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Economic Analysis of Earnings in Pakistan: A Case of Sargodha District

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Abstract

This paper investigates human capital and socio-economic factors in order to find out the personal earnings of workers in Sargodha District. The Multiple Indicator Cluster Survey data 2007-08 of Punjab has been used. Education and age are used as variables for human capital whereas, gender, age, age square, different classes of age, marital status, area, different education level, employment status, and tehsil dummies are used to investigate the determinants of personal earnings of the workers of Sargodha district. Ordinary least square results explore that education and age plays an important role in the determination of personal wage. Moreover, as the level of education increases the returns to each year of education also increases. Male workers earn more than female which indicates gender discrimination in the labour market. The most productive age is 40-45 years. The individual belongs to rural areas earn more than urban counterparts. When we analyzed the earning pattern in the context of different occupational classes the magnitude of agricultural sector is high. Hence, these facts highlight the importance of a district level growth/economic strategy because the dynamics and geography of each district is different from the other and the earning pattern of a particular district is closely aligned with its demographic conditions.

Key words: Human Capital, New Growth Strategy, Sargodha, Earnings.

1. Introduction

Increased productivity, fortified internal markets and community-led development considered as necessary conditions for country's development. The "New Growth Strategy" (NGS) becomes a table talk in Pakistan among researchers, policy makers and politicians. This approach puts emphasis to increase

productivity, innovation and entrepreneurship in Pakistan. It stresses to encourage good governance, improve the structural capabilities of cities and transform land entitlements in which economic efficiency is gained. Provision of facilities and encouragement of interactions among people at city level is one of the main features of this strategy. Every area has its specialties. The need is to highlight these specialties to achieve the collective productivity gains. There is a need to identify the areas and to invest in their specialty with the help of hardware (e.g., infrastructure) and software (innovation and better management). The NGS firstly puts emphasis on thinking of the new role of cities as engines of growth. Secondly, there is a need to move towards the development approach while focusing on the software (talent, technology and tolerance) of cities.

The individual prefers to do work in that sector where wage rate/earnings are high. Education, experience etc. increase the individuals earning. Several studiesⁱ highlight that there is positive relationship among earnings and schooling and confirmed the significance of education in economic and social spheres. Human capital investment (investment in health & education) heaves labour productivity and provokes an efficient allocation of resources (Schultz, 1992). The well-being of the family is dependent on the earnings of the members. The inequalities among households significantly increase in the case of earning disparities. There are several reasons behind personal income inequality. Personal income may be unequal due to the differences in educational status, experience, skills etc. Therefore, individuals invest in human capital in order to gain more earnings in future because investing in human capital increases their productivity. As wages are given according to productivity of labor, so as the productivity of labor increases the wages of labor also increase. The earning gap between rich and poor might create severe problems for society. The consequences of this earning disparity are great challenge for policy makers of developing and developed countries. Therefore, there is a great need to study the determinants of personal earning.

Several studies in Pakistan like Hamdani (1977); Guisinger et al. (1984); Khan & Irfan (1985); Ashraf & Ashraf (1993); Ahmad & Sirageldin (1994); Nasir (1998); Nasir & Mahmood (1998); Nasir & Hina (2000); Awan & Hussain (2007); Awan et al. (2011a,b) and others, highlight this issue in their own

manners. These studies tried to investigate their study objectives on overall Pakistan or on provincial level. The earning disparity may be due to other factors like regional ideology about work, social setup of the society, cultural and religious norms of that area etc. Therefore, it is a need to study not only the impact of human capital on personal earnings, but to investigate the socioeconomic factors due to which personal earning is unequal. Hence, a study on district level and even on tehsil level will highlight the reasons of earning disparities in more depth. On city level, the only study of Haque (1977) is perceived in literature, with reference to Pakistan, that investigates the determinants of personal earnings of Rawalpindi city. The present study is an effort to find out the factors that play a major role in shaping up the personal earnings of the inhabitants of Sargodha district. The recognition of these factors at district level can help to design policies not only to improve the economic and social conditions of the individuals but also the growth strategy for the region. The study used MICS 2007-08 data in order to fulfill the objectives of the study.

The rest of study is organized as: Section two explains the theoretical frame work for the study, section three discusses variables and data sources, section four investigates and interprets the empirical results, and finally section five gives the conclusion of the study and also provides some policy implications.

1. Theoretical Framework

The theory of human capital provides the basic frame work for our analysis. This theory states that people spend in human capital to get more earnings in their upcoming life because investing in human capital boost their productivity. Because wages are specified according to productivity of labor so, as productivity of labor increases the wages of labor also increase. Individuals invest on human capital up to that point where their marginal returns equals marginal costⁱⁱ. In literature large numbers of variables are used to find out the determinants of personal earnings. Therefore, this study is using multiple regression models to dig out the determinants of personal earnings in Sargodha District. Several continuous and dummy variables are used in this analysis, which we discuss in detail in data and methodology section.

$$w_i = \beta_0 \sum_{p=1}^n \alpha_p Y_{pi} + u_i$$

In above equation p shows the different variables, i show the individuals, w_i is the monthly earning in terms of natural logarithm, Y_{1i}, \dots, Y_{ni} are the n th observable continuous and dummy characteristics of individuals which are used to explain w_i , while u_i is the disturbance term.

2. Variables and Data Sources

The study used Multiple Indicator Cluster Survey (MICS) of Punjab 2007-08. This data set gives complete information about household characteristics as well as earnings, occupation sector etc. First round of survey was conducted in 2003-04 and second round was completed in 2008. The survey was conducted by the Bureau of Statistics, Government of Punjab, Planning and Development Department with technical support of The United Nations Children's Fund (UNICEF). MICS 2007-08 consists of more than 70 indicators, which were 40 in MICS 2003-04, and the coverage has been extended down to Tehsil level. The survey covered 6,368 clusters and 91,280 households in urban and rural areas of the Punjab province. This study puts focus on District Sargodha only.

This study used the variable education which captures the direct human capital effect and age as a proxy of human capital. The study used age as proxy of human capital because in MICS data set there is no data regarding school starting age. One possible solution of this problem is to set the school starting age as six years but we have no continuous data on education. Moreover, we drop the unemployed and unpaid family helper for our analysis because the focus of this study is to investigate the determinants of personal earnings. The study used gender, age, age square, different classis of age, marital status, area, different classes of education, employment status, and tehsil dummy. The detailed descriptions of the variables are as follows.

Age = age of the respondent in years.

Age 1 = dummy variable, which is equal to 1 if age is between 16-19 years and 0 otherwise.

Age 2 = dummy variable, which is equal to 1 if age is between 20-24 years and 0 otherwise.

Age 3 = dummy variable, which is equal to 1 if age is between 25-29 years and 0 otherwise.

Age 4 = dummy variable, which is equal to 1 if age is between 30-34 years and 0 otherwise.

Age 5 = dummy variable, which is equal to 1 if age is between 35-39 years and 0 otherwise.

Age 6 = dummy variable, which is equal to 1 if age is between 40-44 years and 0 otherwise.

Age 7 = dummy variable, which is equal to 1 if age is between 45-49 years and 0 otherwise.

Age 8 = dummy variable, which is equal to 1 if age is between 50-54 years and 0 otherwise.

Age 9 = dummy variable, which is equal to 1 if age is between 55-59 years and 0 otherwise.

Age 10 = dummy variable, which is equal to 1 if age is over 60 years and 0 otherwise.

Age square = square of the age of the respondent in years.

Gender = dummy variable, which is equal to 1 if respondent is male 0 for female.

Marital Status = dummy variable, which is equal to 1 if respondent is married and 0 otherwise.

Area = dummy variable, which is equal to 1 if respondent belongs to all urban area 0 for rural areas.

Education 1 = dummy variable, which is equal to 1 if respondent's education level is Primary and 0 otherwise.

Education 2 = dummy variable, which is equal to 1 if respondent's education level is Middle and 0 otherwise.

Education 3 = dummy variable, which is equal to 1 if respondent's education level is Metric and 0 otherwise.

Education 4 = dummy variable, which is equal to 1 if respondent have higher educated degree and 0 otherwise.

Education 5 = dummy variable, which is equal to 1 if respondent have Mudrassa degree and 0 otherwise.

Employment 1 = dummy variable, which is equal to 1 if respondent is employee and 0 otherwise.

Employment 2 = dummy variable, which is equal to 1 if respondent is employer and 0 otherwise.

Employment 3 = dummy variable, which is equal to 1 if respondent is self employed and 0 otherwise.

Employment 4 = dummy variable, which is equal to 1 if respondent is laborer and 0 otherwise.

Employment 5 = dummy variable, which is equal to 1 if respondent belong to Agricultural sector and 0 otherwise.

Employment 6 = dummy variable, which is equal to 1 if respondent belong to other sectorsⁱⁱⁱ and 0 otherwise.

Tehsil Bhalwal = dummy variable, which is equal to 1 if respondent belongs to Bhalwal Tehsil and 0 otherwise.

Tehsil Kotmomin = dummy variable, which is equal to 1 if respondent belongs to Kotmomin Tehsil and 0 otherwise.

Tehsil Sahiwal = dummy variable, which is equal to 1 if respondent belongs to Sahiwal Tehsil and 0 otherwise.

Tehsil Shahpur = dummy variable, which is equal to 1 if respondent belongs to Shahpur Tehsil and 0 otherwise.

Tehsil Silanwali = dummy variable, which is equal to 1 if respondent belongs to Silanwali Tehsil and 0 otherwise.

Tehsil Sargodha = dummy variable, which is equal to 1 if respondent belongs to Sargodha Tehsil and 0 otherwise.

3. Findings of the Study

In first model the dependent variable is log of monthly earnings, whereas age, age square, gender, area, marital status, different educational and occupational levels are the independent variables. By using OLS, results depict that all the variables are significant, except marital status, education1, education 2, education 5, and employment 2. The coefficient of age shows a substantial increase in the wages with each additional year spent. The sign of age square is negative which is according to our expectation and implying the concavity of earning function. Among the different levels of education the people who have a higher degree earn more as compared to the respondent having education less than primary level. As the level of education increases the returns to each year of education also increases. These results are in line

with the previous literature^{iv}. All the occupational status earns more than labourer and respondents belong to agricultural sector earn 18 percent more than the labourer/excluded category. This is the highest earning difference among different occupational level towards excluded category. Moreover, married person earn more than others. Male respondents earn more than female which indicates a gender gap in the labour market. Moreover, the respondents belonging to rural areas earn more than urban respondents.

Table 1: Earning Patterns in Different Education and Employment Groups

Variables	Coefficients	Std. Error	Sig. Level
Constant	8.806	0.040	0.000
Age	0.009	0.002	0.000
Age ²	-0.001	0.000	0.000
Gender	0.124	0.013	0.000
Area	-0.027	0.010	0.006
Marital status	-0.008	0.013	0.559
Education 1 (Primary)	0.008	0.013	0.554
Education 2 (Middle)	0.013	0.013	0.327
Education 3 (Metric)	0.042	0.012	0.001
Education 4 (Higher)	0.106	0.015	0.000
Education 5 (Mudrassa)	0.185	0.163	0.255
Employment 1 (Employee)	0.109	0.012	0.000
Employment 2 (Employer)	0.016	0.073	0.146
Employment 3 (Self Employed)	0.090	0.012	0.000
Employment 5 (Agriculture)	0.180	0.012	0.000
Employment 6 (others)	0.104	0.024	0.000
R square	0.082	Std. Error of Regression	0.3245
Adjusted R square	0.079	F-Statistics	37.231 [0.000]

We segmentize the age of the target people into different categories. The purpose of this exercise is to point out the most productive age. OLS results depict that the sign of gender, area and marital status are same as in first model. The most productive age is found between 40-45 years. This result is similar with Haque (1977) in which city level data investigates that 40 years is the most productive age. The result regarding earnings due to different educational level is same is as we investigated in first model that,

people who have higher education earn more as compared to the respondent having education less than primary level.

Table 2: Earning Patterns in Different Age and Education Groups

Variables	Coefficients	Std. Error	Sig. Level
Constant	9.007	0.044	0.000
Gender	0.113	0.013	0.000
Area	-0.050	0.014	0.000
Marital status	-0.013	0.044	0.346
Age 16-19	0.046	0.042	0.290
Age 20-24	0.030	0.043	0.477
Age 25-29	0.024	0.044	0.574
Age 30-34	0.043	0.044	0.326
Age 35-39	0.092	0.045	0.038
Age 40-44	0.152	0.045	0.001
Age 45-49	0.146	0.045	0.001
Age 50-54	0.126	0.045	0.005
Age 55-59	0.110	0.046	0.018
Age 60 and above	0.101	0.044	0.023
Education 1 (Primary)	0.021	0.013	0.108
Education 2 (Middle)	0.040	0.013	0.002
Education 3 (Matric)	0.076	0.012	0.000
Education 4 (Higher)	0.158	0.014	0.000
Education 5 (Mudrassa)	0.235	0.165	0.155
R square	0.055	Std. Error of Regression	0.3292
Adjusted R square	0.052	F-Statistics	20.376 [0.000]

Model three is the human capital model, in which we use education as a direct human capital variable and age as an indirect variable. The result depicts that all the variables are significant except Education 5 (Mudrassa).

Income is increasing function of education that confirms the human capital hypothesis. Higher level of education commands increasingly higher level of income. Again we found that as the level of education increases the returns to each year of education also increase. The age is positively related with personal

earnings that show a substantial increase in the wages with each additional year spent. These results are in line with Haque, 1977.

Table 3: Human Capital Model's Result

Variables	Coefficients	Std. Error	Sig. Level
Constant	8.940	0.029	0.000
Age	0.010	0.001	0.000
Age ²	-0.008	0.000	0.000
Area	-0.051	0.010	0.000
Education 1 (Primary)	0.027	0.013	0.032
Education 2 (Middle)	0.052	0.013	0.000
Education 3 (Matric)	0.087	0.012	0.000
Education 4 (Higher)	1.52	0.014	0.000
Education 5 (Mudrassa)	0.224	0.166	0.177
R square	0.039	Std. Error of Regression	0.331
Adjusted R square	0.038	F-Statistics	32.232 [0.000]

In fourth model, we introduced dummies for different tehsils of Sargodha district. Again the sign of age, age square, and area is same as in our previous analysis. The respondents having higher degree earn more than others. Among all the tehsils dummies, dummies of Sahiwal and Shahpur are insignificant. The magnitude of Silanwali tehsil is higher than all other tehsils. Silanwali tehsil is famous for its handicrafts and wood works and this area produced lot of agricultural commodities like sugar cane. The magnitude of the coefficient of Bhalwal is at second number and individual belonging to that area earn more than Sargodha (reference category). Bhalwal is famous for Citrus and large number of people are engaged with Citrus grading, polishing etc. Our previous result no doubt, is far from trend; where we find that rural individual earn more than urban and magnitude of the coefficient of agriculture sector is high. However, after the results we taken from tehsil level analysis, it is confirmed that these result are due to the ground realities of Sargodha region, in which large number of individual are engaged with agriculture related sectors (agriculture-plus).

Table 4: Tehsils-Wise Human Capital Model's Result

Variables	Coefficients	Std. Error	Sig. Level
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Constant	8.928	0.029	0.000
Age	0.010	0.001	0.000
Age ²	-0.008	0.000	0.000
Area	-0.050	0.010	0.000
Education 1 (Primary)	0.027	0.013	0.033
Education 2 (Middle)	0.053	0.013	0.000
Education 3 (Matric)	0.086	0.012	0.000
Education 4 (Higher)	0.153	0.014	0.000
Education 5 (Mudrassa)	0.220	0.166	0.186
Bhalwal	0.014	0.013	0.251
Kotmomin	0.014	0.014	0.292
Sahiwal	0.014	0.015	0.358
Shahpur	0.001	0.014	0.923
Silanwali	0.029	0.013	0.030
R square	0.040	Std. Error of Regression	0.331
Adjusted R square	0.038	F-Statistics	20.278[0.000]

Now we extend our analysis and try to investigate the human capital factors by gender and marital status.

The sign of marital status, area, and gender is similar as we found in all previous models. Coefficients of the dummies of Kotmomin, Sahiwal and Shahpur are not significant.

Table 5: Tehsil-Wise Earning Patterns

Variables	Coefficients	Std. Error	Sig. Level
Constant	9.018	0.022	0.000
Age	0.002	0.000	0.000
Gender	0.110	0.013	0.000
Area	-0.048	0.010	0.000
Marital status	-0.038	0.012	0.001
Education 1 (Primary)	0.018	0.013	0.157
Education 2 (Middle)	0.039	0.013	0.003
Education 3 (Matric)	0.075	0.012	0.000
Education 4 (Higher)	0.157	0.014	0.000
Education 5 (Mudrassa)	0.231	0.165	0.163
Bhalwal	0.017	0.013	0.168
Kotmomin	0.011	0.013	0.304
Sahiwal	0.015	0.015	0.304
Shahpur	0.001	0.014	0.993

Silanwali	0.030	0.013	0.021
R square	0.047	Std. Error of Regression	0.330
Adjusted R square	0.045	F-Statistics	22.308 [0.000]

4. Conclusion and Policy Implications

The purpose of this study is to dig out the human and non-human capital factors in order to determine the personal earnings of workers in Sargodha District. The study use Multiple Indicator Cluster Survey data 2007-08. Education is used as a direct human capital variable while; age is a proxy of human capital. The dependent variable is monthly income which is in log form while, independent variables are gender, age, age square, different classes of age, marital status, area, different classes of education, employment status, and tehsil dummies. Ordinary least squares results depict that education and age plays a significant role in the determination of personal wage. The magnitude of the educational variable increase as the education level increases. Finally, the workers who have higher level degree earn more than the workers having education less than primary level. Male workers earn more than female which indicates gender discrimination in the labour market. The most productive age is 40-45 years. The individual belongs to rural areas earn more than urban individual. When we analyze the earning pattern in the context of different occupational classes the magnitude of agricultural sector with some value-addition is high. Hence, these facts highlight the importance of a district level growth/economic strategy because the dynamics and geography of each district is different from the other and the earning pattern of a particular district is closely aligned with its demographic conditions.

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End Notes:

ⁱ Birdsall, 1985; Chernichovsky, 1985; Khan & Irfan (1985); Jamison and Lockheed, 1987; Haque, 1977; Hamdani (1977); Shabbir, 1991; Singh, 1992; Maglad, 1993; Maglad, 1994; Nasir & Hina, 2000; Awan & Hussain, 2007; and others.

ⁱⁱ For more detail see Becker (1974).

ⁱⁱⁱ Pension, Tutor, Embroidery/stitching, Student labourer, Labourer student, Home-based work/cottage

^{iv} Hamadani, 1975; Haque, 1977, Khan & Irfan, 1985; Shabbir, 1991; Nasir & Hina, 2000; Awan & Hussain, 2007; Awan et al., 2011.