A multiscale Analysis of Housing demand for Tenants seen Through Theories of locational Choice in Rawalpindi and Islamabad, Pakistan.

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Abstract

The study investigates the housing demand for the tenants by the interplay among "Rational Choice Theory" along with "Theory of Self-Selection" and "Behavioral Decision Theory" at multiscale level. Study employs primary data, collected from the twin cities of Rawalpindi and Islamabad, Pakistan. A customized questionnaire for data gathering used as the information for behavioural aspects is missing in the general census. We build a hypothesis that it is important to investigate tenants' behaviour due to the fact that there is a difference in the decision making process of tenants and owners as the former tend to think of in-time decision without taking into account the future aspects of property value. If so, these variations should be included in demand for housing as tenants and homeowners, different city structures, income group, and family structures cannot be treated equally, as one size does not fit for all. With that goal, Tobit model is estimated at multiscale level by employed key variables such as house characteristics, proximity to work place, relatives, central business district and urban amenities; transport modes choice represent the self-selection theory in the context of residential location choice. Results show that housing demand vary across the different cities' structures, income groups, and family structures, in particular for tenants. Besides the in-depth empirical contributions, findings highlight the important reality where tenants and homeowners treated equally, which creates problem with the most of housing policies. Therefore, to understand better these variations should be included in the housing policymaking and in future census.

Keywords: Housing demand, Behavioural theories, Tenant's residential location choice, Multiscale analysis.

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1. Introduction

There is a gradual shift of population residing in rural areas to urban centres in the developing countries. The rate of urbanization is the highest in Pakistan among all South Asian countries, where the urban population is growing annually at a rate of 2.7% that lead to construction of 0.15 million new urban housing units against a demand of 0.35 from different income groups (Hassan & Arif, 2018).

According to Pakistan Living Standard Measurement Survey (PSLM) 2014-15, Islamabad 51%, Rawalpindi with 68% households have their own housing units. Which concludes that, in Islamabad 41% households and in Rawalpindi 23% are living in rented houses. Which makes a strong case for studying the tenant's households housing demand in the study area. Due to lack of mass-transit or public transport, the low-income urban dwellers choose to live near commercial hubs and have to pay high rents for housing units with poor conditions. Moreover, the behavioural theories the of which are ignored one can play critical role in closing the loop by bridging the theory driven and data driven approaches as theories can provide the rationale for the rules variables, assumptions and parameters for the basis of analytical modelling (Gardner, 1970).

The study investigates the residential choice of households influenced by key social, economic and cultural factors affecting housing demand of the tenants. The key variables are derived from the following theories: 1) The "rational choice theory", that suggests the optimum residential choice of households follow principles of bounded rationality. 2) The "theory of self-selection" that states that residential choice of tenants depends on proximities to urban amenities, accessibility of (public) transport, along with the supply side characteristics of house.

On the demand side, 'behavioral decision theory' suggests that agent norms, beliefs, and values of people would lead to the location choices and this behavior is reflected as they live near the parents and relatives that give them a sense of security. Key determinants of housing demand include household income, proximity to urban amenities, access and availability of different modes of public transport and corresponding commuting cost, and behavioural and cultural factors specific to the location and its distance from work and relatives.

The policy prescribed based on most of earlier studies presumes the tenant's behaviour as given and only few studies derived housing demands of tenants by employing physical, economic and behavioural aspects. Therefore, this study examines the issue of tenants' residential choice based on certain premises of urban form, norms and belief, family structures, housing, and transport markets. The study investigates the housing demands of tenants by using above mentioned behavioural theories. Our independent variables will be house characteristics, distance from workplace, proximities to central business district and urban amenities, transport modes choice represent the 'self-selection theory' in the context of residential location choice. Income profile and corresponding costs of housing will validate the 'rational choice theory'. While behavioural or cultural factors that are relevant to the choice of a specific location such as norms and distance from parents and relatives can be seen in the framework of behavioural decision theory.

The study applied the discernment regression analysis to predict the housing demand of tenants. To that aim, we utilized a household survey for the tenants' form the twin cities of Rawalpindi and Islamabad covering the urban areas. The field survey was conducted during June to August, 2019 covering the clusters of Rawalpindi and Islamabad. The data was obtained through structured questionnaires from 995 households about their residential location choice in order to investigate the housing demands and costs based on their preferences of residential location choice. The questionnaire covers the important factors that derived demands of housing such as neighbourhood characteristics; i.e. proximity to market (commercial centres), availability of public transport, proximity to workplace; schools; norms and beliefs; family structures; close friends; and bus stop and affiliations within the community.

To contextualize the study area, Islamabad is a well-planned new city with a gird structure with the current state of parking lots, public and environmental spaces and public transport that is much better when comparing with any other city of Pakistan. Rawalpindi on the other hand, is an old city with an organically developed structure that evolved over time and is more congested, lacking a coordinated planned effort and fewer strict land use planning restrictions. The urban area in both the cities is 3723 km^2 and 95% people in Islamabad is living in urban areas while, 63% people living in urban areas of Rawalpindi. Islamabad contributes 1%, while Rawalpindi contributes the approximately 4% to the country's GDP. The economy of Rawalpindi has a diverse industrial base, whereas in Islamabad it is based on services sectors and state-owned companies.

The rest of the study is organized as follows. Literature evidences deciphering the relationship between housing demands with residential location choice were first collected and described in Section 2. This helps us to define the basis for the modelling framework and empirical methodology by providing an overview of the research design given in Section 3. Section 4 generates the discussion on the regression model results. Section 5 summarizes the findings and concludes the study.

2. Understanding Residential choices and Housing demand of Tenants

The residential location choice debate in urban planning literature primarily focused on the land use and transport interactions. In essence, this debate addresses the question of how urban form, proximity to urban amenities, public transport accessibility, norms and beliefs, and land use patterns generate the demand for housing (Jim & Chen, 2007; Schläpfer, Waltert, Segura, & Kienast, 2015; Schwartz, Voicu, & Horn, 2014; Xu, Zhang, & Zheng, 2015; Zhang & Dong, 2018).; Gherki et al., 2019). In recent years, the literature on residential location choice finds overwhelming factors influence on residential location decisions including the house characteristics to the household's needs, urban amenities including public transport accessibility and neighborhood characteristics. These factors are usually creating demand for housing in the specific location selected by tenants (Cao et al., 2006; Naess, 2009; Leung et al., 2012; Park et al., 2019; De Vos & Alemi, 2020).

Various studies survey in detail the literature on relationship between housing demand based on the location choice of the household. Further, Keskin & Watkins, 2017; Leung, Cheung, & Tang, 2013), which is important at both conceptual and empirical levels (Bhattacharjee et al., 2016). Local differences in housing demand can be attributed to differences in location (Geng, Bao, & Liang, 2015), demographic effects (Mankiw & Weil, 1989), income levels (Abelson, 1997; Bramley & Leishman, 2005; Shi, Chen, & Wang, 2016), and quality of life (Saphores & Aguilar-Benitez, 2005), which may differ across housing submarkets. Many later studies include housing related attitudes norms or beliefs or residential preferences as control variables in the regression (see e.g. Handy et al., 2005, 2006). Even in countries where the housing market is developed, many factors such as a lack of affordability and limited housing options may prevent households from settling in their preferred neighbourhoods (Schwanen & Mokhtarian, 2004).

In the previous studies mentioned above, the literature supporting the argument of location ignore the possibility of the location choices of tenants. More specifically, tenant's demand for housing is unlike that of the owner, as the former in their decision-making process account for the usufructuary rights of the property only ignoring the future growth prospects of the property value. Secondly, previous literature considers the aspects of proximity and economic cost in location choice but overlooks the cultural aspects, family structures and emotional attachment with the area and relatives. The present study attempts to address the housing demand by the tenant's perspective not only at multiscale level but also incorporates the influencing behavioural and cultural factors more comprehensively.

Most importantly, past studies predominantly used secondary data or housing data in the context of the developed world to find the relationship between housing demand of households doing residential self-selection (see Coulter & Scott 2015; Bayer, Ferreira, & McMillan, 2007; Brueckner et al., 1987; Hanushek, Kain, Rivkin, & Branch, 2007; Hanushek & Yilmaz, 2013). Contrary to the popular literature, we adopted a different research design by making use of a structured questionnaire that covers the tenant's behavioral, social and economic characteristics, norms and family structures and their decision making that were generally overlooked in past studies.

In the context of Pakistan, specifically, selecting the tenants for my study area, according to Pakistan Living Standard Measurement Survey (PSLM) 2014-15, Islamabad 51%, Rawalpindi with 68% households have their own housing units - this study concludes that, in Islamabad 41% households living in rented and subsidize rented houses. Moreover, the study area is governed by two authorities regulate the housing market namely, the Capital Development Authority (CDA) in Islamabad and the Rawalpindi Development Authority (RDA) in Rawalpindi. CDA regulates the Zone (I-V) of the Islamabad and RDA tertiary is 311 Sq Km spread over Rawal Town and 64 Revenue Estates of Potohar Town, Excluding Cantonment. The growth pattern in the study area are shown in the figure below and presents a very fast urban growth in recent ties.

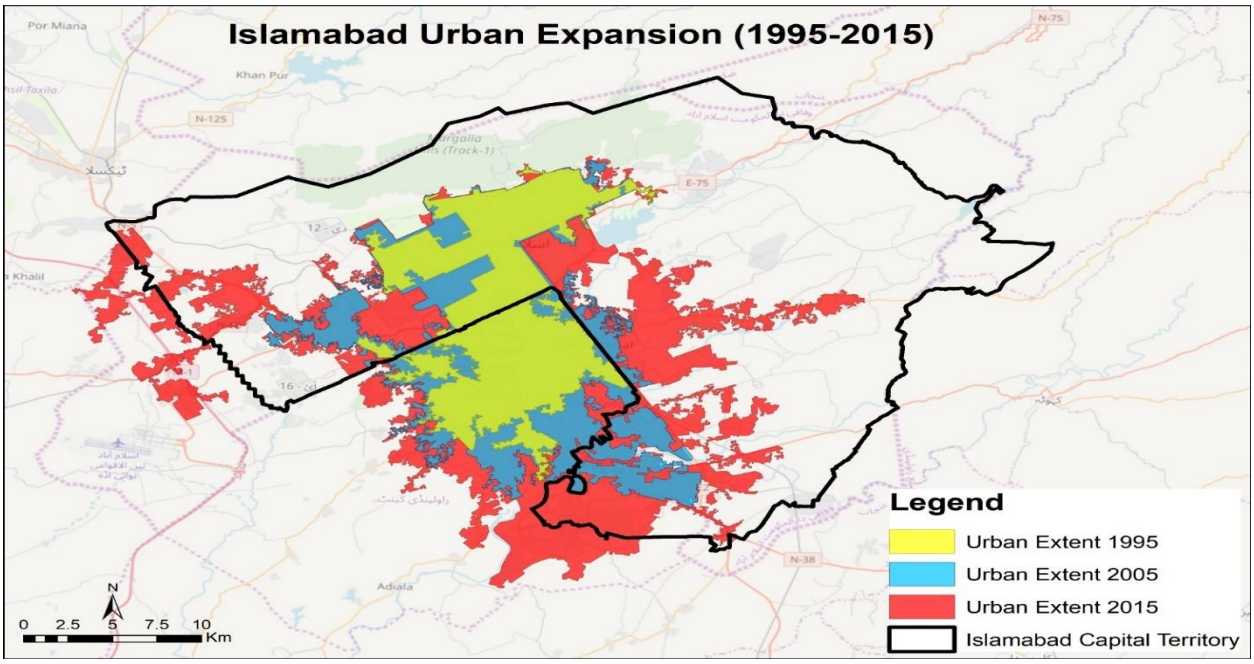

Figure 1: Urban Growth Patterns in the study area.

3. Data Methodology and Research Design

3.1. Modeling Framework

In the literature (Alonso, 1969; Muth, 1969; and Mills, 1972) introduced the "Modern location theory". Many later theoretical and empirical studies endorse this theory (such as, Muth, 1969; Mills, 1972; McFadden, 1978; Hendresen, 1983; Brueckner, 1987; Fujita, 1989; Cheshire and Mills, 1999; Glaeser and Kahn, 2004; Small and Verhof, 2007; and, Duranton and Puga, 2015; Li et al. 2017, Yamamoto et al. 2019). Along with these theories of economics and urban planning there are many theories used by the behavioural science research but their application are missing in the decision making of residential location choice prospective (Kwon & Silva, 2020).

The standard model proposed by us can be distinguished from others because (i): we are considering the tenant households as 'decision making of tenants' because they are very different from owners - when the time to decide happens, tenants think and engage in their decision making without taking in to account the future aspects of property value (ii): Rent will not only be determined by house size but house characteristics including urban amenities play phenomenal role in the decision (iii): Behavioural factors such as distance form relative and

belonging to the specific locality is also key components in the decision making for the tenants household.

The utility function for the tenant household is assumed strictly quasi-concave and has three goods vectors as arguments. These are vectors of house characteristics including urban amenities L_i; and composite good excluding, amenities and house consumption X_i; given the socioeconomic variables S_i.

So, the utility maximization problem is as follows.

$$Max\ U\ \left(\ X_{ij}, L_{ij}; S_{ij}\ \right)$$

Subject to

$$I = L_{ij}R_{ij}^{p}(z_m) + X_{ij}$$

The budget constraint shows that income ***I*** equal expenditures representing hedonic price function $P_{Li}(z_i)$ that includes the vector of housing characteristics Z_l and vector of urban amenities Z_m , P_{xi} represents the prices of composite goods; t_i is per unit commuting cost. Therefore, an individual spends its given income (which is endogenous) on housing, commuting, and composite goods.

The vector Z_l contains the housing characteristics such as age and size of a house. Whereas, the vector of urban amenities Z_m, contain variables such as the number of parks, schools and hospital, relative to the neighborhood of that locality.

The constrained optimization problem is specified as the following Lagrange function.

$$\mathcal{L} = U\left(\ X_{ij}, L_{ij}\ ; S_{ij}\ \right) - \lambda(I - L_{ij}R_{ij}^{p}(Z_m) - X_{ij}) \qquad \text{(i)}$$

We assume Cobb–Douglas utility function with elasticity coefficients conditions as follows.

$$\mathcal{L} = {X_{ij}}^{\alpha}{L_{ij}}^{\beta} - \lambda(I - L_{ij}R_{ij}^{p}(Z_m) - X_{ij}) \qquad \text{(ii)}$$

$\therefore \alpha > 0\ ;\ \beta > 0 \quad \alpha + \beta = 1\ ;$

By maximizing the household utility subject to budget constraint of the model, we will get tenants' housing demand function.

$$L_{ij} = \left(\frac{\beta}{\alpha+\beta}\right)\left(\frac{I - X_{ij}}{R_{ij}^{p}(Z_m)}\right) \qquad \text{(iii)}$$

$$L_{ij}R_{ij}^{p}(Z_m) = \left(\frac{\beta}{\alpha+\beta}\right)(I - X_{ij}) \quad \text{(iv)}$$

Equation (iii) is the Housing demand function, which highlights the relationship between land use, hedonic price function of house characteristics and urban amenities, explained by rents and income. According to the demand function, there is a negative relationship between demand for land and per unit land rent whereas, there is a positive relationship between income and land demand. Equation (iv) is the linear expenditure system (LES), representing the expenditures borne by tenants households in the form of accommodation expenses.

3.2. Research Design

3.2.1. Data Collection method

Data has been collected from the sample of 995 tenant's households from the twin cities of Rawalpindi and Islamabad through implementing a structured questionnaire. The survey collected information on housing demand of tenants. Variables to be collected in the questionnaire included: income profile of households, proximities to urban amenities, access and availability of public transport modes, associated costs of commuting, accommodation, and behavioral or cultural factors that are their belonging to that specific location and distance from relatives that are used to construct the variables of the model. .

In the survey questionnaire table B3, questions about the preferences of tenant's households while selecting the residential location choice were asked. Examples include: do they choose location near to work place or near to bus stop or children for school purposes. We also made an effort to include questions that addressed the listed theories. Therefore, in that section in Table B5 and B6, we have asked about the neighborhood design and residential location choice, which take in to account the preferences of tenant's households regarding neighborhood choice. These components validate the 'theory of self-selection'. While we have also asked in the same section about the distance from relative in the preferences and number of years they have been living in the current location in Table B6 in order to validate the 'behavioral decision theory' by using the regression model.

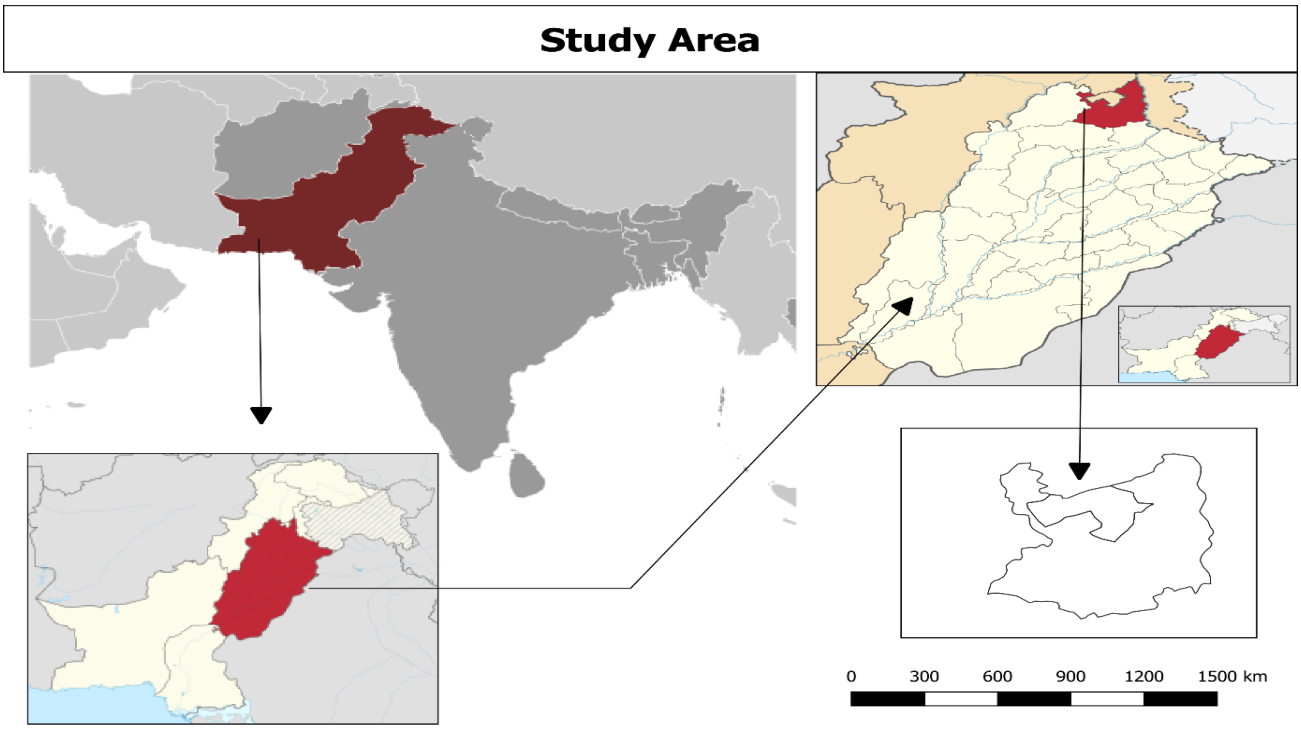

Figure 2: Study area and sampling design

3.2.2. Sampling Technique and Sample Size

The sampling technique in this study made use of a two-stage stratified random sampling. In the first step, twenty-five clusters are select from Rawalpindi and Islamabad, Pakistan ensuring sufficient geographical coverage and spatial variations. In the second step, forty tenants are randomly' selected from each cluster ensuring that the sample is representative that allows us to generalize the findings.

Table 1: Sample Selection, and the details of selected clusters

Division	Sub Divisions
Islamabad	
Islamabad Div-I	Sector G-6, F-6, G-8
Islamabad Div-II	Sector F-10, I-8, I-9, G-13,
Islamabad Div-IIII	Ghori Town, Gulberg, Jinnah Gardens, PWD, Sawan Garden
Rawalpindi	
City Div	Liaqat Bagh, Jabbar Colony, Raja Bazar, Dhok Hasu
Cantonment Area	Saddar, Chaklala Scheme III, Adlyala
Satrelite Town Div	6-Road, Satelite Town, Gulzar-e-Quaid, Commerical AMrket
Westrege Div	Dhok Chodrian, Koh-e-Noor

3.3.Empirical Methodology

In the theoretical model, from equation (iii) we have arguments of the housing demand function for empirical estimations by using the tobit regression model. These methods used to explain and quantify the relationship between a scalar outcome variable and two or more independent/ explanatory variables using the method of ordinary least squares (Field, 2013). However, in our study Tobit is appropriate model that can fulfill our research objectives. There are two main reasons for using the tobit model. Firstly, the Tobit estimates are more sensitive than OLS estimates to the prevalence of zeroes in the data. However, a lower sensitivity to window length does not imply that OLS is better from a statistical. This means that while working on housing data of household Tobit models are deemed necessary to address the significant censoring (i.e. large numbers of zeroes) typically found in time-use data, in the face of which OLS estimators would be biased and inconsistent (Foster et al., 2013). Secondly, analysis also involve either binary or polychromous outcome variables. Tobit is also considered the most suitable method of analysis for these cases of discrete outcome variables.

$$L_{ij} = f\left(R_{ij}^{p}, z_m, I\right) \quad \text{(vi)}$$

In functional form, we can write equation as:

By using the equations (vi) and (vii) we will get a regression equation models:

$$L_{ij} = \alpha_1 R_{ij}^{p} + \alpha_2 Z_m + \alpha_3 I + \varepsilon_1 \quad \text{(viii)}$$

Above equations shows the regression forms of housing demand functions of tenants that depends on the vector of house characteristics including urban amenities, income profile of household a household and costs associated with housing and commuting. We have employed tobit regression model

4. Empirical Results

4.1. Results and Discussion

Demand for housing are derived demands that refer to the tendency of the agent to choose the location based on travel abilities, needs, and preferences, which generate the derived demands for housing. Overall, the tenants' data from the two cities can be characterized as having statistically significant differences on the basis of income and family structure, housing demands based on their residential location choice.

We are using the three theories simultaneously to investigate the housing demand functions in the table below. We have four blocks in the estimation results. The first block is the section of variables that are economic and that operate the under the assumption of rational choice theory, as all tenants households are rational and their spending on housing are based on the assumption of rationality. The other two blocks are regarding choice of tenants regarding house characteristics such as house size, house age; number of bedrooms etc. and validates the 'theory of self-selection' empirically. Moreover, the third block, which represents the choice of neighborhood and proximities to the urban amenities, also consider as confirmatory evidence for the 'theory of self-selection'.

In the last block, we have behavioral components such as the distance from relative in the preferences and number of years they been living in the current location, which are confirmatory evidence for the 'behavioral decision theory'. Number of years in current location gives the sense of belonging of household member to the locality. While, distance from relatives and parents gives the component of emotional aspect and sense of security by living in that locality. These are the main components that we have used to investigate the housing demand by using the abovementioned theories.

Table 3: Housing Demand Function

		Tobit Model							
		Whole Sample	**Islamabad**	**Rawalpindi**	**Low Income**	**Middle Income**	**High Income**	**Nuclear Family**	**Joint Family**
	VARIABLES	Housing Demand	Housing Demand	Housing Demand	Housing Demand	Housing Demand	Housing Demand	Housing Demand	Housing Demand
Economic Components	*Household Income*	0.000747**	1.255**	0.205*	0.00017**	0.00015**	0.00012*	0.856***	4.271***
		(0.00483)	(0.559)	(0.125)	(0.000126)	(0.000325)	(0.000557)	(0.153)	(0.568)
	Rent	-0.0303***	-0.397*	-0.278**	-0.00043***	-0.00013**	-0.00041***	-0.397**	-0.278*
		(0.00929)	(0.23)	(0.14)	(0.000204)	(0.000731)	(0.000163)	(0.23)	(0.14)
House Characteristics	*House Age*	0.00733*	-0.705**	-0.234	-0.00189	-0.00311*	-0.0346***	-0.00244	-0.0150**
		(0.0044)	(0.283)	(0.185)	(0.00518)	(0.00568)	(0.0132)	(0.00553)	(0.00707)
	Floor Area	0.791***	0.251	0.286*	0.606***	0.897***	0.665***	0.820***	0.735***
		(0.0385)	(0.163)	(0.155)	(0.107)	(0.0323)	(0.081)	(0.0424)	(0.0777)
	TV Lounge	0.327**	1.004***	0.273*	0.535**	0.0716	1.094*	0.146	0.819**
		(0.154)	(0.253)	(0.18)	(0.252)	(0.122)	(0.651)	(0.141)	(0.382)
	No. of Bedrooms	0.227***	1.799**	0.154*	0.174*	0.211**	0.170***	1.799**	0.154***
		(0.152)	(0.729)	(0.0929)	(0.103)	(0.0841)	(0.0754)	(0.729)	(0.0929)
	No. of Bathrooms	0.201**	0.856***	4.271***	0.874**	0.788**	0.871***	0.194**	0.192
		(0.0809)	(0.153)	(0.568)	(0.003)	(0.134)	(0.133)	(0.0882)	(0.151)
Proximity to Urban Amenities	*Dist from Work*	-0.0484**	-0.071*	-0.0160**	-0.321**	0.124**	-0.439*	-0.071*	-0.160**
		(0.0203)	(0.0137)	(0.00626)	(0.121)	(0.0731)	(0.738)	(0.0137)	(0.0062)
	Dist from Park	-0.807*	-0.3884**	-0.257*	0.83	-0.765**	-0.307***	-0.244**	-0.265
		(0.442)	(0.14)	(0.102)	(0.274)	(0.123)	(0.0774)	(0.353)	(0.631)
	Dist from School	-0.0786*	-0.0506**	-0.0296**	0.430**	0.265**	0.302*	-0.0506*	-0.0296
		(0.0422)	(0.0288)	(0.0303)	(0.274)	(0.123)	(0.574)	(0.0288)	(0.0303)
	Availability of Modes	0.410**	0.517***	0.316***	0.721***	0.124**	0.479*	0.517***	0.316***
		(0.196)	(0.187)	(0.113)	(0.239)	(0.0731)	(0.338)	(0.187)	(0.113)
	Dist from Bus Stop	-0.214***	-0.279*	-0.164**	0.0605***	0.148*	0.0546	-0.0248	-0.355**
		(0.0739)	(0.16)	(0.0749)	(0.185)	(0.0816)	(0.137)	(0.0701)	(0.184)
Behavioral Components	*Dist from Relatives*	-0.254***	-0.221***	-0.0603***	-0.874*	-0.788**	-0.87*	-0.221***	-0.0603
		(0.0139)	(0.0666)	(0.0473)	(0.003)	(0.134)	(0.133)	(0.0666)	(0.0473)
	Years in Location	0.0236*	0.0268**	0.0159***	0.0101**	0.148*	0.141**	0.328**	0.0211*
		(0.0222)	(0.00991)	(0.00598)	(0.0085)	(0.0816)	(0.0737)	(0.166)	(0.312)
	Observations	999	446	549	172	555	267	549	446
	R-squared	0.768	0.488	0.22	0.737	0.787	0.643	0.488	0.626

*** p<0.01, ** p<0.05, * p<0.1

4.2. A Specific discussion on Table 3 results

4.2.1. Housing Demand Estimations Results for Overall Sample of Tenants

This multiscale regression analysis results suggest that tenant's income profile of tenant's household's house characteristics including urban amenities and public transport accessibility influence the derived housing demand that can be explained by using the abovementioned theories of self-selection and rational choice. Moreover, according to behavioral decision theory the cultural or behavioral factors such as distance to their family and friends; and residing history play an important role in the derived housing demand, as these give a sense of security to tenants. Additionally, economic factors such as the rent are highly significant with the negative sign, as an increase in the house rent will reduce the demand for housing on the location, which resonates with the results of the (Scheiner, 2018). A similar unexpected negative influence of distance from a bus stop and positive influence of availability of transport modes are also the key decision factors in the choice.

4.2.2. Housing Demand Estimations Results at City Level

The third and fourth Columns of table 3 show the comparison of housing demands of Rawalpindi and Islamabad, as these cities are very different in terms of their age, and urban development and nature of people's jobs. Housing demand is more sensitive towards the income in the case the Islamabad as compare to Rawalpindi, as tenants of Islamabad are more conscious of the house size as compare to people of Rawalpindi. In contrast to that, tenants of Rawalpindi are more sensitive toward house size and it makes sense from the previous variables that due to rent they are more conscious of house demand. This validates the rational behavior of household and results are in conformity to rational choice theory.

Surprisingly, in our results, the age variable is more significant for tenants living in Islamabad as compared to tenants in Rawalpindi. This happens due to the age difference between two cities, as Rawalpindi is a very old city as compare to Islamabad that is why the average house age is very high in Rawalpindi as compare to Islamabad. Moreover, tenant's living in Islamabad are highly sensitive to house characters such as (Bedrooms and TV Lounge) as compare to Rawalpindi due to the nature of their job and difference in living standards.

Besides, housing demand of tenants in Rawalpindi is more significantly influenced by the access and availability of transport mode, as the average number of cars Islamabad tenants having in Islamabad are more than Rawalpindi signifying that they have less dependency on public transport, which aslo resonate with the results of (Pinjari et al., 2007). Interestingly, tenants of Islamabad are less sensitive to the distance from their workplace as compare to the Rawalpindi primarily due to the difference in jobs nature where majority belongs to service sectors and doing office jobs as compare to people of Rawalpindi owning businesses or doing informal jobs and are more sensitive to time and distance.

4.2.3. Housing Demand Estimation Results for tenants of different Income Level

While doing cross income household analysis**,** the housing demand of high-income group is least sensitive to the income as they have an abundance of initial endowments. There emerges some patterns regarding the effects of house rents. Interestingly, lower-income and upper-income group's housing demand is more sensitive as compared to the middle-income groups. This suggests that low-income people have a tight budget to manage their rent and high-income groups, which leads to the high sensitivity of the economic cost of accommodation. More of it, due to affordability issues, for the low-income group's "house age" is insignificant and high-income classes are highly sensitive towards the age of the house, as they prefer new houses. An unexpected result, that low-income tenant's households are more inclined towards having the TV lounge in their house. This result suggests that low-income households' bonding is more and they want some commonplace to sit and enjoy as compared to high-income classes with privacy and tight routine. While it also shows the confirmatory results regarding the implication of theory of self-selection in selection of house by keeping in view the house characteristics.

Results of access and modes availability of public transport are, as per our expectations, that lower-income tenant's household are more sensitive towards house choice. This suggests the reliance of low-income tenant's households on public transport due to the unaffordability that their income level produces. Also, results might also suggest the influence of distance from relatives and the workplace is less significant for the high-income groups as compared to the low-income group. This suggests that high-income tenant's households have either their own status and therefore the distance does not matter for them or they have less time for the

socialization with relatives due to tight routine that validates the importance of theory of self-selection for different incomes groups regarding their transport choices.

4.2.4. Housing demand Estimation Results for Tenants having Nuclear VS Joint Families

Analysis among different family structures in the last two columns of the table shows how housing demand varies among different structures. In Pakistani culture, there is a huge trend of living in the joint family system. Interestingly, the sensitivity of tenant's towards rent is severe in the nuclear family as compare to joint families. This suggests that joint families are less sensitive towards rent as they have contributors that are more than one in most of the cases for rent paying in the joint family system as compared to the nuclear family in which the household head is solely responsible for the rent payment. In addition to it, joint families are more inclined towards having a TV lounge in the house as compared to nuclear families. The influence of the number of bathrooms on the housing demand for the joint and nuclear family tenants is unexpected as nuclear families are more sensitive to the number of bathrooms, as there should be more requirements of bathrooms for the joint families as they have the high number of household members.

Distance from the bus stop is sensitive to the joint families as compared to nuclear families, which is also a bit anomalous. More interestingly, nuclear families count the distance from a relative in the decision making of the location choice of the house due to a sense of security and the possibility of weekend visit to their relatives (especially visiting parents). In addition to that, the influence of the residence location history counts more for the nuclear family as compare to the join one especially if you were living in a joint family and you separated from your siblings, so you want to live around your family and parents in the same area. Therefore, these results validate the 'behavioral decision theory' in the selection of location choice for different family structures. Lastly, the distance from the park highly influences the nuclear families in their housing demand as compared to the joint families.

5. Conclusion

The study leads to a number of conclusions and policy implications. Below is summarized the inferences drawn from our empirical analysis. First, the importance of abovementioned behavioral theories in the residential location choice and subsequent demands for housing is highlighted, which suggest that not only physical and economic but emotional belonging to the specific locality and distance from relatives turn out to be key influencers in the locational choice, that derive the housing demands.

Second, housing demand is more sensitive towards the income in case of residents of Islamabad as compare to that of Rawalpindi highlighting that tenants of the former are more conscious of house size as compare to the later. This can be attributed to the fact that most of the residents in Islamabad are migrants from rest of the country and location choice is influenced mainly by the house characteristics with no effect from distance from relatives. Third, housing demand for tenants in Rawalpindi is more influenced by the access and availability of transport mode as compare to its counterpart. This is essentially because of a relatively higher number of car ownership in Islamabad implying their less dependency on public transports. Fourth, lower-income and upper-income group's housing demand is more sensitive as compared to the middle-income groups, which imply that low-income people have a tight budget to manage their rent, and high-income groups, which leads to the high sensitivity of the economic cost of accommodation. Fifth, house choice of lower-income tenants is more sensitive to access and modes availability of public transport for due to their reliance and unaffordability of private conveyance.

Sixth, influence of distance from relatives and the workplace is less significant for the high-income groups as compared to the low-income group since high-income tenants generally own have private vehicle and have less time and incentive for the socialization with relatives. Putting another way, tenants of Rawalpindi are more conscious of “commuting cost” as compare to the Islamabad, which is in line with the rational choice theory. Lastly , housing demand of joint families are less sensitive towards rent as they can share the rent amongst themselves as compare to nuclear family in which household head has generally the sole responsibility for the rent payment.

These findings highlights the important reality where tenants and homeowner, different city structure, income group and family structure cannot treated equally, as one size does not fit for all.

These behavioral variations were not included in most of housing planning, which creates problem with the most of housing policies. Therefore, these variations should be included in the housing decisions and customized policymaking is required for the future planning. Moreover, these variations should be included in the future national census by adding further questions that covers the missing aspects specifically in the tenant's perspective.

Appendix

Table 2: Descriptive Statistics (Total observations = 995)

Variables	Unit	Mean	Std.Dev.	Min	Max	p1	p99	Skew.	Kurt.
Household Size	(count)	4.883	1.638	2	12	2	10	.796	4.376
Household Income	(PKR)	104000	129000	5000	1500000	10000	800000	5.527	46.487
No. of Working people	(count)	1.587	0.336	0	4	0	1	.296	0.853
Total Assets	(PKR)	2090000	1.7e+07	0	5.0e+08	0	2.1e+07	25.097	708.329
House Size	(PKR)	6.523	3.292	1	25	1.5	17	1.283	5.743
House Age	(count)	10.938	10.162	0	60	0	50	2.047	8.003
No. of Bedrooms	(count)	2.712	.915	1	6	1	5	.616	3.588
No. of Sch Child	(count)	2.038	.234	1	3	2	3	2.482	16.946
House Rent	(PKR)	22651.5	16019.2	2000	180000	3500	80000	2.634	17.386
Annual Rent Growth	(Percentage)	2.163	.731	1	4	1	3	-.216	1.984
Commuting Cost	(PKR)	5276.55	6227.64	0	40000	0	28000	1.825	6.594
Dist from Work	(count)	13.472	14.226	0	75	0	65	1.544	5.543
Years Same Locati	(count)	8.943	14.017	0	81.5	0	72	2.469	9.992
No. of Cars	(count)	.64	.671	0	4	0	3	.951	4.35
No. of Bikes	(count)	.72	.648	0	4	0	3	.814	4.941
Dist from Bus Stop	(count)	1.463	.822	1	3	1	3	1.271	2.692
Floor Area	(count)	6.189	2.944	0	25	1	15	1.172	6.214
TV Lounge	(Binary)	.55	.498	0	1	0	1	-.2	1.04
Garage	(Binary)	.436	.496	0	1	0	1	.257	1.066
No. of Bathrooms	(count)	2.584	1.031	0	6	1	6	.571	3.681
Dist from Relative	(count)	3.932	5.107	.1	50	.2	25	3.149	16.769
Dist from Park	(count)	2.717	2.936	.1	25	.2	15	2.789	14.562
Dist from Clinic	(count)	1.906	2.916	0	30	.1	20	5.129	35.61
Distance from Grocery	(count)	1.485	2.327	.1	35	.1	10	8.631	105.961
Distance from School	(count)	2.12	2.783	.1	40	.1	10	5.129	51.49
.Transport Modes	(count)	1.727	.813	0	4	1	4	.886	3.316

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