DETERMINANTS OF THE QUALITY OF HOUSING IN POOR AND NON-POOR HOUSEHOLDS

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ABSTRACT

Living conditions are very important in the sense that they provide peaceful environment to inhabitants. Living conditions are primarily based on the income level of the household. Higher income usually leads to higher quality of housing. But there are still other factors which are responsible for good housing conditions. It is fact that housing provides shelter to their inhabitants, access to health and educational services as well as employment opportunities which may lead to higher productivity and income for families. Since the quality of contains many aspects, it not only depends upon the internal features of the housing units, but also depend upon the environment of the community where this house is located.

Keywords: *Determinants, Quality of Housing, Poor and Non-poor Households*

INTRODUCTION

Broadly speaking, both the internal as well external factors determine the quality of housing. Internal factor consist of various housing facilities available at the house. The external factors facilities are available to the households in their surrounding provided by the public sector. Hence we will incorporate all these facilities in order to construct the quality of housing index (QHI). As far as the determinants of QHI are concerned, there are both demographic and economic variables which may affect the quality of housing. Therefor this paper considers broader set of explanatory variables which may affect the QHI.[3]

So the theme of this paper is to explore the determinants of quality of housing by using the country-wide micro-level data collected by Pakistan Bureau of Statistics (PBS), Islamabad under Pakistan Social and Living Standard Measurement Survey (PSLM VI): 2010-11. Since the housing conditions are different between

poor and non-poor households, therefore the extents of the determinants of the quality of housing are also different between poor and non-poor. So we will assess the extent of determinants of housing quality for poor and non-poor households separately.

The arrangement of the paper is as follows: Review of earlier studies appears after this section. Then proposed model and suitable estimation technique applied on the model is described. Section four deals with the results and discussion and last section conclude the study.

REVIEW OF LITERATURE

There are various studies measuring the quality of housing in terms of various housing indicators: they include number of persons per housing unit, number of rooms per housing units, room density, age of the House, quality of the housing; access to water, electricity, piped gas, bath, toilet and telephone facilities etc. number of housing units in the building, number of storeys of the building, Building age. [see Boelhouwer (2002),Bratt (2002), Das (2007),Ferriss (2000), Gabriel et al. (2003), Giannias (1998), Hemmasi and Prorok (2002), Westaway (2006), Mendes and Motizuki (2001), Royuela et al. (2003), Richards et al. (2007).

Park (2009) assessed the quality of life of South Korea as households by using the Asia Barometer Survey (ABS); 2006. In which 1023 respondents were contacted by ask about the housing conditions, living style[4] and consumption pattern. The researcher divided the respondents into 3 categories: low, medium and high based on their income level. Modern life of the Korean households was estimated by considering all the housing facilities and public utilities available to them. Education has more effective impact on the modern lifestyle of the Korean households. The study concluded that socio economic progress has failed to make every Korean experience a good quality of life because only a few Korean are enjoying the highest quality of life. The majority of the respondents believe marriage as a most satisfying factor in their quality of life.

The determinants of rental value of the house were studies by Ruivo (2010) and Marco (2006). They investigated the rental value of the houses and found that cities with higher incomes, higher employment opportunities and small number of

rental housing units are associated with higher rental rates. Sumka (1977) measured the quality of the housing unit from the self-weighting sample of rental housing units selected from non-metropolitan cities in North Carolina characteristics as well as neighbourhood characteristics were considered for the quality of the housing units. Sumka (1977) concluded the inverse relationship between the value of the quality of housing index and deficiencies in the various housing facilities like plumbing, heating and other infrastructure. The researcher further concluded that the quality of housing index increases proportionately with the availability of the physical housing facilities in the house.

Rietz (1977) estimated the five versions of the demand for housing by using the census data of 1970 for the country of Stockholm. Explanatory variables are income of the household age, average age of the family, female ratio and marriage ratio of the household, marital status. Rietz (1977) found the consistent results in all the five equations. That are, demand for housing increases with the income and decreases with the age of the head as well as average age of the household. Rietz (1977) concluded that the elasticity of housing expenditure per household with respect to permanent income of less than one. The estimated income elasticity of demand for rooms per household is 0.4. Demand for rooms per capita also appears to be responsive to changes in the average age of the population. Demand for rooms per household is found to be more sensitive to household size.

Kain and Quigleyt (1970) explored the determinants of the quality of the housing by selecting the physical variables. Researcher selected residential quality, average structure quality, age of the housing unit, no of rooms, education of the head, no of bathrooms, surroundings of the house (location), and distance of the house from the central business area. The value of the housing units is taken as a dependent variable, while all the above-mentioned variables are explanatory variables. Kain and Quigleyt (1970) concluded that housing value is positively related with no. of rooms and bathrooms, average structure quality, education of the head and location of the housing unit. On the other hand, age of the housing unit and the distance of the house from the central business centres are inversely related with the value of the housing unit.

Rodgers and converse (1975) investigated the American adults for the perception about quality of life through structured questionnaire based on responses of their satisfaction level ranging from complete dissatisfaction to complete satisfaction. These questions were concerned with the aspects of marriage, family life, job,

housing, education, standard of living and saving. Using the factor analysis research concluded that marriage; family life, health and education are the major factors of their perceived highest satisfaction for their quality of life. It means that the majority of the respondents assigned highest value to above factors/variable for their quality of life.

Goodman (1978) estimated the housing quality of the low-income households living in the rental houses in Pennsylvania, USA. He proposed a quality of the housing model in which the explanatory variables are households' income, family size, education level, race, financial burden, crowding. He used Multiple Indicators and Multiple causes model (MIMIC) proposed by Joreskog and Goldberger (1975). The researchers concluded that quality of housing is based positively on income, education and the race. Littlewood and Munro (1997) examined the relationship between income and poor housing conditions by using the dataset of Scottish House Condition Survey: 1991. They considered the role of housing outcome measures in relation to the different concepts of poverty, deprivation and social exclusion. They examined the relationship between income, socio-economic household characteristics and housing deprivation and concluded that income alone does not provide an adequate proxy for the quality of housing outcomes and that multiple housing measures are more satisfactory than the use of any single indicator. They concluded that overall, the low income has resulted into poor housing conditions of the households. Whereas, a very few non-poor households have also housing deprivation.

Saddozai *et al.* (2013) examined the descriptive analysis of Determinants of Quality of Housing by dividing the quality of housing into three outcomes (, *Pucca, Semi-Pucca* and *Ketcha*) in Pakistan. This analysis is also performed for each Province and for each region (Rural and Urban). The study concluded that maximum households are living in the pucca houses in urban areas of Sindh and Punjab provinces, whereas majority of the household have Ketcha houses in Baluchistan and Khyber Pakhtoon Khuwa provinces. The main findings are that the age and grand income of household has positive impact on the quality of houses. The dependency ratio is inversely related with the quality of the housing.

Babalola et *al* (2013) investigated the factors affecting the house rental rates in the university environment. The study applies a Hedonic pricing model, which captures multi-dimensional characteristics of the houses in the sample. They concluded that housing rental value is inversely related with the age of the house

and the number of houses built in the university environment. Rosen (1974) brought out a theoretical application of the hedonic price model to the residential housing market. Several authors have adopted this technique to construct house price indices and to determine the factors responsible for property prices (Butter, 1982; Margo, 1996; Meese and Wallace, 1997).

Zietz *et al.* (2007) investigated the relationship of particular housing characteristics with the selling price. The study found that characteristics do not have the same price across a given distribution of house prices. The study, therefore, utilized quartile regression analysis to examine the issue and found that purchasers of high-priced homes value certain housing characteristics such as the number of bedrooms differently from buyers of low-priced homes. That other variables such as age also played significant role in evaluating house prices. Most of the studies showed that poverty leads to the poor housing quality. As the poor have less economic resources to finance their family, so they may have lesser housing facilities. As a result, the poor not only have the inadequate housing facilities but the quality of the housing facilities are also very low. Hence the relationship between poverty and the low quality of the housing is linked many most of the researchers. [See, for example, Rowntree, 1901; Townsend, 1979; Mack and Lansley, 1985; Black *et al* 1988; Hopton, and Hunt, 1996; Bradshaw, 1993].

Earlier studies showed that quality of life and housing is much explored under the domain of sociology, anthropology, psychology and other disciplines of social sciences but it is less explained in the context of economics. Therefore we are interested to explore the economic aspect of the quality of the housing. It will be done by indicating certain variables/factors affecting the quality of the housing of the households. That is why; the main focus of this paper is to explore the determinants of the quality of the housing.

MODEL
Over dependent variable is quality of housing index (QHI). QHI is detailed and comprehensive in the sense that it covers the four important and diversified aspects of housing. One, It includes the detailed housing characteristics possessed by the households at their premises. Since the different housing facilities have different quality available to the households, all these housing facilities are given different weights according to their quality. Of course, the highest quality is assigned highest weight and lowest quality with lowest weight. By adding all

these weights at each household level, we got certain numerical values for housing facilities as a variable "WEIGHT1".

Two, distance of the facilities from the house is included in constructing the quality of the housing index (QHI). Obviously, some facilities are very near to the house, whereas some are distant from the house. So these distances are given weight accordingly. By adding these distances' weights at the household level, we again get certain aggregated numerical value under a variable "WEIGHT2"

Three, the frequencies of use of these facilities are also included in the Index, which shows the number of time as specific facility is utilized by the household. Most frequently used facilities are assigned highest weights and least used facilities are given minimum weights. All these weights are added together to get a variable "WEIGHT3".

Four, perception of the households about the quality of available facilities and services are also the part of this Index. Weighted perceptions are also added up to form the variable "WEIGHT4". Now all the constructed weights (*WEIGHT1 through WEIGHT4*) are added up to have the quality of housing index (QHI).

Our explanatory variables are age, of the household head, education, and income of the household head. We have also the qualitative variables such as employment status of the head, industry of the head where he/she is employed, location, wellbeing, status of the house, occupancy status of the household. It is important to note that each qualitative variable is shown through dummy variable. Each dummy variable has a base category having the value of zero. The following table shows the base category of each qualitative variable, whose value is zero.

Variable	Base category
Industrial classification	Agriculture
Employment status	Paid employee
Poverty	Poor
Status of the house	Ketcha house
Occupancy status	Owner occupied
Location	Rural

For each qualitative variable, value of coefficient of their categories shows the comparison with its base category. After incorporating the categories of the all

dummy variables in the model, we have the following form of the model for estimation.

$$
\begin{aligned}
QOH\ index \\
= \alpha + \beta 1\ (age) + \beta 2\ (income) + \beta 3(education\ of\ head) \\
+ \beta 4(no.\ of\ persons\ having\ the\ education\ of\ matric\ and\ above) \\
+ \beta 5(POVERTY) + \beta 6(location) + \beta 7(EMPL) + \beta 8(SE) + \beta 9(OT) \\
+ \beta 10(WS\_RT) + \beta 11(MAN) + \beta 12(TRP) + \beta 13(CON) + \beta 14(CSPS) \\
+ \beta 15(OTH) + \beta 16(UNDE) + \beta 17(pucca) + \beta 18(SEMI\_PUCCA) \\
+ \beta 19(rent) + \beta 20(sub\ \_rent) + \beta 21(rent - free) + error
\end{aligned}
$$

The error term possesses the conventional assumptions. Since our dependent variable is quantitative, the most appropriate available estimation technique is ordinary least squares (OLS) to estimate the coefficients of the explanatory variables. Each estimated coefficient will show the effect of relevant explanatory variable on the dependent variable. As the data are cross sectional, the hetroskedasticity problem is most likely to prevail. Robust least square estimation technique is use to take care of the hetroskedasticity.[5]

RESULTS AND DISCUSSIONS

Using the robust least square estimation, we have found the overall regression results given in table 1. As we have repeated the estimation of the regression model on poor and non-poor sub-samples, separately, therefore these regression results are also sown in tables 2. Referring the table 1, we found that the coefficient of age implies that with a one-year increase in the age, quality of housing increases by 0.03 units. The effect of the education of the head is also positive and significant. The result shows that quality of housing increase by 19%, if there is 100% increase in the education level of the head. We also show the effect of family education on the quality of housing.[6] The results show the effect of family education is higher than the head's education. That is, with the addition of one member having matric or higher education in family, the quality of housing increases by 0.61 units. The income of the family is positively affecting the quality of housing of the households.

When we compare the effect of various categories of the employment status with "paid employee", we found that quality of housing between 'employer', 'other'

and 'paid employee' is almost the same. The quality of housing increases by 1.46 times, when the employment status of the head changes from 'paid employee' to 'self-employment'. Now we look in the performance of industrial classification. The results imply that whenever the industry switches from 'agriculture' to any other specific category, the quality of housing increases. It clearly shows that the households whose heads are engaged in agriculture have the minimum quality of housing than the rest of households. The quality of housing is highest in those households whose heads are involved in 'community, social and personal services'. When industry changes from 'agriculture' to 'community social and personal services', the quality of housing improves by 3.4 times.

Similarly, 'manufacturing', 'wholesale and retail trade', 'construction', 'other' industries and 'transport' sector also contribute positively towards the households' quality of housing. The quality of housing declines by 0.313 units, on average in poor households as compare with the non-poor. It implies that quality of housing in poor households are smaller (by 0.313 units) from the non-poor households. The urban households have the better quality of housing (by 4 times) than the rural household. Now we discuss the impact the status of housing on its quality. The results given in Table 1 shows those households, living in semi-pucca houses, have 6 times better quality of housing than those households living in ketcha houses. Similarly, the pucca houses residents are better-off even more (7times), when compared with ketcha house residents. The results further show that when the occupancy status changes from 'owner-occupied' to 'rental' housing, the quality of housing declines by 0.96 units. The households living in rent-free houses are worse off; that is, their quality of the housing is 4.5 times lesser than the 'owner-occupiers'. 'Subsidized rental' households are worse off than 'owner occupiers'.

Table 6.1: Regression results of overall households

Variable	Coefficient	Probability
Constant	58.83918	0
AGE	0.030902	0
Construction	1.922906	0
Community, social and personal services	3.446488	0
Manufacturing	3.245335	0
Others Industries	2.846156	0
Transport	3.261558	0
Undefined economic activities	4.247674	0.4268

Wholesale and retail trade	2.529641	0
Self-employed	1.468773	0
Other_E_status	-0.70868	0.8945
Employer	-0.26035	0.673
Members with at least matric education	0.61491	0
Poverty	-0.31358	0.04
Rental	-0.96113	0
Rent free	-4.58395	0
Subsidized rent	-1.47425	0.0009
Yearly Income of household	0.00714	0
Year of education of HEAD	0.194174	0
Location	3.937343	0
Pucca house	7.356316	0
Semi-pucca house	6.290037	0

Source: calculated through using PSLM-VI data, by the researcher

We assume that the effect of each explanatory variable is different on the quality of housing of the poor and the non-poor sub-samples. Therefore, we estimated the quality of housing model for poor and non-poor separately, as shown in Table 2. The age affects the quality of the housing of the non-poor insignificantly, but affects significantly on the poor. There is no effect of "employer" on the quality of the housing of the both poor and non-poor [7]. In non-poor, the quality of housing of the 'owner occupiers', 'subsidize rental' and the 'rental' households is the same. The rest of the variables affect the quality of housing of both poor and non-poor, but different in magnitude. The details are given I table 2. Overall, the magnitudes of the effects of these variables are higher in non-poor than the poor households. This clearly implies that each explanatory variable affects the quality of housing of the non-poor with the greater amount, relative to the poor. All such details are given in Table 2. These results confirm the belief that non-poor households have better quality of the housing than the poor.

Table 2: Regression results of non-poor and poor households

Variables	Non-Poor		Poor	
	Coefficient	Prob.	Coefficient	Prob.
Constant	55.42467	0	58.66535	0
Age	0.011729	0.2914	0.042283	0
Employer	-0.54314	0.8159	0.114065	0.8617

Other_E_status	4.529359	0	-1.02671	0.8504
Self-employed	1.648885	0	1.220152	0
Construction	3.428302	0	1.265181	0.0001
CSPS*	4.550256	0	3.02856	0
Manufacturing	4.403214	0	2.912097	0
Others Industries	3.440627	0.0004	2.611723	0
Transport	4.50159	0	2.760663	0
Undefined economic activities			4.135024	0.4473
Whole sale and retail trade	4.291755	0	2.054065	0
Location	4.573869	0	3.66742	0
Members with at least Matric education	0.258302	0.0402	0.620446	0
Pucca house	5.455758	0	7.790949	0
Rental	-0.25451	0.5668	-1.1478	0
Rent free	-4.37138	0	-4.53335	0
Semi-pucca house	4.50618	0	6.781462	0
Subsidized rent	-1.40453	0.1861	-1.4265	0.0038
Yearly Income	3.25E-05	0	5.93E-06	0
Year of education of Head	0.222499	0	0.213316	0
Rent free	-4.37138	0	-4.53335	0

Note: *CSPS- Community, social and personal services

Source: calculated through PSLM -VI dataset by the researcher

CONCLUSION

After regressing the relevant variables on the QHI, it is concluded that the age, income, education of the head as well as family's education have positive and significant impact on the quality of the housing. Out of these variables, the family education contributes at the most on the quality of the housing, since it value of coefficient is highest (0.6149). The households living in pucca houses or own-houses or in urban area are much better-off. Besides, the households who heads are engaged in the services sector are enjoying highest quality of housing than the others. On the other hand, the quality of housing between those households whose head are linked with undefined economic activities or agriculture sector is almost the same.

Mostly, the significant coefficients in the poor and non-poor sub-samples are the same, but they are different in their numerical values. It implies that the extent of effect of the most of the explanatory variables in poor and the non-poor sub-samples are different. The effect of age and rent is different between the poor and the non-poor. The age of the head does not affect the housing quality of the non-poor, but significantly affects the poor. The logic behind it is, the poor households struggle more for their livelihood, therefore their quality of the housing may increase with the increase in the age of the head. On the other hand, in non-poor households, the age of the head does not matter for the quality of the housing. Therefore the head's age does not affect the quality of housing of the non-poor. In case of non-poor, the quality of housing between the owner-occupiers and rental households are the same. Conversely, in poor households, the quality of the housing of the rental households is better than that of owner-occupiers.

Our results suggest that government should improve the public provisions to the rural areas. She should also give priority to those rural households those heads are engaged in undefined economic activities (informal sector).

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