

## Earnings Functions in Pakistan's Urban Informal Sector: A Case Study

ABID AMAN BURKI and QAISAR ABBAS

### I. INTRODUCTION

The informal sector is frequently attacked on the grounds that it offers very low earnings in very unfavourable and exploitative working conditions with no prospects for upward mobility for its participants. Since entry in this sector is not restricted, therefore, it is argued that a mushroom growth of labour supply takes place particularly at times when growth in the formal sector slows down [Richardson (1984)]. Therefore, earnings in this sector do not reflect variations in personal capabilities on account of human capital endowments. As a result, it is opined that workers in this sector face a flat age-earnings or experience-earnings profile because they are not rewarded for their schooling and accumulated experience with age.

The unrestricted entry of labour may be the case in some sub-sectors of the informal sector where no specific skills are required. However, it cannot be generalized because there are many activities which require from their workers to have learned some sort of skills, thus creating barriers to entry. The existence of such barriers may explain higher earnings in these sub-sectors [Burki (1989); Burki and Ubaidullah (1990)].

The primary purpose of this paper is to test whether human capital investments are rewarded in the informal sector as they are in the formal sector. In this regard, we will use earnings functions which will include only human capital variables (viz., schooling, experience and vocational training). The estimated regression equations will allow us to separate the effects of these variables on personal earnings and to explain the variation in earnings with changes in individual characteristics. This analysis will also be used to explain the returns to investment in education, which is the secondary purpose of this exercise.<sup>1</sup> Section II below

Abid Aman Burki is Assistant Professor and Qaisar Abbas is a Student at the Department of Economics, Quaid-i-Azam University, Islamabad.

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<sup>1</sup>Ahmad *et al.* (1990) and Burki and Khan (1990) have also used a subset of this large survey data to study various aspects of earning and learning.

gives a description of the sample used and presents data on certain characteristics of individuals in the sample. In Section III the methodology of the paper is discussed. Section IV presents the results and its discussion. And the last section gives the conclusions.

## II. THE SAMPLE

The data used in this paper come from the survey of male self-employed and wage and salary workers (also called *ustads* and *shagirds*) gainfully employed in the skill-intensive urban informal sector of Pakistan, conducted by the Department of Economics, Quaid-i-Azam University, Islamabad in 1989 [Chaudhary *et al.* (1989)]. The data pertains to 1058 respondents including 665 workers and 393 self-employed engaged in 24 informal activities spread in seven cities viz., Rawalpindi, Sialkot, Daska, Gujranwala, Lahore, Mian Channu and Karachi. The establishments covered in the sample consist of unregistered firms employing only 10 or less than 10 workers. The respondents include skilled, semi-skilled and unskilled (new entrants) wage and salary workers, highly experienced salaried *ustads* (master craftsmen), and different forms of self-employed like owner-managers, working owners of small and medium size establishments and small artisans. However, the survey excludes petty traders, shopkeepers, transporters and related individuals, casual labourers, and the participants of very low level informal activities which require very little or no skills. In addition, the survey does not include unemployed individuals relating to activities included in the sample. Therefore, the sample selection procedure is expected to create an upward bias in the results. Thus, these results should be interpreted and compared with caution.

Table 1 summarizes important characteristics of some key variables in the sample. The mean monthly earnings of the self-employed are 3.8 times more than the earnings of wage and salary workers. Experience consists of actual time spent in learning skills and practical work experience. The educational attainment of the persons in the sample shows that 27 percent or one-fourth are, in fact, illiterates. Of the literate persons most of the workers have received only primary schooling while the self-employed are relatively better placed with their greater concentration in secondary and higher schooling. More importantly, Table 1 shows that the sample respondents work for very long hours. Hence, their monthly earnings must be weighed by their weekly hours worked for empirical analysis. Finally, informal training is the dominant form since only 9 percent of the persons in the sample received vocational training.

Table 1  
*A Profile of Sample Respondents by Selected Variables*

Item	Workers	Percent	Self-employed	Percent	Total Sample	Sample Percent
<b>Earnings</b>						
Mean Monthly Earnings (Rs)	751	—	2848	—	—	—
<b>Experience</b>						
0 – 5	533	80.2	104	26.5	637	60.2
6 – 10	109	16.3	182	46.3	291	27.5
11 +	23	3.5	107	27.3	130	12.3
<b>Schooling</b>						
Illiterate	217	32.6	68	17.3	285	27.0
Primary	330	49.6	138	34.9	468	44.6
Matric	102	15.3	121	30.8	223	21.0
F.A./B.A.	16	2.4	66	16.8	82	7.7
<b>Weekly Hours Worked</b>						
< 35	18	2.7	5	1.3	23	2.2
35 – 48	238	35.8	121	30.8	359	34.0
48 +	409	61.5	267	67.9	676	63.8
<b>Vocational Training</b>						
Diploma/Certificate	19	2.9	73	18.6	92	8.7
No Vocational Training	646	97.1	320	81.4	966	91.3
Total	665	100.0	393	100.0	1058	100.0

### III. METHODOLOGY

We estimated pure human capital earnings functions to test the basic propositions of this paper. The first function that we fit takes the following form:

$$\ln Y = a + bS + cEX + dEX^2 + U \quad \dots \quad \dots \quad \dots \quad \dots \quad (1)$$

where  $\ln Y$  is the natural logarithm of hourly earnings,  $S$  is years of formal schooling,  $EX$  is years of apprenticeship training or related work experience,  $EX^2$  is the square of the experience variable, and  $U$  is the error term. In this form of the earnings function the estimated coefficient  $b$  is interpreted as the private rate of return to one additional year of schooling, averaged over all individuals. Similarly,  $c + 2d Ex$  in this semi log specification shows the average private rate of return to one extra year of experience. Since the earnings function given in Equation (1) cannot distinguish among the rates of return to different levels of schooling, therefore, a different specification of the earnings function is also fitted to the data which allows varying rates of return across different levels of education. In algebraic form this specification is given below:

$$\ln Y = a + bPRIM + cSEC + dHIGH + eEX + fEX^2 + gVOC + U \quad (2)$$

In this equation,  $PRIM$ ,  $SEC$  and  $HIGH$  are schooling dummies for primary, secondary and higher levels of education, respectively while  $VOC$  is the dummy for vocational training (i.e. these variables take the value 1 if the respondent belongs to that category and zero otherwise). As in Equation (1),  $EX$  here stands for the years of work experience which is also included in the function in quadratic form. The omitted categories in schooling dummies are illiterates and incomplete primary (i.e. 0–4 years of schooling) while in  $VOC$  those who did not receive vocational training are omitted. The dependent variable,  $\ln Y$ , in both equations is the natural logarithm of hourly earnings. Since work norms are not fixed in the informal sector, therefore, the reported monthly earnings of the persons in the survey are converted into hourly earnings by dividing individual monthly income by their monthly hours worked.

The estimated coefficients for schooling dummies in Equation (2) are used to estimate the rates of return to specific levels of schooling. These rates are obtained by dividing the difference between two coefficients relating to the two educational levels by the average time duration which is required to complete the higher education level of these two.

#### IV. RESULTS

The results of Equation (1) are presented in Table 2 for the workers and self-employed, separately. The regression coefficients in Table 2 clearly show that the human capital variables are highly rewarded. For example, in the case of workers, the coefficients for years of schooling and experience are highly sig-

nificant and the model explains 31 percent of variation in relative earnings. The rate of return to one extra year of schooling, on average, is 6.9 percent. In addition, the negative coefficient for experience square ( $EX^2$ ) shows that the workers face a concave experience-earnings profile which peaks at 25 years of experience. However, the level of earnings at this peak depends on other human capital and non-human capital variables. Similarly, in the case of the self-employed, the coefficient for schooling ( $S$ ) is highly significant which gives a rate of return of 5 percent per year. The coefficient for the years of work experience ( $EX$ ) has the expected sign and is also significant, but the quadratic experience term is insignificant and has the positive sign which means that later in life the self-employed do not reduce their work effort and continue working. The explained variance of pure human capital variables is quite reasonable (i.e. more than 28 percent) for the self-employed. These results confirm that schooling and experience are the most important variables which explain a large part of the dispersion in relative earnings for the individuals in our sample. These results compare favourably with some earlier estimates [Guisinger and Irfan (1980); Khan (1983)].

Table 2

*Estimates of the Earnings Functions*  
(Dependent Variable is Natural Logarithm of Hourly Earnings)

Variable	Workers	Self-employed
Constant	0.386	1.829
Years of Schooling ( $S$ )	0.069* (11.65)	0.050* (10.95)
Experience ( $EX$ )	0.103* (7.21)	0.023*** (1.83)
Experience Square ( $EX^2$ )	-0.00195** (-2.32)	0.000427 (0.78)
$R^2$	0.308	0.283
Number of Observations	665	393

Notes: Numbers in parentheses are  $t$ -values.

\* Significant at 1 percent level.

\*\* Significant at 5 percent level.

\*\*\* Significant at 10 percent level.

Table 3 gives the estimates for earnings functions with dummy variables. The coefficients for dummy variables in this form are interpreted as the difference

Table 3

*Earnings Functions with Dummy Variables*  
(Dependent Variable is Natural Logarithm of Hourly Earnings)

Variables	Workers	Self-employed
Constant	0.456	1.893
Primary ( <i>PRIM</i> )	0.388* (8.30)	0.234* (4.83)
Secondary ( <i>SEC</i> )	0.532* (8.27)	0.314* (6.18)
Higher ( <i>HIGH</i> )	0.916* (6.68)	0.581* (9.78)
<i>EX</i>	0.104* (7.26)	0.026* (2.16)
<i>EX</i> <sup>2</sup>	-0.00209* (-2.47)	0.000268 (0.50)
Vocational Training ( <i>VOC</i> )	0.350* (2.82)	0.192* (4.35)
<i>R</i> <sup>2</sup>	0.308	0.325
Number of Observations	665	393

Notes: Numbers in parentheses are *t*-values.

\* Significant at 1 percent level.

in earnings of the included category relative to the excluded category. We find that all the coefficients representing different levels of formal schooling are highly significant. As expected, successively higher education levels show higher coefficients e.g. *PRIM* has the smallest coefficient while *HIGH* has the highest coefficient in both the equations. The premium on education is higher for workers than the self-employed at all levels of schooling. Moreover, the coefficients for *EX* and *EX*<sup>2</sup> have improved a little in both the regressions if compared with our results in Table 2. The average earnings for the individuals with vocational training (*VOC*) are found to be 35 percent higher in the case of workers and 19 percent higher for self-employed than those who have not received any vocational training. The estimates in Table 3 also show that in the case of workers the regressions do not improve the explanatory power of the function. In the case of the self-employed, however, the log variance of earning improves from 28.3 percent to 32.5 percent which may be explained by the inclusion of vocational dummy (rep-

representing 23 percent of the self-employed having acquired vocational training in the sample).

The schooling coefficients given in Table 3 are used here to determine the rates of return to specific levels of education. The estimated rates of return are given in Table 4 which show that the rates are very low on an absolute level for primary and secondary education but are quite high for higher education. It is interesting to note that the highest rates correspond to higher education and the lowest to secondary education in both the categories. The rates of return to primary education are higher as compared with secondary but lower if compared with higher education. These results deviate sharply from the pattern observed by some recent studies on Pakistan in that they show that these returns are positively associated with the level of education [Khan and Irfan (1985); Guisinger *et al.* (1984); Haque (1977)]. Another interesting study has observed that the rates of return tend to decline with the level of schooling for all workers and particularly for the informal male and female workers [Khan (1983)].

Table 4

*Rates of Return by Educational Level for Workers and Self-employed*

Educational Level	Rates of Return	
	Workers	Self-employed
Primary	7.76	4.69
Secondary	4.11	2.53
Higher	18.00	10.44

*Note:* Average Schooling years between levels are used as divisor to estimate rates of return.

Different reasons can be given for the observed rates of return to education in the informal sector. For example, the evidence shows that most informal activities became very profitable during the Seventies and Eighties partly due to increased demand for their goods and services and partly due to the deregulated tax free economy which this sector represents [Kazi (1988)]. This was also reflected in higher real wages and earnings in this sector. Therefore, our higher absolute returns can be explained by an overall increase in the real wages in this sector during the same period. In contrast, due to compressed real wages of government employees and other formal sector employees, the estimated rates of return in the formal sector are computed as low. The sharp decline in rates of return for secondary education is sometimes explained by the saturation of

labour market for the matriculates [Khan and Irfan (1985)]. In addition, higher absolute returns can also be explained by the selectivity bias in our sample in that it excludes low level informal activities, females and the unemployed.

## V. CONCLUSIONS

This paper was an exercise to empirically test the claim that earnings in the informal sector do not reflect the rewards for the human capital endowments of the participating individuals. Using survey data from the skill-intensive urban informal sector of Pakistan, human capital earnings functions were estimated for workers and the self-employed. The apparent evidence seems to suggest that human capital investments are rewarded in a manner which is remarkable similar to that prevailing in the formal sector of Pakistan. Schooling and experience affect earnings of the individuals as expected. In particular, there is no evidence of a flat experience-earnings profile.

Although the variation in individual earnings is well explained by schooling and work experience, the analysis suggests that vocational training is an important explanatory variable for the self-employed. This may be due to the self-employed adapting their vocational training to the nature of work in their informal activities. Since the estimated rates of return to different levels of education are relatively higher than the formal sector, therefore, the individuals in our sample have no incentive to move to formal sector jobs. An important policy implication is that we can reduce earning inequalities by extending education and training facilities to more people and by reducing unequal access to such facilities.

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**Comments on**  
**"Earnings Functions in Pakistan's Urban Informal Sector:**  
**A Case Study"**

As one of the few formal analyses of the informal sector, this paper by Burki and Abbas is a very significant contribution to the literature. Considering the importance of the informal sector for the developing countries, this paper is a valuable addition to the meagre literature on the determinants of earnings in the informal sector.

The question of what determines individual earnings and its distribution in a population is an important one both from an analytical as well as a public policy viewpoint. The possible answers to the above question have a strong bearing on issues of economic efficiency and social equity. Though social scientists have investigated the nature of income distribution and related matters for a long time, the fascination with the subject along with the list of unresolved questions has persisted. In fact, one of the unresolved important questions is precisely the one that has been addressed by Burki and Abbas i.e., does the human capital earnings specification apply to the informal sector? In my view, this paper is a successful attempt at estimating a Mincer-type human capital earnings function for Pakistan's urban informal sector. The fact that the paper is based on a recent survey makes it very topical. I would, however, like to present the following specific suggestions that may further sharpen the focus of this paper:

1. Whereas the authors have presented the earnings function both for the self-employed and the wage-earners separately, I propose that they focus only on the 665 wage and salaried earners. Since the self-employed are known to work longer hours and perhaps have different risk preferences, a part of their earnings may really represent returns to these and other factors which systematically differentiate them from the wage earners. In fact, even in the Burki and Abbas sample the mean monthly earnings of the self-employed is about four times that of the wage earners. The self-employed also have higher mean years of experience, schooling, hours worked and the level of vocational training (Table 1 of Burki and Abbas paper);

2. Since the sample excludes low or unskilled workers, the lower end of the skill distribution has gotten truncated. As acknowledged by the authors too, this sample selection creates upward biases in the regression coefficient estimates. It also makes them less reliable since this decreases the variance of the 'explanatory variable' as well as limits the general applicability of the results. The possibility to control for this sample selection bias by using the inverse Mill's ratio should be looked into;
3. We need to interpret the results for the wage earners with caution since the mean age of the people in the sample is rather low. So the interpretation of the experience coefficient for this sample of young wage earners needs to be made in that light;
4. The authors have some interesting results when they introduce nonlinearities by using the schooling dummies. However, Mincer-type nonlinearities could have been tested as well by including a quadratic or even a cubic schooling term;
5. I also suggest that it would be useful to test the alternative earnings function specifications which control for such factors as the individual's family background and credential effects of schooling. As noted by Behrman and Birdsall (1987), ignoring such control factors could seriously overstate the rate of return to schooling; and
6. Finally, the comparison of the rates of return across the formal and informal sector is a little tricky considering the possibility of variations in samples as well as in classifications of the formal vs informal sector across studies. Such a comparison is a particularly difficult one to make if biases are suspected in the rates of returns to schooling for one or both of these sectors. It is better to hold off this comparison till signal to noise ratio improves in such studies.

In general, I feel that this study by Burki and Abbas is a very important one. It demonstrates that the human capital earnings function is a viable specification particularly for the wage earners. Like all good research, their analysis stimulates its audience to think of the extensions and variations on the theme. I would like to commend the authors for a very interesting paper.

Tayyeb Shabbir

Pakistan Institute of  
Development Economics,  
Islamabad.

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