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Sheepskin Effects of Investment in Schooling: Do They Signal Family Background? Case of Pakistan

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Abstract

Considerable recent research both for the developing as well as the developed countries has provided evidence for the existence of the sheepskin effect to the economic returns in schooling investment. However, there has not been much empirical work investigating the mechanism that may lie behind the observed sheepskin effects. The few notable exceptions that have started addressing this important yet neglected question of interpreting what do sheepskin effects signal include Flores-Lagunes and Light (2007) for the U. S., Riddell (2008) for Canada and Shabbir and Ashraf (2011) as well as Shabbir (2011) in the case of Pakistan.

The present study was undertaken to examine the robustness of sheepskin effects in the face of measured family background in the case of Pakistan. The unique feature of this study is that it utilizes the only nationally representative data set available which allows for a test of sheepskin effects; in fact, Shabbir (1991) was the first of its kind study which used this data set to test (and establish) the existence of sheepskin effects in the case of Pakistan. The present study is an attempt to build on that research finding in order to explore the question of what do sheepskin effects signal? In particular, do they signal measured family background?

The important empirical finding of this study is that there is strong evidence of significant sheepskin or diploma effects for all four important certification levels i.e. Matric, Intermediate, Bachelor of Arts (B.A.) and Master of Arts (M.A). Further, and more importantly in terms of the research question posed by this paper, these diploma effects are robust when measured family background effects are controlled for using such measures as father's education, father's income and mother's income. Thus the observed sheepskin effects may be signaling other aspects of ability or other relevant influences besides measured family background (including latent or unmeasured family influences) which keeps the all-important question of the mechanism underlying these observed sheepskin effects open and in need of future research.

Keywords: Human capital investments, returns to education, sheepskin effects Pakistan, family background.

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1. Introduction and Review of the Literature

The positive correlation between the labor market earnings of individuals and their years of completed schooling is perhaps one of the most widely acknowledged empirical phenomena across all types of economies. Theoretically, there are two contending explanations for this observed correlation -- the 'traditional' one is the human capital hypothesis (Becker (1964) and Mincer (1974)) which posits that this correlation (net of labor market experience) reflects productivity-enhancing skills that individuals acquire through schooling. As against this standard explanation is the alternative view which contends schooling to be merely (or, at best, mostly) a signaling or 'screening' device for the pre-existing abilities and individual characteristics that are valued by the employers and for which only imperfect indicators may be available (Arrow (1973) and Spence (1974)). The so-called 'sheepskin' effect[i] is consistent with this alternative signaling hypothesis where, unlike in the case of the traditional human capital earnings function as specified by Mincer (1974), the returns to schooling increase discontinuously in diploma years reflecting a positive premium due to individual characteristics such as perseverance that correlate with completion of a course of study.

Both from a purely academic as well as a public policy perspective, knowing the relative strength and soundness of these contending views is important since, unlike the human capital view, the sheepskin view implies an absence of social returns to schooling. This is an important issue, since in most countries public expenditures on schooling is an important part of the debate about optimal allocation of public resources. Thus the study of the sheepskin phenomena has important practical as well as theoretical implications.

Considerable recent research both for the developing as well as the developed countries has provided evidence for the existence of the sheepskin effect to the economic returns in schooling investment. As examples of the former are seminal empirical work by Hungerfold and Solon (1987) and more recent research for the U. S. (Park, 1999; Flores-Lagunes & Light, 2007) as well as the other developed countries, for instance, Mcguinness (2003) and Antelius (2000) for Europe, and Bauer et al. for Japan (2004). Examples of such work for developing countries include Shabbir (1991) for Pakistan, Schady (2003) for the Philippines, and Mora and Muro (2008) for Colombia.

However, despite finding significant sheepskin effects, few of these existing studies try to empirically investigate the exact mechanism by which these effects work. Theoretically, it has been conjectured that they may reflect such factors as native ability (Arrow, 1973), demonstrated discipline, goal-orientedness and perseverance to finish a prescribed program or even 'socialization' i.e. development of non-cognitive, affective ability which makes for a good employee (Bowles & Gintis, 1976). These characteristics might then be expected to be correlated with family background, home environment or perhaps a different set of factors altogether (Chiswick, 1973).

Also, in terms of relevant empirical studies, there has not been much work investigating the mechanism of the observed sheepskin effects. However, a few notable exceptions have started addressing this important yet neglected question of interpreting what do sheepskin effects signal? For the U. S., see Flores-Lagunes and Light (2007), for Canada, Riddell (2008) and for Pakistan see Shabbir and Ashraf (2011) as well as Shabbir (2011)

where the latter explores the relative impact of native vs. cognitive ability as possible explanations for the observed sheepskin effects in the case of rural Pakistan. However, these previous studies for Pakistan were based on a data set which was not nationally representative and was drawn only from a select few districts of the country. Still, given the fewness of such studies for Pakistan and developing countries in general, these are significant sources of information on this important empirical question of policy as well academic significance.

The unique feature of the present study is that it utilizes the only *nationally representative* data set available for Pakistan which allows for a test of sheepskin effects; in fact, Shabbir (1991) was the first of its kind study which used this data set to test (and establish) the existence of sheepskin effects in the case of Pakistan. The present study is an attempt to build on that research finding in order to explore the question of what do sheepskin effects signal? In particular, do they signal measured family background? Considering the importance of unearthing the true impact of schooling on skills and productivity for individuals with its implications for social vs. private rates of returns and public policy, any addition to the scant evidence for Pakistan and developing countries in general on the nature of the sheepskin effects should be an important contribution to relevant literature.

More specifically, the objective of the present paper is to use a nationally representative data for male wage earners in Pakistan to examine the existence and the nature of possible sheepskin or credential effects of schooling, in particular, explore whether any observed sheepskin effects signal family background influences?

The rest of the paper is organized as follows:

Section 2 presents the proposed methodology and model specification while Sections 2 describes the data. Section 4 describes and discusses the empirical results and finally, Section 5 contains conclusions for this study.

2. Methodology and Model Specification

The sheepskin or credential argument pertaining to schooling implies that, unlike in the case of the traditional human capital earnings function as specified by Mincer (1974), the returns to schooling increase discontinuously in diploma years. Leaving the question of the family background effects aside for the time being, we can formalize the above argument by considering the well-known Mincerian earnings function which, in an abbreviated form, is given in equation (1) below where Ln Y represents natural log of individual earnings, S, years of completed schooling (of course, EXP, years of labor market experience and its square can be added, however, in the present context, it would be convenient to suppress the experience terms as well as the error terms until we get to the final specifications for our models to be empirically tested).

$$\text{Ln } Y = \alpha + \beta_1 S \qquad (1)$$

The important point regarding (1) is that the marginal rate of return to schooling, $\partial \text{ LnY}/\partial \text{ S} = \beta_1$, is constant. In effect, this implies that all years of schooling are 'created equal' in return of their marginal impact on log earnings. In particular, there is no 'premium' or 'bonus' rate of return if the marginal year of schooling marks the completion of a degree/diploma.

In order to test for the possibility that the return to education increase discontinuously in diploma years (i.e. the sheepskin effect exists) we take the following approaches:

(a) We generalize the human capital linear specification (1) to allow for discontinuities at values of S which correspond to award of degrees, and,

(b) We specify Ln Y to be a step function of S with a separate step for each year of completed schooling and the 'step size' for diploma years is then compared with that of the years of schooling leading up to the diploma.

In the discussion that follows, Model I corresponds to approach (a) while Model II corresponds to approach (b) above. In order to further elaborate these approaches let us discuss them in turn.

First, in order to elaborate approach (a) let us suppose that there are only two 'diploma years' corresponding respectively to ten and twelve years of completed schooling. Define D10 and D12 as two dichotomous (0, 1) variables such that D10 = 1 if $S \geq 10$ and D12 = 1 if $S \geq 12$.

Model I: "Dummies for Degrees".

In this case, the relevant discontinuities are allowed for by simply adding the dummy variables D10 and D12 to the traditional human capital function. The following equation represents Model I.

$$\text{Ln } Y = \alpha + \beta_1 S + \beta_2 D10 + \beta_3 D12 + e_2 \qquad (2)$$

In the above specification, significantly positive regression estimates of D10 and D12 would imply sheepskin effects. Also, we are assuming the error term (e_2) has all the desirable properties to make the OLS appropriate estimation technique. In particular, e_2 is identically independently distributed with a zero mean and a homoscedastic variance and it is independent of the included explanatory variables.

Also note that for every n 'diploma years', a graph of $\partial \text{LnY}/\partial \text{S}$ would get divided into (n+1) 'segments' over the domain of S. In the case of equation (2), the three relevant regimes defined over the domain of S are given by $0<S<10$, $10<S<12$ and $12<S<\infty$. The relevant marginal "rates of return", over the domain of S are noted below:

Years of Schooling (S)	Marginal Rate of Return (r)
$S < 10$	β_1
$S = 10$	$\beta_1 + \beta_2$
$10 < S < 12$	β_1
$S = 12$	$\beta_1 + \beta_3$
$S > 12$	β_1

Model II: Step Function.

For purposes of exploring the relationship between schooling and earnings for possible diploma effects, the final specification of interest is the so called 'step function' which is a non-parametric specification. In this case, no restrictions are imposed on the earnings-schooling profile --- the log of an individual's earnings is treated as a 'step function' of years of completed schooling with a separate step for each year. For K years of completed schooling, such a specification can be represented by equation (3) which is given below.

$$\text{Ln } Y = \alpha + \sum \beta i \, Si + e_3 \qquad (3)$$

Here each Si is a (0, 1) dichotomous variables where Si = 1 only if S = i and i = 1, 2….K. The error terms e_3 is iid ~ $(0, \sigma^2)$.

The estimated regression coefficients βi can be used to calculate the implied step size in terms of the 'marginal' rate of return to an additional year of schooling. Thus, in order to evaluate the potential sheepskin effects, the step size for the year conferring a particular diploma can be compared with the step size corresponding to each of the years leading up to that diploma.

Controlling for Family Background Effects:

The best way as how to account for family background influences is subject to some debate. This may, in part, be due to the fact that certain aspects of the family background such as the home environment or endowments may be unobserved. However, at a formal level we can introduce controls for measured family background in our human capital cum credential models as given in equation (2) or (3) by introducing an n-dimensional vector FB and a corresponding vector of coefficient parameters gamma to represent generically such family background influences. The exact nature of FB would be determined by data availability and the context of the analysis. (In our particular case[ii], FB would be represented by father's education (FED), mother's education (MED) and father's income (FY)[iii].)

Thus we can write the appropriate versions of (2) and (3) with controls for measured family background as following equations (4) and (5).

$$\text{Ln } Y = \alpha + \beta_1 S + \beta_2 D10 + \beta_3 D12 + \gamma \, FB + e_4 \qquad (4)$$

$$\text{Ln } Y = \alpha + \sum \beta i \, Si + \gamma \, FB + e_5 \qquad (5)$$

Note that for (4) we are we are assuming the error term (e_4) has all the desirable properties to make the OLS appropriate estimation technique. In particular, e_4 is identically independently distributed with a zero mean and a homoscedastic variance and it is independent of the included explanatory variables. Further, for specification (5) above, we assume that the error term e_5 is iid ~ $(0, \sigma^2)$.

Analytically speaking, thus there are two sets of empirically testable questions that the model specification (3) through ((5) can be used to address. Do sheepskin effects exist

(specifications (2) and (3) above and, if so, do they represent measured family background (specification (4) and (5) – the exploration of this latter question will be an attempt to understand the very important mechanism that may generate the observed sheepskin effects in the returns to individual's investment in schooling?

3. Data Description

The data set used in the present study has been obtained by merging information from the Household Income and Expenditure Survey (HIES) and the Migration Survey which were, in fact, two of the four separate 'modules' (i.e. questionnaires) of the 1979-80 Population, Labor Force and Migration Survey (PLMS). Conducted during 1979-80 as a joint project of the Pakistan Institute of Development Economics (PIDE) and ILO-UNFPA, the PLMS, a nationally representative survey, was based on a two-stage-stratified random sample of 11,288 households.[iv]

The same households were asked to respond to four sets of questionnaires, two of which, 'HIES' and 'Migration', are relevant here. Whereas HIES is a survey that is conducted with some regularity, the Migration Survey was conducted only one time in 1979-80.

It is important to note that HIES has information on some but not all the variables that are needed for estimating the sheepskin relationship as specified in this paper. More specifically, while HIES has relevant data on monthly earnings, age, employment status of individuals and certain important aspects of their family background, the information on their schooling is not available in an appropriate form. As is typical with this survey, the question regarding the individual's schooling is so designed that the possible responses are 1-digit codes e.g. 'Primary but less than Middle' is assigned code 3; 'Middle but less than Matric' is assigned code 4 and so forth. Thus, it is not possible to distinguish those who complete a course and stop there from those who start the next level but drop out. This makes the HIES's schooling variable inappropriate for the present study since we need information on the exact number of years of completed schooling for each individual.[v] Interestingly, in the Migration Survey, the question regarding schooling has been designed in a manner that is appropriate for providing the above information. Since the same households were targeted for both the surveys, matching individuals across the two modules allowed us to retrieve information on schooling from the Migration Survey. This merge enables us to obtain perhaps the only nationally representative sample for Pakistan where schooling is measured as a continuous variable measured in terms of the exact number of years completed.

Finally, as a result of restricting the observations to those for male earners (wage earners or salaried employees) for whom years of schooling (S) is $0<S$

≤ 16, natural log of yearly earnings, $Y>0$ and information is present for all the variables listed in Table 1, a sample of size 541 is obtained (N=501 when father's earnings variable is also a required filter). Importantly, these data include measures of parental education and father's earnings which provide controls for important aspects of measured family background. Table 1 presents the definitions of variables, their sample means and standard deviations.

4. Empirical Results and Discussion

In this section, we look for evidence regarding two related questions i.e. do sheepskin effects exist and, if so, do they represent family background influences?

(a) Do sheepskin effects exist?

In terms of the existence of sheepskin effects, Table 2 (Columns 2 and 3) and Table 4 (Columns 1 and 3) present the relevant evidence.

Let us first look at the regression results given in Table 2 --- its first column presents the estimates for the familiar Mincerian or Human Capital (HC) specification while the next column presents estimates for a Pure Credential (PC) model i.e. only degrees matter while the third column presents the estimates for a 'mixed' model allowing for both these effects. As a representative of the productivity-enhancing view of schooling's effects, the Mincerian earnings function would act as a 'reference' point (or the 'baseline' case) since here an absence of diploma effects is presumed. In terms of the empirical evidence, as can be seen from column 1, all the coefficient estimates of the HC model are significant at the 95% level. Note that on the basis of these results the marginal rate of return to schooling for this sample of male earners is 9 %. Also, the coefficient estimate of the EXP variable is positive and significant while that of $(EXP)^2$ is negative and significant which implies the well- established 'concave' age or experience earnings profile of individual earnings.

On the other hand, column 2 presents the estimates that correspond to the Pure Credential model where only dichotomous dummy variables are used to represent the effects of the diploma award years: D10 for Matric, D12 for Intermediate, D14 for B.A. (Bachelors of Arts) and D16 for M.A. (Masters of Arts). Note that the coefficient estimates are positive and significant at the 95% level of significance in all cases implying the presence of the credential effects. (Also note that compared to the HC model, the PC model explains marginally more of the variance in the dependent variable since adjusted R^2 is 0.28 for column 2 vs. 0.26 for column 1).

However, it would be useful to see if the significantly positive coefficient estimates for diploma effects would persist if we also include S or years of schooling in the specification. We do this in column 3 of Table 2. First, it may be noted that while the coefficient estimate of S has dropped by over 50% as compared to that in the Mincerian specification, it is still significant. In terms of the variables measuring the diploma effects, note that the coefficient estimates for D12 and D16 are still significantly positive at the 95% level while for D14 it is significantly positive only at 90% level for one tailed t-test. In connection with this drop in the significance level of the coefficient estimates of some of the diploma dummies, it should be noted that Shabbir (1991), which uses the same basic data set but does not address the question of family background, reports no decline in the significance level of any of these four dummy variables in the context of a similar 'mixed' model. Thus the additional filter of requiring that information for family background is also known thins out the data leading to the observed reduced significance level. In the light of this last observation, the mere fact that all the diploma dummies are positive may carry more weight than usual as evidence in favor of the presence of the credential effects. In fact, additional evidence in favor of credential effects for the present sample is provided by the so-called step function estimates given in column 1 of Table 4. The step function specification provides an opportunity to look more directly at the data in a non-parametric fashion since no restrictions are imposed on an individual's

schooling-earnings profile. Here the log of an individual's earnings is essentially treated as a step function of the years of completed schooling with a separate step for each year. It is noteworthy that large 'upward' and significant step sizes are reported for many of the relevant diploma levels e.g. for S=8, S=10 and S=12; however the step size for S=14 while still positive is not significant.

Thus, based on a nationally representative sample from Pakistan, there is compelling empirical evidence in favor of the existence of strong and significant sheepskin effects from the above regression estimates of both set of specifications corresponding to specifications (2) and (3) as noted in the Methodology section.

(b) Do sheepskin Effects signal family background?

In relation to the sheepskin or diploma effects that we have noted above, a very important question arises as to what do they signal? Besides ability or perseverance to finish stipulated programs of study, they may be merely reflecting family's social contracts or, more broadly, home environments of the individuals. In fact, a few studies for other countries report that when family background is controlled for in the human capital or Mincerian type of earnings function it leads to significant changes (often reductions) in the estimated coefficients of years of schooling. We are interested in exploring whether the same is true for the sheepskin effects that we have noted.

Are the above noted sheepskin effects signaling family background influences? In other words, if we control for family background and, as a result, these credential effects lose all significance this would imply that these sheepskin effects signal 'abilities' or characteristics that measures of an individual's family background proxy well. We will try to answer this important question with the help of the estimates reported in Table 3 and Table 4 (column 2 and 4). For the present study, family background is essentially being 'measured' by father's education (FED), mother's education (MED) and father's income (FY) --- a proxy for family's financial resources.

Note that in Table 3, FED and MED as well as FY are positive and generally significant at the 95% level.[vi] Family background is thus clearly relevant to the determination of an individual's earnings.[vii] In the case of the step function specification in Table 4, the coefficient estimates of all these measures of family background exhibit similar magnitudes albeit somewhat smaller levels of significance. Incidentally, in terms of the relative magnitude of these measures of family background note that MED's coefficient is twice as large as FED's even when FY or father's income is introduced as an additional control in column 4.

Are the sheepskin effects noted above robust in the wake of introduction of these measures of family background? By and large, the answer is yes. In comparison to Table 2, the significance level of the coefficients of variables D10 through D16 does not deteriorate -- in fact, the coefficient estimate of D10 in column 1 of Table 3 turns significant. However, their relative magnitudes change particularly when we compare the results in column 3 (where all three FED, MED and FY are used to control for family background) ---- the estimated coefficients for D10 and D16 rise somewhat and that of D12 and D14 drop appreciably (by over 30 percent) in each case; however, they are still substantial. Similarly, looking at the evidence presented in Table 4 for the step function specification notice that the introduction of family background measures does not change

the significance level of the ‘upward steps’ that have been noted earlier for the several important diploma levels.

In conclusion, while there is evidence that if the family background is ignored some of its impact gets picked up by the dummy variables measuring credential effects as in the case of D12 and D14, in general, the above empirical results clearly indicate that credential or the sheepskin effects are robust when measured family background is controlled for. Incidentally, our use of step function in addition to the OLS estimation provides a secondary robustness test across model specifications which ought to render greater trust in these empirical findings.

5. Summary and Concluding remarks

This paper specifies and estimates a model where schooling investment may lead to higher individual labor market earnings either due to its productivity- enhancing (human capital) effects or due to credential or screening effects also known as sheepskin effects. The empirical estimates are based on a nationally representative household survey sample for Pakistan which includes data on individuals who have completed their schooling and are wage earners (or employees) and for who we have information about measured family background aspects such as parental income and educations levels. The following are amongst the important findings of this paper:

(i) based on the empirical results from a nationally representative sample for Pakistan, there is strong evidence of significant sheepskin or diploma effects for all four important certification levels i.e. Matric, Intermediate, Bachelor of Arts (B.A.) and Master of Arts (M.A.).

(ii) these diploma effects are robust when measured family background effects are controlled for using such measures as father's education, father's income and mother's income. Thus these sheepskin effects may be signaling other aspects of ability or other relevant influences besides measured family background (including latent or unmeasured family influences) which keeps the all-important question of the mechanism underlying these observed sheepskin effects open and in need of future research.

Table 1: Description, Means (X) and Standard Deviations (S.D.) of Some Important Variables (N=501; Male Earners)

Variable	X	S.D.	Variable's Definition
Y	5.99	0.57	Natural logarithm of the person's monthly earnings which may consist of wages or salary
SCH	8.58	3.31	Years of schooling completed
EXP	9.39	6.35	Total years of labor market experience; (Age - S - 6)
D10	0.51	0.5	Dichotomous, equals 1 if S≥10
D12	0.2	0.4	Dichotomous, equals 1 if S≥12
D14	0.09	0.29	Dichotomous, equals 1 if S≥14
D16	0.01	0.12	Dichotomous, equals 1 if S=16
FED	3.6	4.06	Father's years of completed schooling (could be zero or a positive number)
MED	0.79	2.67	Mother's years of completed schooling (could be zero or a positive number)
FY	838.38	808.92	Father's monthly earnings

Table 2: Human Capital vs. Sheepskin Effects
(OLS; Dependent Variable = Ln Y; Male Earners)

	1	2	3
Constant	4.94 (56.80)	5.49 (91.47)	5.23 (46.31)
SCH	0.09 (12.83)		0.04 (2.64)
EXP	0.05 (4.77)	0.04 (4.31)	0.04 (4.63)
$(EXP)^2$	-0.001 (-2.22)	-0.001* (-1.84)	-0.001 (-2.05)
D10		0.26 -5.2	0.09*** -1.14
D12		0.36 -4.72	0.28 -3.5
D14		0.23 -2.38	0.16** -1.54
D16		0.48 -2.51	0.4 -2.07
Adjusted R^2	0.26	0.28	0.29
N	541	541	541

Notes: Absence of asterisks implies coefficient estimate is significant at 95 % level for two-tailed t-test.

* Significant at 90% level for two-tailed t-test or significant at 95% level for one-tailed t-test.

** Significant at 90% level for one-tailed t-test.

*** Not significant.

Table 3: Effects of Schooling when Family Background is controlled for (OLS; Dependent Variable = Ln Y; Male Earners)

	1	2	3
Constant	5.23 -46.45	5.21 -46.48	5.19 -45.64
SCH	0.04 -2.4	0.04 -2.45	0.02** -1.57
EXP	0.04 -4.56	0.04 -4.77	0.06 -5.54
$(EXP)^2$	-0.001 (-1.96)	-0.001 (-2.09)	-0.001 (-3.53)
D10	0.09 -2.37	0.08*** -1.05	0.15* -1.86
D12	0.25 -3.16	0.24 -3.02	0.19 -2.39
D14	0.15** -1.48	0.13*** -1.26	0.10*** -0.95
D16	0.4 -2.1	0.39 -2.07	0.44 -2.24
FED	0.01 -2.37	0.01* -1.7	0.01 -2.04
MED	- -	0.02 -2.47	0.02 -1.96
FY	-	-	0.0001 (2.14
Adjusted R^2	0.3	0.3	0.3
N	541	541	501

Notes: Absence of asterisks implies coefficient estimate is significant at 95 % level for two-tailed t-test.

* Significant at 90% level for two-tailed t-test or significant at 95% level for one-tailed t-test.
** Significant at 90% level for one-tailed t-test.
*** Not significant.

Table 4: Step Function Specifications (Implied Step Size)

	1	2	3	4
Constant	6.79 -37.85	6.48 -33.01		
SCH	0.04 -4.73	0.06 -5.46		
EXP	-0.001 (-2.02)	-0.001 (-3.27)		
$(EXP)^2$	-0.001 (-2.02)	-0.001 (-3.27)		
S1	-1.72 (-3.31)	-1.501 (-2.97)	-1.72 (-3.31)	-1.5 (-2.92)
S2	-1.74 (-8.09)	-1.502 (-6.68)	-0.02*** (-0.04)	-0.01*** (-0.02)
S3	-1.48 (-7.31)	-1.25 (-5.93)	0.26** -1.58	0.25** -1.52
S4	-1.29 (-6.60)	-1.1 (-5.44)	0.19** -1.37	0.15*** -1.12
S5	-1.38 (-7.48)	-1.15 (-5.92)	-0.09*** (-0.83)	-0.05*** (-0.47)
S6	-1.12 (-5.79)	-0.97 (-4.79)	0.26 -2.48	0.18** -1.57
S7	-1.46 (-7.31)	-1.29 (-6.21)	-0.34 (-2.61)	-0.32 (-2.39)
S8	-1.12 (-5.97)	-0.98 (-5.06)	0.34 -2.79	0.31 -2.54
S9	-1.43 (-7.33)	-1.29 (-6.29)	-0.31 (-2.82)	-0.31 (-2.63)
S10	-1.073 (-6.05)	-0.89 (-4.84)	0.36 -3.79	0.4 -4
S11	-1.071 (-4.71)	-0.91 (-3.87)	0.002*** -0.001	0.02*** (-0.13)
S12	-0.71 (-3.83)	-0.64 (-3.39)	0.36 -2.24	0.27* -1.65
S13	-0.73 (-2.42)	-0.59 (-2.00)	-0.02 (-0.08)	0.05*** -0.2
S14	-0.48 (-2.54)	-0.49 (-2.55)	0.25 -0.98	0.10*** -0.4
FED		0.01** (1.63)		
MED		0.02 (2.12)		
FY		0.0001* (1.90)		
Adjusted R^2	0.31	0.32		
N	541	501		

Notes: Absence of asterisks implies coefficient estimate is significant at 95 % level for two-tailed t-test.

* Significant at 90% level for two tailed t-test; however, significant at 95% level for one-tailed t-test. ** Significant at 90% level for one tailed t-test. *** Not significant.

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[i] Presumable called 'sheepskin' effect because of the fact that, in medieval times, diplomas were sometimes made of parchment (the skin of sheep etc. used as a writing material). In this paper, credential, diploma of sheepskin effect will be used interchangeably to represent formal evidence of completion of a course of study at a university or college.

[ii] We restrict ourselves only to measured family background since it is an important first step considering that so little is known in the case of Pakistan about the nature of the effects of family background on earnings and related phenomenon. However, in principle, the analysis can be extended to more comprehensive measures of family background provided appropriate data are available.

[iii] Father's income often is family income since so few women are in the labor force in Pakistan and comparable developing countries.

[iv] See Irfan (1981) for further details.

[v] Incidentally, the HIES for other years too have the same design regarding the question on schooling. In fact, extremely few micro level surveys for Pakistan have schooling measured as a continuous variable. One notable exception is the data set used in Sabot (1989). However, this data set is not national in its coverage since only a survey of 800 rural households was conducted in specific districts of Pakistan.

[vii] Incidentally, when variables measuring the possible interaction between family background (i.e. FED, MED etc.) and diploma levels (i.e. D10, D12, etc.) were included in the earnings function specification they were found to be statistically insignificant at the conventional levels of confidence; (Results not reported here).