Structural Determinants of Poverty in Pakistan

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Abstract: Poverty of the person is a frustrating hurdle for the household to acquire goods and services. Because of restricted access to resources, a poor person also falls short of his welfare targets. The determination of root causes of poverty must be the primary focus for the underdeveloped and developing economies. This study has used the labour force survey 2010 of Pakistan and extracted 21 indicators which are expected to affect the poverty profile of individuals. Principle factor analysis is used to find important indicators and logit model is used to analyse the effect of important indicators on $1.25 a day poverty status of individual. The result shows that it is the education levels, household size, and job characteristics which define the person being poor.

Keywords: Poverty; Principle factor analysis; Logit model; Labor force Survey.

1. Introduction

The evolution of economics is based on the concept of scarcity, as our needs and wants are endless. The efforts in research and development is playing role in increasing efficiency of resources, still they cannot match needs and wants. If we divide the needs and wants into sub groups, which are necessities and luxuries, so if our income is lower than the income which is required to fulfil the necessities then it is expected to reduce the welfare of the individual. One must know how to sacrifice some non-food necessities and reduces the intake of food necessities (i.e. malnutrition). In Islamic Economics the need of goods and services are divided into three parts first is the essentials without which humans cannot survive like food, clothing and shelter; second is the necessities which are helpful in creating ease in life like transport, and quality food etc. and the last is the embellishments whose purpose is to make life beautiful which are synonym to the term luxury in conventional economics, these include bigger home, expensive vehicle, and entertainment (Al-Zuhaili, 1986; Mustafar and Borhan, 2013). So if a person is not earning income which could allow him to buy basic necessities or essentials then he is deemed to be called as poor. Economic Survey 2014 provides a concise definition of poverty

> *"A state or condition in which a person or community lacks the financial resources and essentials to enjoy minimum standard of life and well-being that's considered acceptable in society."*

When it comes to create a conceptual boundary; who is poor and who is not, it seems easy. When we have to define how much income does it take to come out of poverty, then the issue of relative poverty comes to the surface. People feel poor when they feel their attainment of needs and wants are not similar to what others are getting; even if people are getting necessities the psychological influence makes them to believe that it is not enough, economics is based on the principle, that needs and wants are never ending and some needs are important for someone and not important for others.

According to the head count ratio there is 21.4 percent of population which is earning below US $1.25 and 60.19 percent of population is earning less than US $2.00 a day for the year 2010[1]. This highlighted poverty is most discussed concept of development economics and it is this issue because of which people are undernourished and are forced to sacrifice the luxuries of life which they could have if their incomes were higher. It is because of the hardships the poor face, Holy Prophet (SAW) indicated us to seek refuge from it and Allah guides us to help poor in Al Quran [17:26].

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[1] World development indicators 2014

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Abu Hurairah (RA) Said[2]:

> *The Messenger of Allah [SAW] said: 'Seek refuge with Allah from poverty, want, humiliation and wronging others or being wronged.'*
> *And give the relatives his right, and [also] the poor and the traveller, and do not spend wastefully.* (Al ISRA 26)

Qureshi and Arif (2001) provided the demographic composition of poverty in Pakistan. According to the authors, the age and education of the head of household matters as it alleviates the poverty. For Pakistan it does not matter if the head is male or female as there are equal percentages of population. While other characteristics like having technical education or having migrated to a better residence are important indicators which can reduce poverty.

By using the labour force survey 2010 data of 141283 respondents; after calculating it with household pooled per capita income per month and comparing with the reference of $1.25 dollar per day; monthly income based on 2010 dollar rupee exchange rate, it can be seen that there are 75.4% individuals / respondents who earned income or income share in the household lower than the reference value hence they are considered to be poor while remaining 24.6% individuals are those income levels are higher than the reference value so they are considered to be not poor. These statistics are significantly different as compared to the statistics provided in economic survey of Pakistan. Since this study is using a survey data, hence it is more likely to identify the micro level factors which influence the individual on being poorer.

The objective of this study is to determine the individual and household level indicators which determine poverty characteristics of an individual on the basis of labour force survey 2010 which will help in designing social and economic policy to eradicate this issue of scarcity in terms of provisions of resources for major proportion of the population.

Table-1. Poverty indices of Pakistan

Year	2000-01	2004-05	2005-06	2007-08	2010-11
Poverty Line	Rs 723.40	Rs 878.64	Rs 944.47	Rs 1141.53	Rs 1745.00
Overall poverty	34.4	23.9	22.3	17.2	12.4

Source: Economic Survey of Pakistan 2015

2. Literature Review

In this study the empirical references to factors which can affect poverty status are being cross referenced and their justification of being a suitable factor is stated.

Qureshi and Arif (2001) worked on the determinants of food and basic needs of poverty in case of Pakistan by using indicators like age, gender, education of the individual, household size and its migration status in his lifetime. According to the logistic regression Qureshi and Arif (2001) concluded that for the case of basic needs higher age, higher household size, and lower education attainment leads to higher chances of person being poor. In this study education has been considered an important factor which not only increases the productivity of an individual but it also helps in increasing the productivity of the individuals of his family. Iqbal *et al.* (2009) also proposed that the household size as an important factor for poverty while studying Sargodha city.

Building on it, Hyder and Sadiq (2010) used the data of PIHS 2001/02 and 2004/05, Shirazi (1985) used HIES 1987/88 for Pakistan and a rural study by Malik (1996) concluded that higher education leads to greater reduction in extreme poverty while also confirming results of (Qureshi and Arif, 2001) where age of an individual and number of children are significantly effecting the odds of person being poor. Hyder and Sadiq (2010) also incorporated indicators like person's marital status where a married person is less likely to be poor, and the employment status of an individual where the jobs having irregular payments are contributing more to the poverty.

The determinants of poverty on the household / individual level analysis in Pakistan are coinciding with other empirical work, studies like (Geda *et al.*, 2005), (Datt and Jolliffe, 1999), (Coulombe and Mckay, 1996), (Rupasingha and Goetz, 2007), (Mukherjee and Benson, 2003) which are proposing that role of education, and household size are important in determining poverty.

The studies which have evaluated the determinants of poverty in Pakistan have used a ordinal level data of education which assumes that the marginal impact of the increased level of education remains the same whereas this study will split this variable into several binomial variables describing each education level attainment separately, the advantage of this process is that we can allow the model to have different slopes of different level of education. Also building on Hyder and Sadiq (2010) this study will split the employment status variable into parts, one is employment type which includes employed, unemployed and not in labour force while other will be contract type which includes permanent job, long term contract, short term contract, and no contract.

This study has incorporated the characteristics of the household head like number of hours the household head is working, and salary of household head which is a microeconomic reverse proxy for the unemployment which is

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[2] Sunan an- Nasa'i Vol.6, Book 50 (The Book of Seeking refuge with Allah), Hadith 5463

considered to a positive factor for poverty (Chaudhry *et al.*, 2006). Lastly this study has used other employment market factors which can influence the salary and consequently the poverty of the individuals, this factors include characteristic of person having two jobs, periodicity of the salary payments, any technical training in past, marital status, and looking for more work or not.

In order to counter the possibility of multicollinearity and lack of degree of freedom in the 21 proposed independent variables this study will use the factor analysis in SPSS to reduce the variables to a smaller set which can still explain the major portion of the dependent variable. At the end the factors generated from the factor analysis will be used in the regression analysis in order to determine the marginal impact on the probability of the person being poor.

3. Methodology

In the methodology section, all the available information will be analysed in the light of the discussion being done in the introduction chapter and the review of empirical studies.

3.1. Research Question

With the help of introduction to the issue and its empirical study following are the research objectives which this study will intend to fulfil.
1. Out of all proposed indicators of poverty for the case of Pakistan, how many of them are significant based on criteria of minimum Eigen value (1.0 Eigen value)?
2. Using the short listed indicators of poverty how many of them are significantly explaining the poverty level of Pakistan?

3.2. Variables

There are two sets of variables first one are the variables which are taken directly from the empirical studies and the remaining are the derived forms of these variables

1. Age of the respondent
2. Household size of the respondent
3. Gender of the respondent
4. Educational level of respondent
5. Migrated from rural area or not
6. Individual working hours
7. Family total working hours
8. Salary of the individual
9. Searching for more jobs or not
10. Literate or not
11. Education level up to middle
12. Education level up to matriculation
13. Education level up to intermediate
14. Education level up to degree
15. Education level of masters and above
16. Marital status
17. Had technical training
18. Employment status
19. Employment contract type
20. Periodicity of pay
21. Having dual occupation

3.3. Poverty and Household Level Indicators

While comparing the data with the independent variables, some of the statistics were showing patterns which can explain the differences in the poor and non-poor individuals
1. First of them are the characteristic of the individual of being migrated in his life, as for individuals who migrated, poor are twice of the non-poor while individuals who did not migrated, the poor are three times of the non-poor. Hence it can be expected that characteristic of recent migrate can reduce the probability of an individual being poorer.
2. Second prominent statistic is education, In the case of individuals who had education up to degree and for the education beyond degree, here the poor are surprisingly lower than the non-poor while comparing to individuals who have low education where the poor are more than non-poor. So it can be expected that if individuals attain higher education levels they tend to reduce the probability of ending up poverty.
3. Thirdly, the effect of training in job also seems fruitful as for the individuals who are had the training the poor are twice of non-poor while for individuals who did not had any training the poorer are three times of non-poorer. Hence training can help in increasing income and reducing poverty.
4. Fourthly, for the case of individuals being characterized in terms of their job contracts, here as expected only the individuals with the permanent jobs are less poor than the non-poor. Longer term contracts tend to give confidence to the individuals to plan for future, hence, they tend to be not poor.

3.4. Factor Analysis

Since these proposed variables are expected to be correlated with each other which might lead to multicollinearity. Preliminary zero-order, partial and part correlation test, Tolerance and VIF test shows that variables like education level, literacy, Education level up to middle, Education level up to matriculation, Education level up to intermediate, Education level up to degree, and Education level of masters and above seem to have significant correlation with each other. For this, in this section factor analysis is used to arrange the variables in

terms of its importance and select the variables which explain some variation of the dependent variable which is called Eigen value equal to 1 in technical terms. Commonalities table revealed that almost all of the variables have high degree of commonality with the dependent variable none of them is lower than the cut off value of 30% commonality, hence this study will proceed by using all of these variables for determinations of reduced factors.

In terms of total variance explain, the factor analysis procedure proposes 21 factors. Each of provided variables explains the common variable. Out of these 21 factors some explain 100% of the common dependent variable. These factor analysis short lists 10 factors based on its Eigen value greater or equal to 1 and these 10 factors are still able to explain 71.7% of the variation in the dependent variable, which is surprisingly high considering more than 50% of the variables will be dropped but their explanation will only drop by 28.3%.

In order to balance the Eigen values, rotated component matrix checked for comparing the components with the variables used. Here we can see that for all the factors following are the variables which are most correlated with the factors and their correlations are also provided

1. Education level up to degree (0.966)
2. Marital Status (0.875)
3. Education level up to masters and above (0.949)
4. Education level up to middle (0.878)
5. Household size of respondent (0.907)
6. Education level up to Intermediate (0.904)
7. Individual working hours (-0.700)
8. Education level up to matric (0.977)
9. Technical training (0.528)
10. Having dual occupation (0.845)

Here we can see, rather than education level as a whole being an important factor in reducing poverty which is proposed by Qureshi and Arif (2001); the separate variables for separate level of education is being shown in this study as an important factor. Hence this study will use these new created factors which can be interpreted with the same way as the most correlated variable would have been.

3.5. Ordinary Least Square Estimates

Proceeding to the factor analysis, the ordinary least square regression analysis procedure is applied using the factors as proxy for the variables which are mentioned above, OLS estimates are mostly used as benchmark and if the results do not show any sort of statistical problem then they are used for inference and policy.

In the table below are mentioned are the coefficients, all of them are statistically significant which can be seen from the significance value of individual variables. From the significance of F test of the model it can be said that overall model is valid. From the sample of 25440 respondents, all the independent variables are moderately positively correlated with the dependent variable and coefficient of determinant that shows that these variables are accounting 18% of the variation in the dependent variable which is moderate considering the dependent variable is behaviour characteristic.

The results shows that variables like education level up to masters, Education level beyond masters education level up to intermediate and technical training are reducing the chance of the person being poor while others are increasing the chances of being poor. Here we can see that the coefficient of each education attainment variable is different hence it justifies the use of separate dummies rather than making a multinomial variable which shows overall education level.

Table-2. Least Square Regression Analysis Dependent variable (Individual being poor (1) or not poor (0))

Independent variables	Factor number	Coefficient	Significance
Constant		0.63	0.00
Education level up to masters	Factor 1	-0.11	0.00
Marital Status	Factor 2	0.02	0.00
Education level more than masters	Factor 3	-0.14	0.00
Education level up to middle	Factor 4	0.02	0.00
Household size of individual	Factor 5	0.06	0.00
Education level up to intermediate	Factor 6	-0.03	0.00
Individual working week hours	Factor 7	0.04	0.00
Education level up to matriculation	Factor 8	0.02	0.00
Technical training	Factor 9	-0.04	0.00
Having Dual occupation	Factor 10	0.03	0.00
Regression Diagnostics			
Sample size	25440	F test (Prob.)	545.6 (0.00)
R	0.42	R squared	0.18

While analysing the diagnostics, there is no hint of multicollinearity which is checked from the criterions like VIF, Tolerance, and Eigen value and condition index. While checking the normal histogram plot we can see in figure 1 that there are two peaks in the data which shows that the dependent variable was binomial which is being shown in the histogram hence model residuals are not normal and while analysing the standardized residuals and standardized estimated dependent variable we can see there are two groups of data showing a downward sloping patterns in figure 2 and lastly if we check the residual statistic table we can see the minimum and maximum value of predicted dependent variable is beyond 0 and 1 respectively which is not realistic. All of these issues are indicating that as this model has used a binomial dependent variable, OLS does not support this kind of variable hence causing hetroskedasticity and wrongly predicting dependent variable.

Fig-1. Histogram   **Fig-2.** Scatter Plot
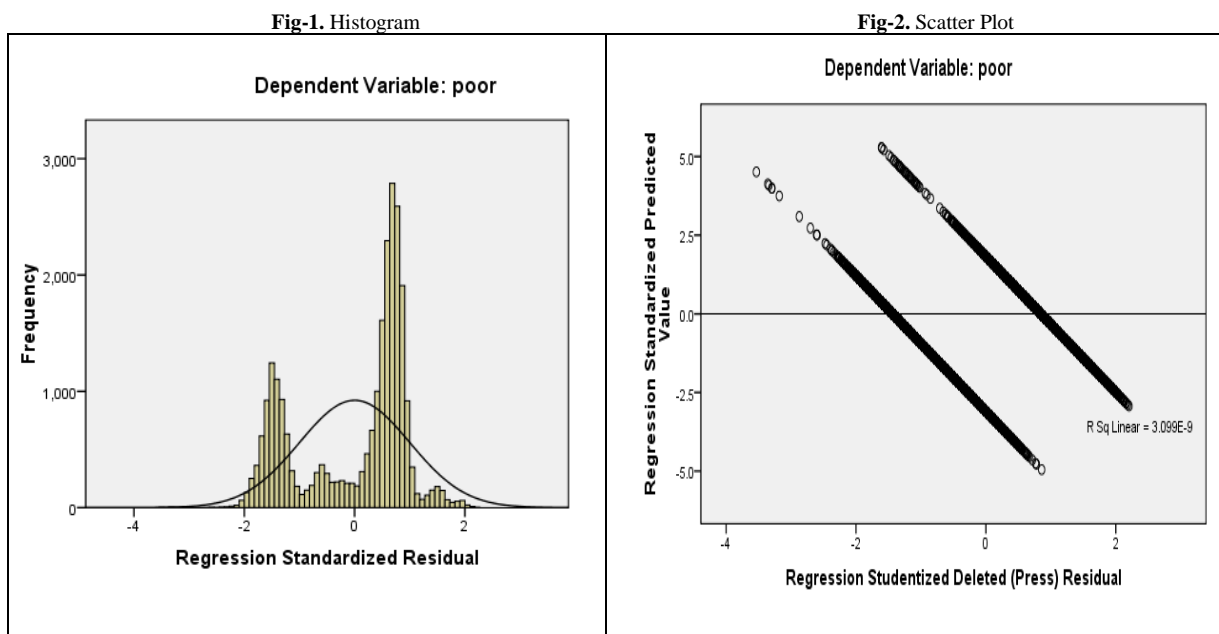
3.6. Binary Logistic Regression

As we have used the binomial variable in dependent, OLS estimates could have some problems like hetroskedasticity in the model, and chances of estimated dependent variable to be beyond the 0 and 1 value of the binary variable which is not true in reality (Gurajati, 2003). Hence under such situation an appropriate model is the one which can incorporate the binary dummy variable as dependent variable, this model is called binary logistic regression.

The interesting thing about this model that since coefficients are not directly interpretable we require reference value of independent variable but this model also provides odds ratio which tells how much odds will improve for the characteristic of dummy dependent variable whose value is 1. Hence if the coefficient is negative then the odds ratio will be less than 1 and vice versa. Here Omnibus test is significant which shows that all the included variables are benefiting the model in terms of explaining the dependent variable. Naglekerke R-square value of 0.24 shows that the included independent variables are explaining 24% of the dependent variable which is quite high based on the fact that the dependent variable is behaviour based. SPSS also makes a chart of sensitivity[3], specificity[4], false positive[5] and false negative[6] and provides a statistic called success rate of the model which is 72.1% which is actually the sum of sensitivity and specificity of the model.

In this model it can be seen that if the respondent has education up to masters then his odds of ending up poor is increased by a multiplicative factor of 0.6 which means technically it is decreased on average which is expected as higher education will enable individuals to get better jobs which are high paying. If the individual's marital status rises by one level then the odd of ending up poor is increased by a multiplicative factor of 1.10. Hence chances are increased as the status is coded as single, marries, divorced and widow hence higher the characteristic more chances that individual is poor on average. If the individual's education level is more than masters then the odd of individual being poor is increased by the multiplicative factor of 0.42 which his smaller than in the case of masters showing that there is less chance of an individual having education higher than masters to be poor. It is different for the case of individual who has attained education up to middle as it increases multiplicative odd of ending up poor by 1.11; it is mainly because this level of education only creates awareness about needs and wants of individual but does not help him to become skilled to find jobs. If the household size of the individual is increased by one member then the

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[3] When model successfully predicts the occurring of event
[4] When model successfully predicts non occurring of event
[5] When model predicts occurring while it is non-occurring event
[6] When model predicts non-occurring while it is occurring event

odd of him to end up poor is increased by the multiplicative factor of 1.40 as it reduces the dependents in the house and makes per capita resources less. If the education level of the individual is intermediate level then the odd of him to end up poor increases by 0.90 which is higher than master's level and beyond master's level, which shows that it will not help in eradicating poverty as compared to higher education level. If the individual working hours are increased by one hour per week then the odd of him ending up poor increased by the multiplicative factor of 1.50 which is surprising but it can be justified by the fact that hours are variable in only few kinds of jobs in which there is no contract so wages are low. If the individual have education level up to matriculation then the odd of him to end up poor increases by the factor of 1.11 which is same as middle education, hence this level does not help him in getting jobs to increase income. If the individual had technical training of any sort in past then the odd of ending up poor will increase by the multiplicative factor of 0.81, which means that training enables individuals to get their jobs secured or increasing incomes hence it reduces chances of being poor. If the individual have a dual occupation then the odd of individual to end up poor is increased by the factor of 1.25, this shows that individual is not specialist or doing a skilled job which usually have higher wages or returns.

Table-3. Binary Logistics Regression Dependent variable (Individual being poor or not poor)

Independent variables	Factor number	Coefficient	Odds Ratio	Significance
Constant		0.57	1.77	0.00
Education level up to masters	Factor 1	-0.53	0.60	0.00
Marital Status	Factor 2	0.09	1.10	0.00
Education level more than masters	Factor 3	-0.90	0.42	0.00
Education level up to middle	Factor 4	0.11	1.11	0.00
Household size of individual	Factor 5	0.33	1.40	0.00
Education level up to intermediate	Factor 6	-0.14	0.90	0.00
Individual working week hours	Factor 7	0.38	1.50	0.00
Education level up to matriculation	Factor 8	0.11	1.11	0.00
Technical training	Factor 9	-0.21	0.81	0.00
Having Dual occupation	Factor 10	0.22	1.25	0.00
Regression Diagnostics				
Sample size	25440	Omnibus Test	5013.10 (0.00)	
Cox & Snell R Sq	0.18	Nagelkerke R Sq	0.24	
Success Rate	72.1%	-2 Log Likelihood	28525.42	

4. Conclusion and Policy Implication

Poverty is the main socioeconomic hindrance for any country, as it creates problems of economics through lack of sales in the market on the other hand it creates social unrest among the households who earn less than subsistence wage of \$1.25 a day. Using the data of labour force survey of 2010, there are about 74% of the respondents whose income or household per capita resources (if there are other earners too) are lower than equivalent to \$1.25 a day benchmark. This statistic is quite horrifying considering the fact that according the government recent official estimates only about 12% population is poor.

This study used the labour force survey data of Pakistan, as extracted as many indicators of poverty as possible in order to have a comprehensive outlook of poverty from the context of household level socio economic indicators. Since the variables generated were too many which could lead to results diluted with multicollinearity. For this, study used factor analysis to first arrange the indicators in terms of its importance and later reducing them to a smaller amount without losing in the explanation power of these variables. After that the filtered factors which then used in the ordinary least squares to see how the factors are performing, luckily all of them are significant but since the dependent variable is binomial the residuals of ordinary least square model were having problems of hetroskedasticity, non-normality and some theoretical reasons like dependent dummy was 0 and 1 but the estimated dependent variable has lowest value less than 0 and highest value more than 1. For this binary logistic regression is adopted in this model whose coefficients were similar to the coefficients of ordinary least squares but it theoretically solves the problem which is caused by the binomial dependent variable.

The main outcome of this study was that the impact of different level of education is different on the incidence of poverty; policy makers should pursuit to promote the educations beyond the intermediate level by developing the universities in Pakistan. The corporate sector and firms should actively participate in training their labour such that

their productivity level rises by becoming skilled and they can earn higher incomes. In the end the eradication of poverty is in benefit of even rich community as it increased the market transactions and hence business can flourish. It should be noted by the government to help households to maintain their resources and subsidize the large households as they are prone to be poor.

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