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LANDED POWER AND RURAL SCHOOLING IN PAKISTAN*

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Anecdotal evidence from rural Pakistan suggests that large landlords are opposed to education since it could cause attitudinal changes that challenge the existing order or cause the emigration of potential labor to towns and cities. Combining a political economic perspective with the human capital demand and supply for schooling model, we use a simultaneous limited dependent variable model to investigate the impact of relative and absolute landed power on the demand for schooling. Our findings show that large landlords have an adverse impact on village educational attainment.

I. Introduction

Anecdotal evidence from rural Pakistan suggests that large landlords oppose education since it could cause attitudinal changes that challenge the existing social order or cause the emigration of potential labor to towns and cities. In addition, if education is one means of gaining access to formal sector jobs, large landlords may have an incentive to confine such jobs to influentials.

Contrary to this, some believe that there is now a groundswell of popular support for rural schooling and a landlord's successful lobbying of the government for a village school may win village goodwill. This in turn could result in being able to "deliver" votes in future local, provincial, or national elections. The political capital obtained from delivering votes is an important way of enhancing personal prestige and power.

Another reason for big landlords to encourage education is that it may complement modern farming practices that accompanied the "green revolu-

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tion." Lockheed, Jamison and Lau surveyed thirty-one studies of education and farm productivity and concluded, with appropriate reservations, that farmer productivity appears to be significantly associated with middle level education, particularly in a modernizing agricultural environment [Lockheed and Lau, (1980)]. Landlords may therefore have an interest in encouraging education to have more productive tenants.

Thus, *a priori,* it is difficult to say what the influence of large landlords would be on rural schooling. Our main objective in this study is to investigate how large landlords affect the demand and supply of rural schooling. From a policy perspective, this hypothesis is important to test because an additional case for land reforms can be made if large landlords deter schooling.[1]

This work follows that of other researchers who have explored various aspects of schooling using the human capital model.[2] We contribute to this literature by introducing and testing an important hypothesis about the impact of large landlords on rural schooling that, to the best of our knowledge, others have not tested.

Our results for rural Pakistan support the findings of Alston and Ferrie's research in USA [Alston and Ferrie, (1989), p.189]. They argue that the Southern white rural elite effectively exerted social control through political and social legislation to ensure cheap and dependent labor. Examples of such legislation included "low levels of expenditure on education, old-age security and welfare."

The data description and definition of landed power are contained in the second section, the analytical framework and estimation model are presented in the third section and the results are discussed in the fourth section.

II. Data and Definition of Landed Power

The data used in this study is drawn from the Rural Income Distribution Survey (RIDS) conducted in Pakistan by the Punjab Economic Research Institute (PERI) with World Bank funding in 1986. A multistage stratified random sampling technique was used by PERI to select 3,000 households from the provinces of NWFP, Punjab and Sindh and an additional 200 households from Balochistan. Districts thus formed the first stage in the selection process, and within districts, villages were randomly selected after having determined the

[1] Other cases for land reforms could be based on an inverse association of farm size and productivity or some criteria of social justice. On these issues, see, Herring, (1983), Chapters 9 and 10.

[2] These include, King and Lillard, (1987), Jamison and Lockheed, (1987), Moock and Leslie, (1986), Jamison, (1986), Chernichovsky, (1985), Behrman and Wolfe, (1984), Birdsall, (1980), Birdsall and Cochrane, (1982), and, Birdsall, (1985).

overall household sample based on acceptable sampling errors. In all, 180 villages were included in the samplle.

The census of all rural households served as a sampling frame for the selection of households within villages. The two strata in the villages were farm and non-farm households. All households were listed in descending order according to farm size for farm households or income for non-farm households. The household selection was then done systematically with a random start. The representation of the two strata in the sample was proportionate to their population in the village. Thus, the data set was nationally representative of rural areas.

This data set does not provide village level information on the existing social infrastructure and on the size distribution of land ownership by village. Using the information on land ownership, we constructed three variables to represent landed power. Two are measures of relative landed power (RLP), which were alternatively defined as the largest land holding as a percentage of total village land holding in the sample and the gini coefficient of village landholding. The third represents a measure of absolute landed power (ALP), which is the absolute size of the largest land holding in the sample.[3]

Since landownership is a crucial explanatory variable for our analysis, we compared the size distribution of land ownership from the Rural Income Distribution Survey with that of the Pakistan Agricultural Census data.

Table 1 reveals that the basic structure of land ownership in the three data sets is similar. The major difference is that relative to the 1980 and 1990 Agricultural Census data, there is a sizable under-representation of the smallest farm size category and an over-representation of the second (5 - < 12.5) size category in all provinces. For our hypothesis, the structure of farm size on the upper scale is more important. In all provinces except Balochistan, there is an over-representation in the largest farm size category (> 50 acres). This oversampling is useful from our point of view.

III. Analytical Framework and Estimation Model

Our approach combines the human capital model as developed by Becker and Lewis, (1974), and DeTray, (1974), with a political economic perspective. We assume that households act as rational welfare maximizing agents. Thus, the decision making unit is the household rather than the individual, as is normally the case in the theory of consumer choice.[4] Decisions are rational in

[3] We dropped villages from our analysis for which less than five sample households provided informations.

[4] For rural Pakistan, one could imagine the head of the household as being a dictator making decisions in the best interest of the household; or, more likely, decision making resulting from a consensus

TABLE 1

Percentage Distribution of Households by Farm Size and Province, 1980, 1990 and 1986

Provaince/ Farm Size	BALUCHISTAN			NWFP			PUNJAB			SINDH		
	1980	1990	1986	1980	1990	1986	1980	1990	1986	1980	1990	1986
< 5	28	23	10	62	69	51	31	46	28	26	34	12
			(7)			(127)			(346)			(33)
5 - < 25	54	55	78	34	27	42	58	45	60	68	60	72
			(56)			(103)			(755)			(187)
25 - < 50	10	13	8	3	2	2	7	5	7	5	4	12
			(6)			(6)			(92)			(31)
> 50	7	10	4	2	1	5	2	2	5	2	2	4
			(3)			(12)			(56)			(9)
Total Households			72			248			1,249			260
			(4)			(14)			(68)			(14)

Notes: Percentages may not add to a hundred due to rounding errors. Parentheses contain category observations except in row five in which they represent percentages.

Sources: Pakistan Census of Agriculture, 1980 and 1990, All Pakistan Report, Lahore: Agricultural Census Organisation, Statistics Division, 1983, 1992. For 1980, pp.74, 146, 218 and 290; and for 1990, pp.9, 15, 21 and 27. For 1986, the Rural Income Distribution Survey (RIDS), on which this study is based.

that choices are consistent with enhancing household welfare. Family welfare is constrained by income and time. Therefore, in simple terms, the behavioral framework for the family can be depicted as the maximization of a welfare or utility function subject to budget and time constraints.[5]

This approach has been utilized for estimating the demand for schooling. We believe that the demand for schooling in rural Pakistan, and other similar environments, should take rural power realities into account. Large landlords could directly influence the demand for schooling by intimidation. In addition, the presence or absence of a village school, and therefore the distance of a household from a village school, could be influenced by large landlords.

We use educational attainment to represent the household demand for schooling and estimate it jointly with a schooling supply equation where distance of the school from the village represents the supply of schooling for the household. This variable is also included as a proxy for price in the attainment equation. Since the educational attainment variable is left censored (i.e., we do not observe the desire for schooling among those with zero attainment), using ordinary least squares would result in biased and inconsistent coefficients.[6]

As recognized by Birdsall, the Tobit model is appropriate for estimating attainment functions in such situations [Birdsall, (1982), p.65]. We have a latent variable (A^*) representing the "desire for schooling" in the following attainment function:

$$A_j^* = \alpha_1 + \theta_i R_i + \gamma_j S_j + \lambda_k LP_k + B_1 EXPEN + B_2 CD + \varepsilon \qquad (1)$$

where i represents provincial dummies, j school levels and k alternative measures of landed power as follows:

among the adult members of the household, especially males. Strong preferences expressed by children, particularly about schooling are often taken into account although adults may over-rule a child, particularly over the continued education of pubescent girls or where the opportunity cost is high. Higher earnings contributed to the household could in turn enpower young adults. There is in practice the possibility of conflicting preferences within the household which we do not model. Our operational assumption is that households in rural Pakistan act as a unit although observed decisions are likely to result from a complex and changing process. On these and other cultural and institutional issues regarding schooling in South Asia, see, King and Hill, (1993).

[5] A set of demand equations, including that for schooling, could be derived by solving some version of the simple general model represented by the utility function and income and leisure constraints. Because all these equations are functions of the same exogenous variables, each demand equation can in principle be estimated separately. On this point, see, Birdsall, (1982), p.30; and Rosenzweig, (1980), pp.12-13.

[6] If illiterates were for some reason excluded from the sample, it would be truncated, and we would need to use a different estimation technique. Thirty five per cent of the total sample had no schooling at all.

R_i = dummy variables representing Punjab, Sindh, NWFP and Balochistan.

S_j = variable representing the distance of the village from a primary, middle or high school for boys. The three variables for the three separate equations are PB, MB, and HB.

LP_k = variables representing landed power defined above as ALP for absolute landed power and RLP as relative landed power.

EXPEN. = household expenditure as a proxy for permanent household in come.

CD = distance from a civil dispensary as a proxy for access to health services. Good health can be viewed as leading to better attend ance and hence higher educational attainment.

Let A represent the observed educational attainment variable and T the threshold level of desire of schooling beyond which these desires are observed. Thus

$$\text{if } A^* < T, A = 0$$

$$\text{if } A^* > T, A = A^*$$

Ordinary least squares would fail to account for the qualitative difference between the limit observations (illiterates in this case) and the non-limit continuous observations (positive educational attainment).[7]

To allow for the completion of the respondents education and yet for their educational experience to be recent enough to be influenced by the current structure of land ownership, we selected the educational attainment of the 20-25 age cohort as the dependent variable.[8] Since females in the 20-25 cohort are likely to have married into the household they are living in, none of our

[7] Tobit uses the maximum likelihood method such that the first discrete part of the likelihood function denotes the product over zero education and the second continuous part the product over positive education [Greene, (1993), pp.691-704].

[8] The average college student could be expected to graduate with a bachelor's degree at about the age of nineteen years. We chose 25 years as a cut-off because the schooling attainment cross-tabulation with age showed a significant drop after 25 years. Working with the 20-25 years old cohort enables us to avoid the right censoring poblem but forces us to assume that household, school and community conditions at the time of the survey are relevant for our selected sample. For our main variable of interest, landed power, such an assumption appears justifiable since there has not been radical land reforms in Pakistan since the seventies (or even before), and the oldest in our 20-25 year cohort started school in the early seventies. However, in other cases, such an assumption would be less warranted, for example, in using current household expenditure or using current household composition to identify sibling effects of schooling. In principle we could have confined our analysis to a younger cohort by only looking at the probability of primary school completion. However, given that over half of our sample attained more than the five year of primary schooling, this approach does not utilize all the available information.

variables would be of relevance to them. A younger aged cohort such as 10-19 would give biased estimates since the educational experience for some would be incomplete or right censored.[9]

The attainment functions [equation (1)] were estimated jointly with the following supply equation:

$$S_j = \alpha_2 + \xi_i R_i + \lambda_2 LP + \beta_3 ELECT + \varepsilon_2 \quad (2)$$

where the school distance variables (S_j) represent the supply of schooling to the household. Apart from provincial and landed power variables, the equation was identified by including village electrification (ELECT.) as an explanatory variable. The presence of electricity in the village represents a proxy for the un-observable village influence with the government, which is the predominant provider of schools in rural Pakistan.[10]

IV. Findings

We first estimated the Tobit educational attainment equations jointly with distance from schooling for the primary, middle and high schools [as represented by equations (1) and (2)]. The equations seek to identify the desire for schooling based on access to a particular level of schooling, landed power and other variables described earlier. In each case, we conducted an exogeneity test which revealed that the demand for education was determined independently of supply.[11] Thus, we estimated the attainment equation (1) and the supply equation separately and these are reported in Tables 2 and 3.

Since we did not have priors about the precise form of the association of landed power and schooling we tested for non-linearities and were not able to

[9] It is possible to econometrically adjust for right censorship by estimating hazard functions. However, in order to do so, it is necessary to be able to identify current students. Unfortunately, we were unable to identify current students due to reporting errors. Even though the total population in the 10-19 age group was 3,770, only 389 reported their current occupation as students. What made this response suspect was that we apparently have zero students in this time period in Sindh and Baluchistan. Also, about fifty per cent of the students were of the age of thirty or above, which seems highly unlikely. It appears, perhaps due to the interpretations of the interviewers, that some respondents perceived they were being asked about ever having been students whereas others, notably in Sindh and Baluchistan, did not perceive being students as an occupation. For a survey of the use of hazard functions see, Keifer, (1988), pp. 646-679.

[10] Electricity could in principle have a positive impact on educational attainment via making more study time available and hence may belong in the demand equation. We tested this hypothesis by including it in the demand equation and found it to be insignificant in all cases.

[11] If the t-test suggests that the coefficient of correlation of the error terms of the two equations is not significantly different from zero, we accept the null of exogeneity. For all three equations, we accepted the null of exogeneity.

TABLE 2

Tobit Educational Attainment functions
(Dependent Variable: Educational Attainment)

	PB		MB		HB	
	β	Marginal	β	Marginal	β	Marginal
Constant	2.630**	1.9650	1.182	1.380	3.238*	2.415
	(2.25)		(1.58)		(2.79)	
Punjab	1.193	0.8910	1.404	1.069	1.104	0.823
	(1.06)		(1.31)		(1.02)	
Sindh	1.359	1.0160	0.968	0.737	1.469	1.096
	(1.01)		(0.77)		(1.16)	
NWFP	-1.314	-0.9820	-0.399	-0.304	-1.758	-1.311
	(1.10)		(0.34)		(1.49)	
HB					-0.150*	-0.112
					(3.98)	
MB			-0.036	-0.028		
			(0.54)			
PB	-0.020	-0.0150				
	(0.18)					
EXPEN.	0.001	0.0008	0.002	0.002	0.004	0.003
	(0.44)		(1.02)		(1.60)	
CD	-0.142*	0.1060	-0.126*	-0.096	-0.133*	-0.099
	(6.88)		(5.68)		(6.44)	
ALP	0.069*	0.0510	0.089*	0.067	0.072*	0.054
	(9.25)		(11.04)		(10.02)	
ALPSQ	-0.002*	-0.0013	-0.003*	-0.002	-0.002*	-0.001
	(9.09)		(10.08)		(9.55)	
Log Likelihood	-3,361.160		-3,526.370		-3,680.230	
n	1,384		1,441		1,519	

Source: RIDS.

Notes:

1. t-values are in parentheses. Coefficients are insignificant. *Significance at least at one per cent level. **Significance at least at the 5 per cent level. ***Significance at least at 10 per cent level.
2. No electricity in Baluchistan province = base categories for the dummy variables.
3. Variable definitions:
   HB = distance of high school for boys from village; MB = distance of middle school for boys from village; PB = distance of primary school for boys from village; CD = distance of civil dispensary from village; EXPEN. = monthly household expenditure; ELECT. = if village has electricity; ALP = Absolute landed power defined as the acreage owned by the largest village landlord in our sample.
4. All distance variables are in kilometers.

TABLE 3

School Distance Functions (OLS)
(Dependent Variable: Distance from School)

	PB	MB	HB
Constant	2.277*	1.953*	7.168*
	(5.17)	(4.29)	(7.20)
Punjab	-2.404*	1.094**	-0.049
	(5.18)	(2.35)	(0.05)
Sindh	-2.109*	1.650*	5.360*
	(4.79)	(3.09)	(4.26)
NWFP	-1.153*	0.436	-4.933*
	(2.43)	(0.85)	(4.85)
ELECT.	-0.114	0.085	-0.080
	(1.01)	(0.59)	(0.32)
ALP	0.011*	0.017*	0.010*
	(4.47)	(10.59)	(5.32)
R bar Sq	0.200	0.110	0.180
F-Stat	71.820*	38.370*	69.540*
n	1,387	1,455	1,522

Source: RIDS.
Notes: See Table-2 for variable definition.
Results corrected for heteroskedasticity.

reject (using the likelihood ratio test) the use of a quadratic term for absolute landed power.[12]

Our main finding from the attainment functions is that there is a non-linear association of landed power and schooling in rural Pakistan. Absolute land holdings upto a certain threshold appears to exercise a positive impact on the desire for schooling. Beyond this threshold, large landlords appear to have a negative impact on the desire for schooling. The large landlords may validate the assumption of the early development economists about landlords being

[12] We reinforced this finding by estimating a reciprocal version of the landed power variable. The negative coefficient in each case also suggests the existence of a non-linearity and of a threshold level in the positive relationship of landed power and educational attainment.

"prodigal consumers" and disinterested in productive investment - which is complemented by education [Baran, (1988), p.101, and Lewis, (1954), p.159]. Such a view conforms with a prevalent impression about large landlords in rural Pakistan exhibiting a luxurious lifestyle based on "skimming the cream" from extensive land holdings.

Solving the quadratic, we used the coefficients of ALP and ALPSQ to compute the threshold levels of landholdings for the three equations estimated. The threshold levels were 20.2, 16.6 and 21.0 acres for distance from primary, middle and high school, respectively. Since large landholdings are defined as 50 acres or more, our findings show that the negative effect begins with middle sized farmers.[13] Since these landlords have by definition the largest landholdings in the village sample, we continue to refer to them as large landlords.

Merely identifying a negative coefficient on the quadratic term says little about the magnitude of negative effect large landlords have on educational attainment. Thus, Table 2 also reports the marginal effects which represent the effect the independent variables have on the expected value of the dependent variable. The coefficient of the quadratic term appears to be very small but simulations show that the impact it represents is not inconsequential. In the three equations, if we increase landholdings by one standard deviation and hold all variables except the quadratic term at the mean value, the expected value of mean educational attainment declines by 0.73, 1.10 and 0.74 a year in the primary, middle and high equations, respectively.

We did not find significant coefficients for the quadratic when relative landed power (defined as the largest landholding as a percentage of the total sample) was used. However, we replicated the results mentioned above using gini coefficients as a measure of relative landed power. The coefficients were significant at the one per cent level but the t-coefficients were small. We also re-estimated the three equations in Table 2, for non-farm households and found the same non-linear effect at the same level of significance, but once again the t-statistics were not as high. In both cases, the other coefficients for the most part appeared with the same signs and with the same levels of significance.[14]

The Tobit assumes a censored normal distribution of error terms. The distribution of attainment data suggested that there were discontinuities in a roughly normal distribution. There were increasing jumps in frequencies at five years, eight years, and ten years, which represent the completion of the primary, middle and high school (median of the distribution). Since educational

[13] In *barani* (rainfed areas) a 20 acre landholding is considered substantial.

[14] The one exception was that the coefficients of household expenditures in all equations using ginis were positive and significant at the one per cent level.These results are available with the author on request.

attainment can be viewed as count data and since the mean was close to the standard deviation, we checked the robustness of our coefficients of landed power by re-estimating the equations in Table 2 using a censored Poisson model. The results are reported in Appendix (Table II). The non-linear positive/negative association of absolute landed power and schooling is once again evident in all the equations. Given that we are able to replicate our results with changes in specifications and models, we view our basic finding to be quite robust.

Household expenditure had the expected positive sign but was not significant.[15] In all cases the coefficient of distance of village from a civil dispensary has a negative sign and is significant at the one per cent level. If child health is inversely associated with distance from the civil dispensary, we would also expect an inverse association of distance from civil dispensary and attainment insofar as better health is associated with less absenteeism, lower repetition and drop-outs and better concentration and performance. The OLS estimates of the school supply equation are reported in Table 3.

Anecdotal and journalistic evidence suggests that large landlords influence the school location decision. This is also a source of frustration for aid donors. Our results in Table 3 provide support for this view since the coefficient of absolute landed power is positive and significant in all cases at the one per cent level.[16] It may seem contradictory that large landlords have a negative impact on educational attainment in the demand equation and yet they have a positive impact on the supply of schools. This apparent contradiction is resolved when one distinguishes support for schooling and lobbying for schools.

Large landlords may have reasons to welcome the construction of a *school* while still opposing *schooling*. Institutional information gleaned from interviewing federal, provincial and district officials suggests that a landlord may have more than an electoral incentive in having schools built in or close to a village. Large sum of money can be made from the "bricks and mortar" school contract. Rents can be split between officials of the Planning and Development Department, Works Department, Education Department, and the local notables. The landlord can get government employment from providing barren land and then use the building at times as an "entertainment pad." In future years, capital gains can be earned by using the *school* for justifying the building of a road through the land.

[15] A probit model with child in school or not, was taken as the dependent variable, Burney and Irfan (1991) found that household monthly income increased the probability of enrollment for both girls and boys of various cohorts. They used the 1979 Population, Labor Force and Migration Survey, which is a representative data set for Pakistan.

[16] The quadratic term was insignificant.

V. Concluding Remarks

Combining a political economic perspective with the human capital schooling model, we used a simultaneous equation Tobit model to investigate the impact of landed power on schooling in rural Pakistan. Our findings support anecdotal evidence of a negative association of landed power and rural schooling. Beyond a medium sized threshold, the large landlords in a village have an adverse impact on rural schooling. The same result holds true for land concentration measured by the gini coefficient. We expect that this occurs because big landlords are more likely to be interested in a readily available pool of a cheap docile labor force rather than the educated one that has other options. They may also be interested in confining education related opportunities to their own scions. We also found that landlords have various reasons for lobbying for schools while opposing schooling.

Distance of the village from a civil dispensary is inversely associated with school attainment. From a public policy perspective, this highlights the complementarity of rural infrastructure.

Needless to say, we do not view our findings about landed power and educational attainment as conclusive. While we view our findings to be robust, a more tailored survey would be needed for more definite conclusions. However, since access to schooling is one of the few lawful avenues to social mobility for the rural poor, it is discouraging that it appears to be hindered by landed power.

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References

Alston, L.J., and J.P. Ferrie, 1989, Social control and labor relations in the American South before the mechanization of the cotton harvest in the 1950s', Journal of Institutional and Theoretical Economics, 145: 133-157.

Baran, P.A., 1988, On the political economy of backwardness, in: Charles K. Wilber, ed., The political economy of development and under-development, New York: Random House.

Behrman, J.R., and B.L. Wolfe, 1984, The socioeconomic impact of schooling in a developing country, Review of Economics and Statistics, 66: 296-303.

Blau, D.S., J.R. Behrman and B.L. Wolfe, 1988, Schooling and earnings distribution and endogenous labour force participation, Marital status and family size, Economica, 55: 297-316.

Becker, G.S., and H. Gregg Lewis, 1974, Interaction between quantity and quality of children, in: Theodore W. Schultz, ed., Economics of the family, Chicago: University of Chicago, 81-90.

Birdsall, N., 1980, A cost of siblings: Child schooling in rural Colombia, in: J.L. Simon and J. Da Vanzo, eds., Research in population economics, Vol. 2, Greenwich, Connecticut: JAL Press.

Birdsall, N., 1982, Child schooling and the measurement of living standards, Working paper no. 14, Washington. D.C.: World Bank.

Birdsall, N., and S. H. Cochrane, 1982, Education and parental decision-making: A two-generation approach, in: L. Anderson and D.M. Windham, eds., Education and development, Massachusetts. Lexington Books.

Birdsall, N., 1985, Public inputs and child schooling in Brazil, Journal of Development Economics, 18: 67-86.

Burney, N.A., and M. Irfan, 1991, Parental characteristics, supply of schools, and child school-enrolment in Pakistan, The Pakistan Development Review, 30: 21-62.

Chernichovsky, D., 1985, Socioeconomic and demorgraphic aspects of school enrolment and attendance in rural Botswana, Economic Development and Cultural Change, 18: 319-332.

DeTray, Dennis N., 1974, Child quality and the demand for children, in: Theodore Schultz, ed., Economics of the family, Chicago: University of Chicago, 81-116.

Greene, W., 1993, Econometric analysis, Second edition, New York: Macmillan.

Herring, Ronald, J., 1983, Land to the tiller, New Haven: Yale University Press.

Jamison, D.T., 1986, Child malnutrition and school retardation in China, Journal of Development Economics, 20: 299-309.

Jamison, D.T., and M.E. Lockheed, 1987, Participation in schooling: Determinants and learning outcomes in Nepal, Economic Development and Cultural Change, 20: 279-306.

Keifer, N.M., 1988, Economic duration data and Hazard functions, Journal of Economic Literature, 26: 646-679.

King, E.E., and A. Hill, 1992, Women's education in developing countries: Barriers, benefits, and policy, Baltimore: The Johns Hopkins University Press.

King, E.M., and M.A. Hill, 1993, Women's education in developing countries: Barriers, benefits, and policies, Baltimore: The Johns Hopkins University Press.

King, E.M., and L.A. Lillard, 1987, Education policy and schooling attainment in Malaysia and the Philippines, Economics of Education Review, 6(2): 167-181.

Lewis, A., 1954, Economic development with unlimited supplies of labour, The Manchester School of Economic and Social Studies, 22: 139-191.

Lockheed, D.J., and L.J. Lau, 1980, Farmer education and farm productivity, in: Timothy King, ed., Education and income, World Bank Staff Working Paper no. 402, Washington, D.C.

McDonald, J.F., and R.A. Moffit, 1980, The uses of Tobit analysis, Review of Economics and Statistics, 62: 319-321.

Moock, D., and J. Leslie, 1986, Childhood malnutrition and schooling in the Tarai region of Nepal, Journal of Development Economics, 20: 33-52.

Paqueo, V.B., 1981, The household production model of school enrollment - A profit model analysis of the Bicol multipurpose data, Population and Human Resource Division, Discussion paper 81-30, Washington. D.C.: World Bank.

Pakistan, 1983, Pakistan census of agriculture 1980: All Pakistan Report, Lahore: Agricultural Census Organization, Statistics Division.

Popkin, B.M., and M. Lim-Ybanez, 1982, Nutrition and school achievement, Social Science and Medicine, 16: 53-61.

Rosenzweig, Mark R., 1980, Household and non-household activities of youths: Issues of modelling, Data and estimation strategies, Working Paper no. 90, Population and Labour Policies Programme, World Employment Programme Research, International Labor Organisation.

APPENDIX

TABLE I

Means and Standard Deviations for Sample Variables

Variables	Means	SD
Educational attainment	5.41	4.52
Punjab	0.68	
Sindh	0.14	
NWFP	0.14	
Baluchistan	0.04	
Distance from boys primary school (PB)	0.56	2.11
Distance from boys middle school (MB)	3.81	2.83
Distance from boys high school (HB)	7.12	5.12
Distance from civil dispensary (CD)	11.56	8.78
Electrification (ELECT.)	0.65	0.48
Household expenditure (EXPEN.)	1,341.19	704.30
Relative landed power (RLP)	33.44	15.96
Absolute landed power (ALP)	45.43	63.25

Source: RIDS

TABLE II

Poisson Educational Attainment Functions
(Dependent Variable: Educational Attainment)

	HB	MB	PB
Constant	1.928*	2.015*	1.989*
	(23.86)	(25.07)	(24.35)
Punjab	0.075	-0.068	-0.047
	(1.02)	(0.92)	(0.05)
Sindh	-0.012	-0.019	-0.073
	(0.14)	(0.22)	(0.43)
NWFP	0.192**	0.150***	0.111
	(2.35)	(1.88)	(1.34)
HB	0.004		
	(1.54)		
MB		-0.012*	
		(2.57)	
PB			-0.005
			(0.64)
EXPEN.	0.2E-04 ***	0.2E-04	0.2E-04
	(1.63)	(1.10)	(1.04)
CD	-0.002	-0.002	-0.002
	(1.50)	(1.24)	(1.33)
ALP	0.002 *	0.002 *	0.002 *
	(4.06)	(4.02)	(4.86)
ALPSQ	-0.4E-05 *	-0.4E-05 **	-0.5E-05 *
	(4.87)	(1.94)	(3.74)
R.LL	-2,379.430	-2,303.410	-2,172.970
Log liklihood	-2,055.430	-2,276.720	-2,153.360
n	1,519	1,441	1,384

Source : RIDS.
Notes : 1. See Table 2.
2. R.LL = Restricted log likelihood.