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Regional Earning Differentials in Pakistan: Does Age Makes a Difference?

ABSTRACT

To investigate regional earning differentials in Pakistan, Data has been taken from Pakistan Social and Living Standard Measurement. Analysis has been carried out for all, young and old earners. Earning differences are decomposed by using the Oaxaca decomposition technique. Results indicate that old earners face less discrimination as compared to young earners in rural areas. Income differences of 31.6% for all earners, 34.6% for young earners, and 21.5% for old earners are due to regional (urban and rural) factors, which indicates discrimination towards rural workers. Overall, urban workers earn 27% more than rural workers. The impact of education on earnings is higher for urban workers than for rural workers in the case of all earners. The impact of the relatively lower level of education on wages is more in rural areas than in urban areas for young earners. As young earners receive higher education i.e. above graduation, the impact of education is more on earnings if worker resides in an urban area. Furthermore, the impact of the lowest level of education on the earning of workers is more in rural areas than in urban areas for old earners, but as education increases impact is stronger for old earners in urban areas. Based on the results, few policy implications have been discussed.

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1. INTRODUCTION

Urban and rural wage patterns in developing countries have dichotomous characteristics. Various studies have highlighted urban-rural wage differentials across the world which demonstrates that people living in rural areas earn less than those who reside in urban areas even after having the same endowments of the characteristics (Gollin et al., 2014; Young, 2013).

Like other developing countries, Pakistan has experienced the same patterns of income inequality among regions. Along with Pakistan's urban areas, the countryside has also contributed to the growth of the country in past decades, but differences in the development of urban and rural areas in general, and gaps in education and income among regions in particular, have contributed to unequal regional prosperity and poor rural development in the country. As per the World Bank (2019), 63.1% of the population in Pakistan lives in rural areas, whereas 36.9% lives in urban areas. These statistics indicate that majority of the population lives in rural areas. Inequalities in income deprive the majority population of the country residing in rural areas of equal opportunity of participation in economic activities. Such disparities in income also lead to migration to urban areas, besides inefficient allocation of resources, and increasing poverty in rural regions.

Regional earning differentials disincentives people to work in rural areas, which leads to the migration of educated and skilled individuals to urban areas or where there are better working opportunities. Table 1 presents the percentage of people living in Urban and Rural areas of Pakistan in 1960 and 2019. These statistics indicate that people have migrated to urban areas of the country in the last few decades, which indicates that a major portion of the population has migrated to urban areas of the country.

Table 1: Urban and Rural Population Proportion in Pakistan

Region	1960	2019
Rural	77.9%	63.9%
Urban	22.14%	36.9%

Source: Author's Self Calculation Compiled from World Development Indicator

Migration of skilled labor force from rural to urban areas increase the disparity in urban-rural areas, which is described in the report published by International Fund for Agricultural Development (Imai & Malaeb, 2018):

> *"... As a country experiences urbanization, rural-urban disparity tends to increase. If, for example, labor productivity in rural areas rises at a slower rate than in urban areas, the disparity between rural and urban areas will widen even if the proportions of the population in rural and urban areas remain constant. If this comes with an increase in the proportion of the population or labor force in urban areas, overall inequality tends to increase much faster. Different countries have undergone different processes of rural transformation with different speeds of change in labor, productivity and population in rural and urban areas, resulting in different patterns of change in inequality at national and subnational levels."*

Traditional urban-rural migration model such as, Harris & Todaro (1970) suggests that people who migrate to urban areas from rural areas and do not find employment move back to rural areas, increasing unemployment. Furthermore, earning differential also lead to inefficient allocation of labor which is discussed by Artz et al. (2016):

> *"... Large real wage gaps between equally skilled urban and rural workers are a sign that an inefficient allocation of labor exists by region within a country. The larger the wage advantage earned by urban workers over equally skilled rural workers, the greater the inefficiency…"*

Moreover, earning gaps among urban and rural earnings lead to increased poverty in rural areas. The report published by the Department of Economic and Social affairs of The United Nations states that:

> *"....In most developing countries, rural-urban income disparities contribute significantly to overall income distribution. Typically, the rural population is crowded at the bottom end of the income distribution. The difference between the average per capita or household income of rural and urban populations can be extremely large, reaching staggering proportions in some cases. ...The size of the rural-urban income gap in many developing countries reflects the higher incidence of poverty in rural areas. In all countries except Tunisia, Egypt, Indonesia and the United Republic of Tanzania, the incidence of poverty was higher in rural than in urban areas. It has been estimated that of the 1.2 billion people in the world who live in extreme poverty, 75 percent work and live in rural areas..."*

Our study aimed to investigate income gaps between urban and rural areas of Pakistan and how such income differences vary across different age groups. First, we analyzed earning differentials among urban-rural regions in Pakistan by taking all earners in the sample. Further, we examine the regional wage gap by dividing our data into two groups i.e. young earners (age is less than 40 years) and old earners (age 40 or above). Wage gaps among workers in urban and rural areas are estimated after decomposing the results into 'difference due to endowments' and 'differences due to discrimination.

The paper is organized as follows. Review the previous literature is presented first. In the next section, we discuss data and its descriptive statistics. Furthermore, in the next section, we discuss the methodology and framework used in the paper. We, then, present and interpret the econometric results. The final section of the paper highlights the conclusion and implications.

2. LITERATURE REVIEW

Studies have highlighted various reasons for the gap between urban and rural areas across the globe and in Pakistan. In a recent paper, Gollin et al. (2021) document that higher income in urban areas is offset by urban dis-amenities which include public goods provision, crime, and air pollution. Private consumption and amenities measures improve with an increase in population. But few people prefer rural areas because of more connectedness and easier mobility. Lagakos et al. (2016) have identified that the urban-rural wage gap reflects sorting and spatial misallocation of resources. They have analyzed two interpretations of these gaps: one is that labor is misallocated due to migration risk and incomplete markets and the other is that workers are diverse in characteristics and they sort efficiently considering the migration cost. Moreover, Artz et al. (2016) have attributed urban-rural earning differences to labor market distortions that arise due to a less democratic system, high level of education in urban areas, higher taxes, and lower government share in GDP. Eliminating the urban-rural gap increases per capita GDP by 13.9%.

Moreover, country-wise empirical evidence has also been estimated in different studies. Zhang et al. (2016) concluded that 49% of the urban earner's wages and 17% of the urban-rural wage gap in China cannot be explained by observable factors. Education, experience, variation across the industry, occupation account for most of the explained earning differential. Zhu et al. (2016) also investigated determinants of the regional income gap in China. The adjustment reduces the urban-rural earning gap and inequality. After controlling characteristics, residence location is the most important factor in the difference in earning as studied by Sicular et al. (2006). Pereira and Galego (2011) have investigated regional wage differentials for Portugal for time series data for 1995 and 2002. They found that wage differences due to unobservable factors have declined over time. Girsberger et al. (2020), Tremblay (1986), Margo (1999), Rhoades and Renkow (1998), Kim et al. (2015), Lim et al. (2009), Enflo et al.

(2014), Chiquiar (2008), and Nahar et al. (2015) have studied cross country wage differentials across the globe.

In Pakistan, there is hardly any study that analyzed regional earning differentials. One of the rare studies is by Shahbaz et al. (2007). They have analyzed the relationship between financial deepening, trade openness, and urban-rural income inequality in Pakistan and concluded that stability in macroeconomic policies, sustained economic growth, investment in social sectors i.e. education, health, and population welfare results in decreasing rural-urban wage gap. Khan and Idress (2014) studied determinants of earning across the district of Pakistan. Personal and household characteristics have a significant impact on earnings. Socio-development factors have a positive impact on earnings and terrorism has a negative impact on earning across different districts of Pakistan.

Furthermore, no such study can be found which analyzes the urban-rural wage gaps among different age groups in Pakistan. This study is an effort to fill the gap in the literature in this regard. Moreover, the study will help devise a policy to reduce wage inequality in the country.

3. DATA

To study regional earning differentials in Pakistan, Data comes from Pakistan Social and Living Standard Measurement (PSLM) for the year 2014-15, which is published by the Pakistan Bureau of Statistics. From PSLM microdata, 122,663 individuals with any kind of earning were selected for the study. Out of these selected individuals, 22,761 individuals reside in urban areas (18.6% of the selected individuals) whereas, 99902 individuals live in rural areas (81.4% of the selected individuals). Moreover, 102,504 individuals in the selected data set were male which is 83.6% of the total earner and 20,159 were female, which is 16.4% of the selected data set. In Marital Status Variable, 99,449 selected earners are married, and the rest 23,214 are unmarried.

Out of selected individuals, 56,263 earners were paid employees which is 45.9% of the selected earners. Whereas, 66,400 individuals were in other categories of employment, which is 54.1% of the total earners. Individuals with less than primary education are 30,677 in number which is captured by edu.1 dummy variable. 30,677 individuals have less than matric education, which is captured by edu.2 dummy variable. Earners who have education less than intermediate and more than matric are 14761 in number and are captured by edu3. Moreover, individuals who have education less than graduation are 6284 in number. Whereas, individuals with education more than graduation are 7521 in number.

Moreover, summary statistics of Variables are presented in Table 2. The maximum standard deviation is showed by the variable "Age", whereas the least standard deviation is shown by Edu4. Further, Mean, Kurtosis, and Skewness are also presented in the Table.

Table 2: Descriptive Statistics

Statistic	Mean	Standard Deviation	Kurtosis	Skewness
Age	38.02	14.492	-0.253	0.505
Marital status	0.81	0.392	0.518	-0.1587
Employment status	0.46	0.498	-1.973	0.166
Gender	0.84	0.371	1.282	-1.811
Edu1	0.25	0.433	-0.668	1.154
Edu2	0.25	0.433	-0.668	1.154
Edu3	0.12	0.325	3.447	2.334
Edu4	0.05	0.220	14.575	4.071
Edu5	0.0613	0.23991	11.375	3.657

(Source: Author's calculation)

4. METHODOLOGY AND ANALYTICAL FRAMEWORK

To investigate regional earning differentials in the country, the Oaxaca decomposition technique has been used. This technique was primarily introduced by Oaxaca (1973) and Blinder (1973). An econometric model for regional earning differential estimates earning differentials across regions i.e. urban and rural. Equation (1) presents the econometric model estimated, which takes the log of wages as the dependent variable and age, age squared, marital status, employment status, gender, and education as explanatory variables. Log has been taken to estimate Mincer (1974)[1] earning function.

$$W_i = \alpha_0 + \alpha_1(Age_i) + \alpha_2(Sq.Age_i) + \alpha_3(MS_i) + \alpha_4(ES_i) + \alpha_5(Gender_i) + \alpha_6(Edu.2_i) +$$
$$\alpha_7(Edu.3_i) + \alpha_8(Edu.4_i) + \alpha_9(Edu.5_i) + \varepsilon_i \qquad (1)$$

In Equation (1) Log of wages (W_i) has been taken as the dependent variable to study regional wage differentials. Age has been used as the best available proxy for experience. Since no variable existed in the survey to capture the effect of experience or duration individual had worked. Few researchers have used (Age- years of Education-4) as a proxy for experience. $Sq.Age_i$ (Square of Age) is used to take into consideration the effect of concavity of age-earning profile. Marital Status is another important determinant of earnings. Two characteristics of marital status i.e. currently married and unmarried have been included. Unmarried is taken as the missing base category. Employment status is also an important determinant of earning differential. Two categories were identified for the study i.e. Paid employees and others who are not paid, employees. Two categories are formed because paid employees usually face wage discrimination than other categories of employment. Individuals other than paid employees are taken as the base category variable. Gender has two categories i.e. male and female. Female has been taken as the base category variable. Five different levels of Education were identified for the study. They were below primary (those with less than five years of schooling) which is taken as base category variable, below matric (those with less than ten years of schooling), below intermediate (those with less than twelve years of schooling), below graduation (those with less than fourteen years of schooling) and above graduation (those with more than fourteen years of education).

Our variable of interest wages are explained by a vector of determinants, as shown in Equation (2) and (3) for rural and urban workers respectively:

$$W_r = \alpha_r + \beta_r x_r + \varepsilon_r \qquad (2)$$
$$W_u = \alpha_u + \beta_u x_u + \varepsilon_u \qquad (3)$$

Where, W_u is a log of wages of urban workers in Equation 3 and W_u is a log of wages of rural workers in Equation 2. x_r and x_u in Equation 2 and 3 are vector mean values of independent variables of rural and urban earners respectively. α_r and α_u are the coefficient of the variable for rural and urban earners respectively.

We construct a counterfactual equation in which we replace the coefficient of rural with that of urban to determine wage gaps between urban and rural.

$$W_r^* = \alpha_u + \beta_u x_r + \varepsilon_r$$

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[1] Mincer earning function is standard single equation model used to estimate earning differentials. It takes natural logarithm of earnings which is linear function of years of education attained and quadratic function of years of experience. It has been estimated by various researchers for almost all countries.

Now, Subtracting log of wages of rural workers from a log of wages from urban workers to get Equation (4):

$$W_u - W_r = (W_u - W_r^*) + (W_{fr}^* - W_{fr}) \tag{4}$$
$$W_u - W_r^* = \beta_u(x_u - x_r)$$
$$W_r^* - W_r = (\alpha_u - \alpha_r) + (\beta_u - \beta_r)x_r$$

Substituting values in (4) to get (5):

$$W_u - W_r = \beta_u(x_u - x_r) + (\alpha_u - \alpha_r) + (\beta_u - \beta_r)x_r \tag{5}$$

Equation (5) can be decomposed into two segments. First segment "$\beta_u(x_u - x_r)$" is explained term. These differences are due to differences in education, skills, and other such factors. The second term "$(\beta_u - \beta_r)x_r$" is unexplained and can be because of discrimination.

In this study, three categories have been developed for analysis which is: full sample which includes all earning population, young earners which includes earner whose age is less than 40, and old earners whose age is 40 or above. The reason for a separate analysis of young and old earners is that we intend to analyze the dynamics of earning across age groups. Young earners usually have unstable jobs and may switch between jobs. Whereas, as age increases, income becomes more stable.

5. RESULTS

Earning differentials were estimated using the Oaxaca blinder decomposition technique among urban and rural areas of Pakistan. This method decomposes estimates into two parts i.e. explained and unexplained. "Unexplained term" usually refers to discrimination or unobservable factors. Analysis was carried out by initially considering a full sample or all earners from the dataset, young earners and old earners. Coefficient estimates for the urban region are presented in Table 3, whereas estimates for rural regions are presented in Table 4.

Table 3: Comparison of Coefficients of All, Young and Old Earners in Urban Regions

Variables	*Urban Region*					
	All age groups		*Young Earners*		*Old Earners*	
	coefficient	*t.value*	*coefficient*	*tvalue*	*coefficient*	*tvalue*
Constant	8.9846	204.52	8.2917	78.11	9.5675	37.58
Age	0.0767***	32.79	0.1351***	16.82	0.0472***	5.51
Age Sqd	-0.0007 ***	-29.66	-0.0017***	-12.38	-0.0005***	-6.49
Gender	0.8712***	54.44	0.9516***	5.40	0.7216***	3.58
Marital status	0.1529***	8.21	0.0973***	50.19	0.3575***	26.28
Employment status	-0.1540***	-13.11	-0.2101***	-14.90	-0.0821***	-4.16
Edu2	0.2554***	17.62	0.1614***	9.36	0.3455***	13.85
Edu3	0.5406***	32.35	0.3862***	19.01	0.7100***	25.33
Edu4	0.7065***	33.37	0.5364***	21.60	0.9057***	24.24
Edu5	1.1626***	65.68	0.9660***	43.37	1.3672***	47.31
R^2	0.3507		0.3756		0.2800	
Adj R^2	0.3504		0.3752		0.2793	

Source: Author's calculation.***, **, * *indicates level of significance at 1%, 5%, & 10%. respectively*

In the case of all earners, explanatory variables (Age, Square of Age, Marital status, Employment Status, Gender, and Education) are statistically significant for both urban and rural regions as shown in Tables 3 and 4. Age, marital status and education (edu.2, edu.3, edu.4, and edu.5) have a positive impact on the earnings of individuals. Age squared and employment status have a negative impact on earnings. The negative sign of age squared indicates nonlinearity of age, which shows earnings increase with age but a decreasing rate. The nonlinearity of age holds for both urban and rural regions. Negative relation of employment status with earning indicates that paid employees earn less than other categories of earners. This negative relation holds for earners of both urban and rural regions of Pakistan. A similar procedure was carried out for young earners (who have age less than 40) and old earners (who have age more than 40). The results discussed above hold for young and old earners as well.

Moreover, in all earners' analyses, the impact of age, marital status, and education are higher for urban areas as compared to rural areas. Results of education are in alignment with previous studies (Rhoades & Renkow, 1998). Whereas, the impact of gender is higher for rural areas. Moreover, male workers earn more than female earners in urban as well as rural areas. In young earners' analysis, age and marital status have a higher impact in urban areas than rural areas. Whereas, results differ in the case of education.

Table 4: Comparison of Coefficients of All, Young and Old Earners in Rural Regions

Variables	Rural region					
	All age groups		Young earners		Old earners	
	coefficient	tvalue	coefficient	tvalue	coefficient	tvalue
Constant	8.8385	426.25	8.0889	150.89	9.3931	71.35
Age	0.0718***	62.40	0.1286***	30.79	0.0420***	9.90
Sq.Age	-0.0007***	-55.68	-0.0017***	-22.17	-0.0004***	-11.54
Gender	1.0979***	142.68	1.1482***	6.11	1.0094***	6.68
Marital status	0.1354***	13.35	0.0627***	126.13	0.4184***	75.59
Employment status	-0.1692***	-28.27	-0.1447***	-20.41	-0.2236***	-21.59
Edu.2	0.2729***	39.42	0.2013***	24.51	0.3479***	28.91
Edu.3	0.5078***	54.32	0.3884***	35.24	0.6520***	39.59
Edu.4	0.6751***	48.08	0.5387***	34.05	0.8713***	32.60
Edu.5	1.0659***	74.81	0.8944***	52.88	1.2783***	51.48
R^2	0.3270		0.3762		0.2293	
Adjusted R^2	0.3269		0.3761		0.2291	

Source: Author's calculation. ***, **, * indicates level of significance at 1%, 5%, & 10%, respectively

Education dummies (Edu.2, Edu.3, and Edu.4) which represent a relatively lower level of education than Edu.5 have a higher impact in rural areas than urban areas. However, Edu5 has more impact in urban areas than rural areas, which indicates a higher level of education has more influence on earning in urban regions. Results of gender are aligned with previous analysis and suggest that male workers earn more than female workers in both rural and urban regions.

Furthermore, analysis was carried out for old earners. Results of variables i.e. age, gender, marital status, and employment status are similar to all earner and young earner analyses. But, Education dummies show a slightly different pattern in the case of old earners. The lowest level of education which is represented by Edu.2 has a higher effect on earnings in rural region earner than urban region earner. An increase in education to Edu.3, Edu.4, and Edu.5 changes the pattern. Impact of Edu.3, Edu.4, and Edu.5 is more for urban areas than rural areas.

Decomposition output is shown in Table 5. Decomposed results divide wage gaps into three parts i.e. endowments, coefficient, and interaction. The first part "Endowment" indicates explained differences or

mean an increase in wages in rural areas if they had the same characteristics as urban areas. Differentials due to endowments are a result of the difference in education, experience, or any other such factor. Estimates in Table 5 suggest that for full sample analysis differences in income due to the endowment is 71.2%. Whereas for young and old earners, the difference in earnings due to endowment is 60.9% and 90.1% respectively. Furthermore, the coefficient quantifies changes in the earning of rural earners when applying the urban coefficient to the rural characteristics.

Table 5: Oaxaca Blinder Decomposition of Regional - Earning Differentials across All, Young and Old Earners

	All age groups	Young Earner	Old earner
Overall difference	-0.2649	-0.2548	-0.2921
Endowment	-0.1887 (71.2%)	-0.1552 (60.9%)	-0.2631 (90.1%)
Coefficient	-0.0839 (31.6%)	-0.0869 (34.1%)	-0.0630 (21.5%)
Interaction	0.0077 (-2.91%)	-0.0127 (4.9%)	0.0340 (-11.6%)

Source: Author's calculation

Coefficient estimates suggest that 31.6% of the differences in case of all earners, 34.1% of the differences in earnings of young earners, and 21.5% of the differences in earnings of old earners in rural and urban areas can be due to unexplained reasons which can be regarded as discrimination against rural labor market of Pakistan.

The overall difference suggests that the average income of earners in urban areas is 27% more than those in rural areas. Whereas if an earner is young, difference squeezes to 26%, but unexplained or discriminatory factor increases. Moreover, if an earner is old (age more than 40), the difference in income of urban and rural workers increases to 29%, but the discriminatory factor is less for the old earner. The overall difference in income is higher for old earners but, the unexplained factor is more in the case of young earners than old earners, as suggested by empirical results. In general, our empirical findings suggest that earners in rural regions face more discrimination, whereas, in particular, young earners experience more discrimination as compared to old earners.

6. CONCLUSION

We examined regional earning differential among urban and rural areas in Pakistan. Urban-rural areas of the country have dichotomous characteristics. People earn more in urban areas as compared to rural areas with the same level of endowment. This study aimed to analyze regional earning differential across different age groups i.e. young and old earners. Analysis has been carried out for all earners in the sample as well. Data has been taken from Pakistan Social and Living Standard Measurement (PSLM).

By using the Oaxaca-Blinder Decomposition method, it can be concluded that 31.6% of differences in earnings of all earners are due to unobservable factors. Furthermore, 34.1% of the income gaps among young earners in urban and rural areas are due to unexplained factors. 21.5% of the differences in earnings in old earners of urban and rural regions are due to factors other than education, experience, and other explained characteristics. The difference in earnings of individuals in urban and rural areas of Pakistan is generally attributed to the endowment. But results suggest that there are some factors other than endowment which are responsible for earning differentials. This difference can be a result of discrimination in the labor market.

Education has a significant impact on earnings. It was analyzed in the study that the pattern of impact of education differs for young and old earners. A relatively lower level of education has more impact on the earnings of young earners in rural areas. As individuals receive higher education impact of education is

more on urban workers. Further, the lowest level of education has more effect on the earnings of rural workers, but as old earner receives more education than the primary level impact of earning is stronger for old earners in urban areas.

Moreover, young people face more discrimination in the labor market than old workers. Even though Pakistan's majority population (63.1%) lives in rural areas, earners face discrimination by employers. The majority of the population is facing discrimination because they reside in rural areas. To achieve inclusive growth in the country, it is essential to provide equal opportunities to all individuals (whether living in urban or rural areas) of the country. (Imai & Malaeb, 2018) write in the report published by International Fund for Agricultural Development:

> *"... Higher non-agricultural growth tends to widen the rural-urban income gap, the acceleration of the agricultural growth rate (towards the non-agricultural growth rate) would reduce the income gap. Policies to promote education in rural areas are deemed important to narrow the rural-urban human resources gap. Policies that would stabilize macroeconomic conditions and reduce fragility are likely to narrow the rural-urban income gap..."*

Policymakers should focus on improving the socio-economic status of the deprived regions. Most of the gap in the urban and rural areas is due to the disparity in the educational, infrastructural, and technological structure of both areas. The human capital formulation in rural areas needs to be focused on improving the quality of education, skill development, and spread of knowledge. Technological advancement and infrastructural facilities in rural areas should be upgraded. Economic policies should target improving macroeconomic conditions in rural areas. Differences in the income of people residing in urban and rural areas of Pakistan is also a major concern for rural development specialist. Development programs will not be effective without the active participation of people. Such active participation will not be voluntary but reciprocal as identified by Gill et al. (1999). Government and Private sector need to work jointly on policies and programs to reduce the regional earning differential in the country. Such initiatives will help in providing equal opportunities to everyone in the country. Moreover, effective implementation of the initiatives already taken is also required to make rural areas more inclusive. Further, there are avenues generally in the regional earning gap and particularly in the case of Pakistan that merit further research, which includes research at provincial and district levels.

Conflict of Interests:
The authors have declared that no competing interests exist.

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