7	2.7	2.3	28.4	36.4	2.5	2.7
1980-81	62.3	35.0	3.8	2.8	40.8	51.6	3.1	3.5	34.3	25.9	2.6	2.2	28.3	42.5	2.6	2.9
1981-82	61.9	37.0	3.8	2.7	42.8	49.0	3.2	3.5	33.5	28.2	2.5	2.3	29.0	40.9	2.7	3.0
1982-83	65.2	40.5	3.9	2.7	43.1	52.1	3.2	3.5	34.7	34.0	2.5	2.5	28.4	34.7	2.6	2.6
1983-84	69.6	39.7	4.2	3.0	44.9	52.2	3.2	3.5	35.7	36.4	2.5	2.6	27.9	25.8	2.6	2.3
1984-85	60.3	42.6	3.6	3.0	44.9	51.9	3.2	3.4	40.0	40.0	2.6	2.8	27.5	21.8	2.4	2.2
1985-86	74.9	51.0	4.3	2.9	53.7	53.4	3.4	3.5	40.2	46.7	2.7	3.1	21.1	20.9	2.1	2.1
1986-87	69.9	47.9	4.2	3.1	61.9	56.0	3.7	3.7	36.1	43.7	2.7	3.2	20.1	20.6	2.1	2.1
1987-88	68.5	44.7	4.3	3.1	62.9	56.4	3.7	3.7	33.4	47.8	2.6	3.4	20.0	20.3	2.1	2.2
1988-89	53.0	34.6	3.5	3.1	65.4	53.2	3.8	3.5	30.4	59.3	2.5	3.7	18.8	17.3	1.9	2.1

Table 7 Regression Results (Dependant variable is class-wise continuation rate)

Indicator	Class II	Class III	Class IV	Class V
Boys				
School Availability	0.705 (7.77)*	0.238 (3.78)*	0.062 (1.11)	0.145 (2.76)*
Teachers Availability	1.170 (8.61)*	0.505 (4.73)*	0.251 (2.41)*	0.465 (4.29)*
Urbanisation	0.781 (2.43)*	-0.226 (-1.27)	-0.176 (-1.11)	0.103 (0.60)
Per Capita Income	-0.00008 (-2.16)*	0.00002 (0.93)	0.000002 (0.11)	0.00003 (1.60)
Female Literacy	0.009 (2.45)*	0.004 (2.01)*	0.003 (1.60)	-0.002 (-0.85)
R ²	0.84	0.30	0.14	0.44
F-Statistic	50.11	6.83	3.333	9.92
Girls				
School Availability	0.648 (9.67)*	0.114 (1.54)	0.014 (0.25)	0.123 (1.81)
Teachers Availability	0.605 (7.22)*	0.148 (1.95)	-0.005 (-0.07)	0.158 (2.11)*
Urbanisation	-0.837 (-2.31)*	-0.644 (-2.55)	-0.15 (-0.70)	-0.329 (-1.23)
Per Capita Income	0.0001 (2.74)*	0.000014 (0.54)	0.000004 (0.86)	0.00006 (2.22)*
Female Literacy	0.007 (2.11)*	0.009 (3.87)*	0.004 (2.18)*	0.004 (1.39)
R ²	0.80	0.18	0.01	0.27
F-Statistic	56.64	3.95	1.17	5.98

To arrive at the elasticity of the continuation ratios, we multiply the coefficients of the exogenous demand factors by the average value for the country. These elasticities are shown in Table 8. The highest elasticity is for the availability of teachers in the case of boys. In other words, increasing the number of teachers per student leads to an increase in the probability for completing each class. However, in the case of girls, the highest elasticity is the availability of schools generally, except in the case of girls in Class V where the per capita ' income appears to have the highest elasticity. The aggregate elasticity for completing primary

schooling appears to be highest for the availability of teachers for both genders, followed by that I school availability.

Table 8

Elasticities of Continuation Ratios

Indicator	Class II	Class III	Class IV	Class V	Elasticity of Probability of Completing School
Boys					
School Availability	0.705*	0.238*	0.062	0.145*	2.150
Teacher Availability	1.170*	0.505*	0.251**	0.466*	2.392
Urbanization	0.226**	-0.066	-0.051	0.030	0.079
Per Capita Income	-0.278**	0.065	0.007	0.110	-0.096
Female Literacy	0.119**	0.053**	0.040	-0.023	0.189
Girls					
School Availability	0.648*	0.114	0.014	0.123	0.899
Teacher Availability	0.605*	0.148	-0.005	0.159**	0.907
Urbanization	-0.243**	-0.187**	-0.044	-0.096	-0.570
Per Capita Income	0.350*	0.047	0.013	0.207**	0.617
Female Literacy	0.098**	0.124*	0.060**	0.049	0.331

* Significant at (lie 1 % level **
Significant at the 2% level

5. Conclusions and Policy Implications

The results imply that the main impediment to education appears to be enrolling and keeping the child in the Class I. Once this has occurred, the likelihood of continuing appears to be driven by other endogenous factors. This would, therefore, suggest that a reduction in the size of classes would lead to an improvement in the continuation rate of boys from Class I to Class II. This would also appear to hold true for encouraging completion of primary schooling by boys. On the other hand, the policy for improving the continuation of girls from Class I to Class II would appear to be an increase in the number of schools available however, to encourage the completion of schools, both an increase in the availability of spools and of teachers would appear to be the policy package.

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