HOUSING DEMAND IN URBAN AREAS OF PAKISTAN

By

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A Dissertation Submitted in Partial Fulfillment of the Requirement for the Degree of Doctor of Philosophy in Economics

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2015

ACKNOWLWDEGMENT

I am thankful to Almighty Allah the omnipotent and the most Merciful, who enabled me to complete this dissertation.

It is great pleasure for me to dedicate this dissertation to my respected and fatherly caring sister Miss Mussarat Almas late who looked after me after my father's death when I was only five years old. She is very affectionate to me and till her death I never felt that my father was no long with us. However, I missed my sister a lot.

I have no words to overstate my gratitude to my both PhD supervisors, Dr. Rehana Siddiqui and Dr. Nasir Iqbal. Without their inspirational guidance, their enthusiasm, their encouragements, their thought provoking comments, I could never finish my doctoral work. For me, they are not only my teachers, but also lifetime mentors and advisors. I, once again, express my heartfelt gratitude for them and pray for their health and services for the nation as well as for the noble profession.

I would take this opportunity for thanking all my teachers from my school onwards, especially, Dr. Muslehuddin, Dr. Ather Maqsood Ahmed, Dr. Rehana Siddiqui, Dr. Fazal Hussain, Dr. Ejaz Ghani, Dr. Faiz Biliquees, Dr. Eatzaz Ahmed, Dr. Abdul Qayyum, Dr. Najam us Saqib, Dr. Muhammad Iqbal and other faculty of PIDE that enhance my understanding of Economics. I am deeply thankful to Mr. Masood Ashfaq Ahmed (Computer Chief, PIDE) and Dr. Abdul Sattar (Deputy Director, PBS) they provide me data related to my dissertation on data set of PSLM 2004-05 and 2010-11. I

am also extremely thankful to Mr. Muhammad Siddiq Qureshi for his excellent formatting of this dissertation.

I thank my seniors, fellow students and friends at PIDE and elsewhere; Dr Asad Zaman, Dr G.M Arif, Dr. Usman Mustafa, Dr. Muhammad Arshad Khan, Dr. Attiya Javed, Dr. Mahmood Khalid, Dr. Akthar Hussain Shah, Dr. Imtiaz Ahmed, Dr. Idrees Khawaja, Affia Malik, Samina Nazli, Henna Ahsan, Lubna Hassan, Dr. Tariq Mehmood, M. Ali Qasim, Mr. Muhammad Ramzan, Dr. Muhammad Idrees, Dr. Abdul Jalil, Dr. Wasim Shahid Malik, and all others whom I cannot name here due to space limitation for their encouragements, thought provoking discussions, help and support.

Furthermore, I express my humble gratitude to my father, mother, father in law and mother in law for their prayers and holly wishes for me. At the end, I can never forget my wife Samina who provides me tea/coffee in midnight when I was busy in study. I also thankful to her and Sons Awais, Tayyab and Faheem for their co-operation and patience during the period of writing this dissertation. Last but not least I am extremely thankful to my all brothers and sisters who always pray for my success to writing down this dissertation.

Ayaz Ahmed

Dedicated to my late sister

Miss Mussarat Almas

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Abstract

This dissertation focuses on exploring the determinants of the housing demand in the urban areas of Pakistan. It also delves into the impact of different income groups on the housing demand. The hedonic price model was used for the estimation of analysis. The data pertaining to 14 Pakistani urban areas was borrowed from Pakistan Social and Living Standard Measurement (PSLM) survey 2004-05 and 2010-11, respectively. Overall, two models were used in the analysis. The first one was to estimate the Hedonic rent model that helped in finding out that in high-income group households the rent was greater than the middle-income group households, which was increased in 2004-05 and decreased in 2010-11. The study was applied on lower income groups as well. Affordability has same effect on low and middle-income groups, but for high-income group it turned out to be positive yet the value of coefficient remained on the lower side. This comparison helps in designing appropriate policies in accordance with the current state of housing market.

It was found that different factors contributed differently wards housing demand whereas the economic cycles were contrast during both periods of the study. Furthermore, this study provides a policy framework for addressing the factors related to housing demand.

In order to control the selectivity bias between the tenure choice and the quantity of housing services demanded, Heckman's two-step selection procedure was used. The Probit model was opted for calculating the margins for the probability of a house's ownership. Permanent and Transitory incomes were estimated based on the permanent income hypothesis. Another aspect, uncommonly found in studies from developing countries including Pakistan, was separately determining the effects of permanent and more importantly transitory income on housing demand. The aggregate analysis underlined that income, house price, affordability; demographic factors such as age of the

head of household, education, household size, number of earners and marital status are the key factors in determining the housing demand in Pakistan.

CHAPTER 1

INTRODUCTION

1.1 Background

Housing a basic human need and millions of people are struggling to have a roof over their heads. The population of cities has been increasing at a fast pace over the last twenty-five years but the supply of new houses has not kept pace with the increasing demand (Todaro, 1985; Stren and White, 1989). A large gap between the supply and demand for housing is observed in urban areas around the world. Because of the unmanaged housing crisis, many families are forced to live in extremely poor housing conditions with unhealthy and unsafe dwellings (UNCHS, 1986).

Although hundreds of new housing colonies have been established, yet the problem of finding a suitable accommodation in big cities persists. Since every household is not able to build a house for itself, there is always a demand for rental houses. Thus, the demand for houses has grown manifold in almost all the cities. Housing, therefore, as a basic need became a challenging outlay of rapid urbanization in most of the developing countries. Within a reasonable timeframe, the urbanization pattern can neither halted nor revised. Urban organizers albeit have no medium to long term plans for the extension of urban areas, particularly catering for the housing needs of consumers or buyers (Laquain, 1983).

Housing demand is simply housing need which is backed up by the ability and willingness to pay. It depends on the different behavior of individuals, that how

household share actually able to spend their limited resources to fulfill their needs of housing units as well as goods and services. The need of urban housing is affected by a number of factors, such as: rural to urban migration, increasing population, low investment in housing development, low purchasing power of household and poor urban Infrastructure (Parmer, 1991).

For urban and country poor, a house is asylum as well as the essential necessity in the budget. Indeed, basic housing for the homeless who live in shacks, made by covering and leaves or in tin roofed cottages, expands the gains of the detainees a few fold (Sheikg and Ghulam, 1989). But the condition of housing units for a vast majority of people has declined in urban areas, including some major cities of Pakistan, mainly owing to fast increasing population and migration from rural areas (Haque and Nayab, 2007).

1.2 Housing in Pakistan: Motivation

For the past several years, Pakistan has been confronting housing issues in both qualitative and quantitative terms. The issue is more critical in urban regions. It originates from the quickly developing populaces and additionally rural to-urban relocation. The proceeded stay of the Afghan displaced people in Pakistan has further accentuated the issue. In urban territories, accessibility of sufficient residences at affordable rents is getting scarcer by the day.

Out of total housing units enumerated and the estimated in 1998 census, it was believed that nearly 81% were owned housing units, and 19% rented or occupied units on rent-free basis. It was also noticed that the percentage of owned housing units were

higher in rural areas as compared to the urban areas. With an increase of two percent, the owned house percentage has increased from 78.4 percent in a census 1980 to 80.8 percent in 1998 (Government of Pakistan 2000). Since no population censes has been conducted after 1998, the recent information on housing is limited to sample surveys.

Broadly speaking, not a substantial change was recorded between the years 2004-2005 and 2010-2011, except in case of large households. Population living in houses with five or more rooms has declined from 7.1 percent to 5.84 percent. In interpreting these numbers, it is seen that housing standards of a population change very slowly, as demographics, migration and internal working of housing markets in cities, towns and villages guide them. On average, the living condition of Pakistan did not improve as the share of population living in households with two to four rooms inched up from 68.7 to 69.33 percent in seven years and population living in one room housing units was increased from 24.2 to 24.83 percent. The population access to electricity improved significantly from 83.9 percent in 2004-2005 to 91.37 percent in 2010-2011. Because of higher consumption, investment in immovable assets might also have declined as population owning housing units has declined from 86.6 percent in 2004-2005 to 85.9 percent in 2010-2011.

A large amount of literature on housing studies has thus emerged which has attempted to draw theoretical foundations for the demand and supply of housing, elicit empirical analysis and evaluate government policies. Moreover, developments in the housing sector are now seen to benefit from extensive and rigorous research which has matured on the basis of housing demand and supply and has also attempted to measure both the micro and macro implications.

Developing countries as a response to both their own experience and in their pursuit to follow developed countries' experiences have also begun to recognize housing as a consequential sector. They need to cover greater distances in developing research on housing studies that would eventually support their domestic housing policies. Research on housing demand in developing countries has largely focused on the effects of income, prices and household demographics. For example, empirical studies by Malpezzi and Mayo (1987) on Cairo, Suef,Shefer (1990) on Indonesian household data, Arimah (1992) on Nigerian data, Tiwari and Parikh (1998) on India and Ballesteros (2001) on Philippines determined and quantified the effect that household income, house prices and demographics have on the demand for housing. Such empirical studies have sought to determine income and price elasticity that has an important implication for the formulation of housing policies. Another strand of literature on housing studies seeks to determine the demand for various housing attributes such as floor space, water supply, gas connection, distance to city center and other amenities (Follain and Jimenez, 1985 and Arimah, 1992). This is an aspect which has also received growing attention of policy makers since it reflects households' housing preferences.

While housing studies experienced a maturing status in the developed regions, and an emerging one in developing countries, its status in the case of Pakistan is far from being emphatic and its role in policy formulation has not been fully realized. The existing work on housing in Pakistan by Ghaus and Pasha (1990), Lodhi and Pasha (1991), Ahmed (1994) and Pasha and Butt (1996) represent the first few attempts at determining factors that affect housing demand. While these merit commendations, a lot is yet to be researched.

A very few studies have ventured into determining the housing demand across income groups (Shefer, 1990 and Tiwari and Parikh, 1998). No study based on income groups has been carried out for Pakistan and with the persistent concern at the level of disparity in the country, it is tempting to question if these disparities also traverse into housing demand patterns. Motivations for extending conventional housing analysis for a national level is not only drawn from the gap that currently exists in Pakistan's housing literature, but also from the fact that such an approach highlights the importance of formulating policies that ought to target these income groups separately.

1.3 Objectives of the dissertation

Giving this background, the prime objective of this study is to analyze the housing demand in different urban areas, especially big cities of Pakistan. This dissertation attempts to determine empirically how the factors such as wealth, income and house prices influence the ability to own a house differently for low, middle and high-income groups. This variation of housing demand across varied income groups is determined for 14 major urban centers of Pakistan. More specifically, this dissertation attempt:

- To analyze the existing theoretical framework for housing analysis in order to understand a housing demand model for Pakistan, which can be estimated through the given limited data.
- To estimate the housing function for big cities in urban areas of Pakistan on the basis of household data.
- To investigate the factors that cause the fluctuation in housing priceand demand in Pakistan.

- To examine the price differentials among the housing units in big cities of Pakistan.
- To investogate the impact of remittances on housing demand in Pakistan.

1.4 Significance of the study

This study has significant contribution to literature in various contexts. First, the study identifies all the possible factors affecting the housing demand at national, provincial, city and income groups' levels. Second, the study quantifies the role of remittances in determining the housing demand. Third, this study compares the influence of socio-economic factors on housing demand for two different time period i.e. 2004-05 and 2010-11. In 2004-05, the housing market was at its boom while in 2010-11 housing market was faced with recession. Both periods, therefore, have different implications for housing demand. This comparison helps in designing appropriate policies according to the contemporary state of the housing market. Different factors contribute differently towards housing demand on the face of two contrast economic cycles. Fourth, this study provides a policy framework for fulfilling the housing demand requirements in Pakistan.

1.5 Methodology

In this study, Pakistan Social and Living Standards Measurement Survey/Household Integrated Economic Survey (PSLM/HIES) survey data for the years 2004-2005 and 2010-2011are used. We have used data of 14 large urban cities as a sample to achieve the above stated objectives. The sample size is 2752 households for 2004-2005 and 3053 for 2010-2011. Following the conventional housing studies, we

determine a house price by employing the hedonic price model. Unlike most studies on developing countries, we quantified the relationship between the housing demand and its covariates by using an econometric framework augmented by Heckman's two-step selection procedure that controls for selectivity bias between the tenure choice and quantity of housing services demanded. Margins for probability of house ownership are calculated by using the Probit model. Permanent and Transitory income is also estimated according to the permanent income hypothesis. Another aspect not commonly found in studies for developing countries, including Pakistan, is determining the separate effect of permanent and more importantly transitory income on housing demand. The log-linear model is estimated using the Ordinary Least Square (OLS) technique.

1.6 Empirical Findings

The results suggest that the households most vulnerable to the exploitative housing supply behavior belong to the low-income group while the middle-income group is most responsive to changes in prices. Moreover, it also emerged that the issue of affordability plays a significant role in housing demand for the low-income group.

Analysis at provincial and cities levels displays a significant variation in terms of the housing demand. The results also indicated that enormous inflows of remittances put increasing pressure on the housing market. New housing units, therefore, are in high demand for accommodating the population migrating to big cities. The aggregate analysis brings up that income, house price, affordability; demographic factors such as age of the household head, education, and household size, number of earners and marital status of the household head are the key factors in determining the housing demand in Pakistan.

1.7 Organization of the Thesis

The organization of the rest of the thesis is as follows: Chapter 2 discusses the review of literature on housing demand based on demographic, social and economic factors. Moreover, some studies related to household composition, migration effect and remittances on housing demand are also discussed. The chapter 2 also discusses the literature on factors effecting housing demand for developed and developing countries separately, taking Pakistan as a special case. Chapter 3 pertains to stylized facts of housing i.e. housing stock and the style, nature, quality and density of housing units in Pakistan. Moreover, policies related to housing and their financial aspects are also discussed. Additionally, trends in remittances received from domestic and foreign sources and the consumption pattern are discoursed. Chapter 4 is on the economics of housing related to modeling framework and data description. Furthermore, hedonic price model, hedonic rent model and income regression to calculate permanent and transitory income are presented in detail. The chapter also presents demand model with all the attributes that may affect housing demand. Chapter 5 relates to the empirical findings of housing demand using Heckman's two-step model for national level, income group level, province level and city level. Moreover, a separate section discusses the remittances' effect on housing demand. The last chapter discusses the conclusion and policy implications.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Before delving into the findings, recommendations and conclusions drawn by this dissertation, it is important to have a broad idea of the current development in the theoretical and empirical literature pertaining to the housing demand. In the introductory chapter, we briefly discussed the available literature and concluded that the literature does not establish unambiguously the nature of the relationship between housing demand and its determinants. There is a need, therefore, to further explore the literature to identify the gaps and spell out the mechanism to fill these gaps. A large body of literature theoretically and empirically examines the determinants of housing demand for developed and developing countries, including Pakistan. In this chapter, we have reviewed the literature relevant to the objectives of the dissertation.

The rest of the chapter is structured as follows: section 2.2 provides the review of theoretical literature. Section 2.3 provides the empirical evidence both from developed and developing countries including Pakistan. Section 2.4 highlights the evidence regarding the role of remittances in housing demand. The last section concludes the chapter.

2.2 Theoretical Literature: Demand for Housing

Housing is a unique market product for its durability, fixity and heterogeneity. It has distinguished features as compared to other goods and products available in markets.

The housing market is influenced by numerous demographic, social and economic factors. These factors determine the demand for housing. The housing demand is defined as "the number of households actually having or looking for accommodation" (Liu et al. 1996). The housing demand is the quantity of housing, which households wish to buy or rent and are able to afford. Housing demand is different from housing needs. Housing needs are defined as "the number of existing or new households requiring adequate housing. An adequately housed household is one that lives in self-contained living quarters made of permanent material" (Liu, et al. 1996). Housing demand is assumed to be equal to housing needs in the public sector, while demand is constrained by affordability in the private sector.

The factors that influence demand for housing can be categorized into three groups:

i) Economic factors

ii) Demographic factors

iii) Social factors

2.2.1 Economic Factors

In addition to demographic and social factors, there are other factors, such as housing price, income, wealth and remittances – economic factors – also affect the need and affordability of housing demand (Carlinger, 1973; Kau and Keenan, 1980; Francke, 2004; Miron, 2004). The amount that a household can spend on housing is mainly dependent on the household income and wealth. In addition, the demand for housing also depends on the availability of mortgage financing as well as households having money for buying the preferred housing units they wish to acquire.

Figueroa (1993) conducted a survey and the data were collected through a design questionnaire about the housing demand in Paraguayan government. After analyzing the data, the author concluded that social factors such as low-income of populations significantly influence housing programs. Figueroa (1993) verified that urban infrastructure and policies have an impact on the assets' selling price and, therefore, on the families' wealth.

The residential preferences of housing units depend on both housing locations and housing types. Factors relating to location include travel times from residence to workplace, shopping centers, schools or for any other specific traveling needs the individual household may have. The quality of public services also matter for the household in terms of` educational institutions, hospitals, roads and sewerage as well as public parks and playgrounds. Housing types consist of many attributes, but the most important are structuresand types of houses, for example single family, multifamily and tenure choice (rented). The households are paying the price or rent of housing units on the bases of available facilities, compatability with other preferences.

According to De Leeuw (1971) income is an essential element in measuring the housing demand. In North America, the income elasticity of housing demand ranges from 0.5 to 0.9, whereas the permanent income elasticity of housing demand, measured by Kain and Quigley (1975) was a little higher because of the difference in the transitory income each year. For many individuals and communities investing in real estate is hard for several economists are of the view that the housing demand depends on permanent income of individuals owing to higher asset prices in the housing market.

In addition to income elasticity, price elasticity of housing demand is a contributing factor for availability of the asset. According to Polinsky and Ellwood (1979), the price elasticity of housing demand in North America is -0.7, whereas Maisel, Burnham, and Austin (1971) calculated it as -0.9, which was less elastic.

The housing demand is simply a housing need propelled by the ability and willingness to pay. Housing demand of an individual depends on one's preferences as to how much one can afford to pay for the house rent and how much one can spend on other consumptions depending on one's income. Studies based on the effective demand for housing attempted to relate actual spending patterns based on number of measurable influences on spending. For example, household characteristics such as family size, total income, and average price in the housing market, inflationary expectations and government policies on rent (Bourassa, 1994; Gibb, 2000).

2.2.2Demographic Factors

There are various demographic aspects that determine the housing demand. The literature reveals that family structure and migration patterns play a key role in creating the housing demand (see e.g. Brown, 1989; Filardo, 1996; Prybolsky, 1997; Brown and John, 2002; Sanchata, 2003). The family structure includes the family size, the age of each household member, the marital status of family members as well as the household growth rate and earnings. According to Wunsch and Termote (1978) demography is defined as the study of population, its increase through birth and immigration, and its decrease through deaths and emigration.

Findings of Mankiw and Weil (1989) suggested that the housing demand is influenced by the demographic factors. Their findings, nonetheless, received a lot of criticism as well. The critics argued that there are other factors such as real income and preferences based on the difference in age groups in cross-section data (Green and Hendershott, 1996). The demand, therefore, differs among different age groups and heavily depends on the availability of the real income. Another criticism by Swan (1995) is based on the fact that the demographic factors investigated by Mankiw and Weil (1989) underscored that the real income growth is counted twice, but even after correction, substantial effect of demographic factors were found in the housing demand. The important point is that the supply of housing should be very elastic in the long run. The change in the demand for housing based on demographic factors is reflected in the quantity demanded rather than the price of housing. Holland (1991) also argued that age factor is more likely to affect the construction instead of price in terms of the housing demand.

There are several explanations of the fact that change in housing price is not directly related to the demographic factors. Hamilton (1991) suggested that rent rates may indicatea negative effect to the change in the asset price of the house, further the change in demand for housing will affect the housing rent rather its asset price. Additionally, the social factors may increase the demand for house ownership that further increase the asset price, even if the overall demand for housing or rent is decreasing. The stock flow equilibrium model in the housing sector by Poterba (1994) suggests that the change in prices because of shock also depends on the past overshooting. A Price adjustment in the housing sector remains slow, whereas, an initial increase in prices

caused by high demand is followed by a decrease in prices in housing stock. The quantity response in housing demand is explicitly indirect. The literature suggests that the main determinants of the housing demand are demographic. Other factors such as income, cost of housing, credit availability, price of substitute housing, consumer preferences, price of complements and investor preferences also play an important role (Goodman, 1990).

2.2.3Social Factor

Research has established the importance of development in the housing sector since it heavily affects the economic strength and living standards. Long term social and financial benefits are also associated with the kind of a house one owns. Home ownership also plays role in avoiding rent payments and savings. In addition to financial rewards, it also facilitates the social status uplift of the individual owner in the community for having a decent house for the entire family. Development in housing sector adds value to the society as a whole. Policy makers and various housing societies come up with various housing schemes for both fulfilling the political gains and profit making respectively. Other social benefits received through ones ownership of a house include stable housing, educational achievement and lower crime rate as well as participation in maintaining healthier environment. According to Realtors (2012) homeownerships are the source of achieving social benefits and positive externalities. Furthermore, the support of policies in attaining sustainable home ownership is justified through the extensive revival of social benefits.

According to Gate (2007), other social factors such as population growth rate, changing mindset towards marriage, number of children each family plans and women

working full time also influence the housing demand. The average number of children per family has declined enabling families to have additional income and savings that can be directed towards buying new houses and consequently increasing the housing demand and new construction. Gate (2007) is of the view that such social changes moderately affect the demand for housing but their impact is reasonably visible. Along with rising income and wealth associated with the demand for housing, the accessibility and affordability of the housing, depending on the family size, cannot be denied. It is also argued that owing to un-affordability or costly housing, young people are forced to live with their parents or share accommodation with other unrelated individuals (Gate, 2007). Houses available for rent depend on the need instead of the paying capacity. Moreover, the development of new housing schemes depends on the subsidy available for land enhancement as a result of new planning policies.

2.2.4 Household Composition

Jacrobsen et al (2012) argues that "household structure plays an important role in the economic and social well-being of families and individuals as the number and characteristics of household members affect the types of relationships and the pool of economic resources available within the households". Jacrobsen et al (2012) further argues that the trend in household composition, formation, development and dissolution are the main determinants of both current and future housing demand. The literature discloses that demographic characteristics are responsible for driving the housing price (Idrus and Ho, 2008). Residential housing demand is influenced by its prices and location. Ohtanke and Shintani (1996) argue that demographic change has a significant impact on housing prices through the short run adjustment process in the housing

market. Mankiw and Weil (1989) established that housing demand is a function of demographic characteristics such as age. This study found that demand for housing is lower for younger residents than older. Lindenthal and Eichholtz (2010) found that housing demand is primarily driven by human capital.

2.2.5 Migration

Migration has an important role in shaping the housing market dynamics. The impact of local migration inflow on house price depends on both the size and composition of the migration flows and on the elasticity of housing supply. The housing demand is increasing rapidly in Pakistan because of rural to urban migration. Continued migration causes many problems, such as lack of roads' maintenance, insufficient infrastructure, high housing prices, high housing rents and more occupied areas with less greenery. The housing conditions of a vast majority of households in urban areas of Pakistan are deteriorating owingto rural to urban migration. (Haque and Nayab, 2007). The physical impact is visible in the form of informal settlements created by the migrants. The number of informal settlements is increasing continuously. Whereas the town planning regulatory authorities are unable to improve and provide the housing with the increasing demand (Karachi Development plan, 2007).

There are many reasons for migration from rural to urban areas. There is a need for providing basic necessitates to these migrants such as, housing for settlement, water for daily use, sanitation and transportation. Search for new employment opportunities is the main reason for migration. The improved living conditions in urban areas also appear to be the cause of rural to urban migration. These migrations are a challenge for the town

development authorities and policymakers in the area where migration is an ongoing process, such as in South Africa. In order to address the issue of human settlement, different policies have been developed to support the right of house ownership in order to guarantee that there is sufficient housing available in society.

2.3 Empirical Literature

The demand for housing across sections such as the impact of demand on developed and developing countries is very important. This section also reviews the demand for housing in the long run with the development of the market. Relevant literature, nonetheless, pertaining to under-developed and emerging countries in terms of housing demand is not available. Most of the literature discussed in various researches is primarily focused on developing countries (Kaufmann and Quigley, 1987; Follain and Jimenez, 1985a, b; Gross 1988). The current study is focused on the composite demand for housing as a commodity. Owing to the unavailability of data related to under-developed countries, it was hard for the researcher to analyze the housing demand of the past. Additionally, partly available data on pre-reform prices is not enough to estimate the demand parameters.

It is hard to discuss all the literature available on the housing demand. In several previous studies housing demand was considered as a large part of consumption (Lluch et al., 1977; Howe and Musgrove, 1977). Malpezzi and Mayo (1985) and Follain et al. (1980) were the first publishers who studied housing demand specifically. Ingram (1984) selected the data on Bogota and Columbia for the year 1978. Similarly, Strassman (1980b) also conducted a survey of the housing data in Cartagena, Columbia for the year

1978. These studies investigated the housing sector, ownership and rent situation by using the least square method for single equation modeling. Other studies discussed the housing demand based on the factors such as fixed income of individual and the location of house based on individuals' preference and class. Ingram's (1984) study is based on intra-metropolitan location of the house for Bogota and Cali. Other researchers such as Jimenez and Keare's (1984) and Malpezzi and Mayo (1985) investigated within market effect of permanent income and concluded that the demand is income elastic (range 0.4 to 0.6) in the long run and based on the cross-sectional data on rent paid and income received. Malpezzi and Mayo (1987a, b) also established the similar results for developing countries. Furthermore, the demand between household expenditures and income were also found elastic across market. They found that the demand elasticity for house ownership and rent is the same but the consumption for house ownership is more than rent and this difference increases with the income escalation. Mayo (1981) studied the inter-market housing demand between price and income elasticity for selected developed countries and found similar results and the mixed results are found for long run elasticity across countries. Micro data analyzed disclosed that the ratio between housing consumption and income is lower in urbanized countries and higher in emerging economies. Whereas the long run elasticity turned out to be lower (Bums and Grebler, 1977). The price elasticity estimated in housing demand proposes that demand is substantially more elastic than previous estimates in the reviewed literature. The applied model in this research, nonetheless, considered unit income elasticity in the null hypothesis, which is the drawback of the least square model: a zero value of the coefficient of land price indicates a price elasticity of 1.

The evidence of high-income elasticity was found in the study by Daniel (1985) for Hungary. The study found that an increase in income because of subsidies is visible in the housing demand pattern. Moreover, some studies based on transition economies have inspected housing demand indirectly, by queues (Ciechoncinska, 1990; Andrusz, 1990; Charemza and Quandt, 1990). It is generally viewed that the effective demand may be overstated owingtothe low cost related to queues by McMillen and Pogodzinski, (1993) identified that the cost may vary depending on the family status, country of origin and difference in cost schedules.

There is a scarcity of literature on housing sector in Pakistan. Zaki (1981) and Pasha and Ghaus (1990) considered the data on housing conditions for the period 1960-1980. During the selected period it was observed that the quality of housing was low. The supply of housing did not match the housing demand because of the high population growth rate. The condition of housing in rural areas was found critical for the lack of basic necessities such as water supply for daily household needs, clean drinking water for human consumption as well as gas and electricity. In case of Pakistan, there is a sufficient housing available in its urban area. Pasha and Ghaus (1990) are of the view that the gap between housing demand and supply is reduced by 24% over the years and new policies are also being enforced to develop the housing sector. The government is providing incentives in the form of house finance, small and reasonably priced plots in cities.

In another study by Lodhi and Pasha (1991), the characteristics of housing demand in Karachi were analyzed. In case of the planned housing area, the study found that the permanent elasticity of housing demand is higher than the current income elasticity. Additionally, those studies concluded high-income elasticity for the owner

owned houses. In case of katchi abadies (informal dwellings and slums), increase in fixed income do not influence the demand for housing and the demand for rented house is more elastic than the self-owned houses. Arif & Ibrahim (1998) stated that the housing supply became a problem owing to rapid migration of population from rural to urban areas of Pakistan. In 1981, the population of three major cities i.e. Karachi, Lahore, Faisalabad was over one million. The high rate of population growth during 1981-1998 is the cause of the housing unit supply shortage and it promoted the slums. During the time period 1981 to 1998 the population has increased from 84.254 million to 132.352 million (Population Census of Pakistan," 1981 and 1998).

2.4 Home Ownership

2.4.1 Evidence from Developed countries

A survey of the USA (includes different areas) market was conducted by Winger (1963) to measure the increasing demand for housing for families: a)those who were planning to buy a new house; b) those who wanted to renovate or refurbish their existing houses; c) and, those who have not moved within the last five years. Demand for these families was then compared with the actual housing available in the USA market and concluded that the housing space for each family was not enough. Disequilibrium was observed for families housing demand at different stages of lifecycle. One of the findings of the above study suggests that by upgrading the housing demand to its potential the problem of space can be resolved.

Morgan (1965) conducted a survey to examine the associations between consumption of housing and the affordability of paying. The ability of paying does not only depends on the current income, but also on the expected future and past income

based on the age and education. The study concludes that the paying capacity has a significant relation to the education. Higher education helps in ensuring short term income, brings along stability in consumption and results in fulfilling contractual commitments in the long run. Morgan (1965) also argued that the expenditures on housing and other durable items depend on the living standards and number of years a family plans to use these items. This study suggested that the trend of owning an expensive house is common among older people with formal education as well as among the big families with more income.

Uhler (1968) found that the owner occupied housing is positively related to the income and age of the owner. Survey results for the USA underline that the house ownership is the result of accumulated wealth over the period of years. De Leeuw (1971) investigated the impact of assets' price cost (housing), income of individuals and the price in the market (owned) on housing demand for different areas in the USA. Using cross sectional data, it was concluded that the income elasticity for owning a house is higher than the rented house elasticity and it increases with the family size.

Futures and Kushner (1986) used Canadian data to observe the trends in the housing market and its linkage with the income level of the individual. The study concluded that the houses in metropolitan areas are large in size, of better quality and reflect a high asset's value. Whereas, the same house in lower income area is valued less, thus it suggested investigating for other factors to analyze the housing demand. Owing to small sample size and limited number of factors analyzed, authors were unable to find any significant relationship between the price of housing and family size, or any graphic restrictions related to house construction or legal restrictions.

Cheshire and Sheppard (1998) estimated the demand structure for Reading and Darlington– both British Cities. The study also considered the price and income elasticity of demand for housing. For housing demand, characteristics such as location, neighborhood, planning results, space and availability of public goods and transportation are primal considerations. Findings suggest that the land demand is more elastic for individuals with high-income and vice versa. Whereas, the price elasticity of land demand determine the preference of individual i.e. the preference to choose a residential area. High elasticity suggests a quick drop in residential densities as we travel towards the urban outskirts.

Dusansky and Koc (2007) considered the owner occupied demand model for housing. They found significant impact of house price expectations and capital gain on the demand for housing units occupied by their owners. The empirical evidence by Marshall and Marsh (2007) emphasized that the consumer housing demand had lower prices and income elasticity than the housing demand for investors who look for investment opportunities.

2.4.2 Evidence from the Developing Countries

Dantas and Cordeiro (1988) discussed the housing demand based on the prices and location of house for Recife, Curitiba and Brasilia. They estimated separate regression for different income level Brazilian families and concluded that the housing demand depends on the families' willingness to pay for housing units of their choice, in addition to its dependence on income.

Tiwari and Parikh (1998) also calculated the demand for housing in India based on the economic and demographic factors. They measured the demand through the expenditure incurred on buying a housing service through the current as well as expected future income of the family. The Indian housing market is elastic with respect to housing price, but inelastic considering the income factor. The finding indicates that the housing demand in the Indian market is more sensitive to price changes as compared to income.

Goodhart and Hofmann (2007) are of the view that the strengthening of the fluctuations in prices of lodging and credit markets can increase the probability related to sensitivity of future money towards price change. It was proposed that the changes in the long term trends of credit and housing market demand are considered as an indicator to remove the disequilibrium in the banking sector (Goodhart and Hofmann, 2007).

Housing demand in Mexico is analyzed by Fontenla and Fidal (2009) using data on housing mortgage. Similar to other developing countries, Mexico is facing a gap between housing demand and supply. The researchers measured the housing demand using factors such as age, material status, gender, number of dependents and amount of permanent and temporary income. Using hedonic model it was concluded that the change in permanent income has positive and significant effect on the housing demand.

2.4.3 Conclusion

Haurin and Eui-Chung (1998) used parametric risk rate model in the USA for calculating the housing consumption. The study measured the expected future fluctuations and the transaction costs related to the ownership of a house. Outcomes of the housing demand unveiled that the housing cost works better in a multi-period transaction rather than one fixed form.

Pitkin and Myers (1994) selected the USA data to analyze variations in housing demand. They used cross-sectional data over the lifecycle and investigated the impact of population change and age of housing. Estimation was done using the cohort-linked cross section (CLCS) and concluded that in the future, the housing demand will increase substantially in the USA. Li (1977) also found a significant relation between house ownership, income, age of the house owner and family size, using Log it model for husband-wife families. The study found a significant linear relationship between housing demand and family income and age, yet the income factor affects the housing demand more than the aging factor.

2.5 Rented Housing

2.5.1 Evidence from the Developed Countries

Significant research and development has been made in the housing market since the 1960s and considered it as a unique opportunity for market forces. Smith *et al.* (1988) proposes that the development was based on the neoclassical model, suggesting the involvement of government in the housing sector with new, durable and heterogeneous houses. Housing development in the market is a source of creating employment in the related input markets such as, real-estate, building material providers, sanitation services, labor market, water services and electricity (Smith et al, 1988).

Goodman (1990) used the demographic factors in analyzing the housing demand. The study used house survey data of the USA and estimated the income and price elasticity through the Probit model for housing demand. Additionally, found a negative and significant impact of age and race on rented house.

Using Annual Housing Survey Data for the USA, Potepan (1996) tried to explore the interrelationship between housing and its sub markets. The conclusion underscores that the housing rents, urban land price and house price are interrelated in a simultaneous equation system. Strong evidence was found for the impact of income on housing price. Furthermore, housing prices are also affected by the change and growth of population.

Green et al (1996) established a highly significant and positive relation between the housing market and economic activity for the USA and the UK. Several studies discussed the effect of the cost of housing rent on consumption for different developed economies, such as Australia, Taiwan, Hong Kong, Italy, Canada, Sweden, Turkey Portugal, Singapore, China, etc. (Chen et al., 2009; Koivu, 2010).

2.5.2 Evidence from the Developing Countries

Dholakia (1980) used time series data to evaluate housing demand in India. The change in the housing price service is measured through rental price index deflector. The rental price is less elastic as compared to elasticity of other commodities in case of India. Malpezzi and Mayo (1985) selected Colombia, El Salvador, Korea, Egypt, Ghana, Philippines, Jamaica and India form the list of developing countries and reviewed the housing demand. In case of developing countries, the income elasticity of a rented house is lower than the owned house.

2.5.3 Conclusion

Polinsky (1977) and Goodman and Kawai (1984) observed the price and income elasticity for an owned house. The finding suggests that the price elasticity for the owner of the house is lower as compared to the rented house. Whereas, the income elasticity for

the owner is higher than the rented ones. Furthermore, it was suggested that over the long run, the household must invest in house ownership that can be used after retirement (Goodman and Kawai, 1984). Additionally, the study found out that the rent to income ratio was high for the developing countries and this ratio increased with the rise in income. They also found that in housing demand, elasticity for permanent income is higher than the elasticity of current income.

Table 2.1 Summary of literature review (developed countries)

Author	Data and span study	Methodology	Variables	Results
Winger(1963)	Sample survey data of consumer finance in the USA. Panel study 1954 through 1957.	Estimating life cycle stages by simple OLS regression.	Region, City size, occupation, education and marital status of head of household.	Disequilibrium families have significantly less housing than those who are in the adjustment process.
Morgan(1965)	1959 Survey of Consumer finance in the USA.	Descriptive tables and Covariance analysis.	Incomes of all age groups for those with the same education, race and farm status.	Ownership of house is more frequent among large families with higher incomes and small families with low-incomes, but not among either of the other two combinations.
De Leeuw(1971)	1960 census of housing in the USA. Cross sectional data on median housing Expense, median income and price level of 19 metropolitan areas in the USA.	Logarithmic regression demand equations used for rental and owner Housing units	Household real income, average market value of housing units, average annual housing expense and household size.	Income elasticity for homeowner and renters increases with family size. Finally, income elasticity for homeowner above 1.0 and slightly above than the elasticity for renters.
Polinsky (1977)	1966 Federal Housing Administration Survey. Micro Sample of 2900 owners of new homes in 29 Standard Metropolitan Statistical Areas of the USA.	Multiple Micro demand equation estimated for income and price elasticity.	The permanent income of household, quality of services related to housing and the relative price of housing.	Income elasticity of demand for housing is higher with respect to permanent income as compared to the current income of the household.
Goodman and Kawai (1984)	Annual Housing Survey data for 1977. Nineteen Metropolitan areas of	Hedonic Regression techniques are used for each metropolitan area separately.	Housing quantity, price of housing units, income, household size,	The price elasticity for owner are substantially lower than renter housing units. Income elasticity for

	the USA.		age and education level and number of rooms in a house.	owners is substantially larger than rented housing units.
Smith et al (1988)	1960 to 1985 Housing, Vacancy Rate Survey in the USA.	The hedonic price model and spatial fixity of housing has generated model to explain location values.	Single family unit, multiple family unit, vacant unit, home ownership, single family housing resale, new housing, improvement in housing,	The study implies that housing units that have the same price may differ in their size, age, design, access and tax involvement of local government etc. Spatial fixity which refers to location attributes of housing stock.
Goodman(1990)	Annual Housing Survey for 1978. Random sample of 1951housing units, including 1324 owners and 627renters having black and white race of the USA.	Probit Model and Joint likelihood maximization modelfor demand housing.	Income of the household, owner price, value, rent ratio, gender of household head, age of head of household, and family size etc.	Demand by both owners of the household and demand by the renters are inversely linked with age. Income elasticity with respect to race (blacks and whites) increases Monotonically considering the income.
Potepan(1996)	1974-1983 Annual Housing Survey. 58 separate Metropolitan Statistical Areas (Mesa's) of the USA.	Equations for rent, price of housing and price of urban land were estimated by using 2SLS.	Housing price, rent of housing unit, land price, household income, quality of public service, air pollution, crime rate, construction cost and mortgage interest rate.	This study relates the determination of rents, the price of housing and price of urban land in a simultaneous system of equation. The income of household has a strong and significant impact on housing prices.
Cheshire and Sheppard (1998)	Second quarter data of selected sample for 1984.Two cities of England i.e. Reading and Darlington.	The Box-Cox transformation technique based on hedonic price function.	Rental price of housing structure, location specific characteristics, such as magnitude of land along with the structure.	Finding observed that the demand for land was more income elastic, particularly for the high-income groups than for the lower income groups.
Haurin and Eui-Chul Chung (1998)	Panel data study of income dynamics, taking 1973-1988 for 23 Metropolitan Statistical Areas of the USA.	Inter-temporal model of household, housing decisions.	Impute rent of the housing unit for owner, ownership cost, and wealth. Age of head of the household Education, marital status and no. of children.	The study concludes previously demand for housing have underrated the importance of the price elasticity of demand.
Zabel (2004)	1993 and 2001 National versions of the American Housing Survey of the USA.	Hedonic price model. Estimating two stage demand equation.	Price of housing unit, permanent income of household, household size, neighborhood characteristics i.e. school located in the area.	Housing stock and housing services, leads to the separation of ownership and use.
Dusansky and	At least 100,000	Housing price hedonic	Price of Housing	The housing price has a

Koc(2007)	Persons of each Public Use Micro data of the USA.	regression.	units own and rental. Age, gender, education level, race, employment status, marital status, immigration status. Residential status, urban or rural.	positive and statistically significant influence on the housing demand.
Marshall and Marsh (2007)	Annual consumer demand data for housing demand from 1975-1994 and investors of the USA.	Structural-econometric model for the manufactured housing market demand by using OLS and 2SLS techniques.	Number of new manufactured homes, price of newly constructed homes, monthly installment credit loan and interest rate on loan.	Consumers are less sensitive to price changes as compared to investors in manufactured housing.
Phang (2009)	Housing data from 1975 to 2008 of Singapore.	Estimate the price and income elasticity of simple housing model.	Quantity demanded and supplied of housing units. Household income and price of housing units.	Both income elasticity of housing demand and supply elasticity of housing is inelastic.

Table 2.2 Summary of literature review (developing countries)

Author	**Data and span study**	**Methodology**	**Variables**	**Results**
Zaki (1981)	Housing Economics and Demographic (HED) Survey from 1973 and Micro Nutrient survey 1976-77. Urban and Rural level for Pakistan.	Descriptive analysis.	Number of housing units for each HED survey. Number of rooms and persons per housing unit.	Housing conditions are better in the urban areas than in rural areas in terms of the overall availability of basic housing facilities.
Gilani et al (1981)	Migration of Pakistan labor to The Middle East and Its Influence on Pakistan Economy. (1971-79)	Descriptive analysis.	Different occupational groups. Remittances and uses of remittances.	The study concludes that after current consumption needs major share of remittances went to housing and real state.
Amjad (1986)	Middle East migrants' remittance data for time span 1976-77 to 1985-86 in Pakistan.	Descriptive analysis.	Workers' remittances, GDP, Net Factor Income from Abroad, Per Capita Income and uses of remittances.	The study concludes that after recurring consumption the major share of remittances spend on real state.

Pasha and Ghaus (1990)	Housing Census 1960-1980 in Pakistan.	Descriptive analysis. Calculate the housing density standard in terms of persons per room and the magnitude of the national housing shortage.	Owned Household size, number of rooms per housing units, number of persons per room.	In the urban areas, the decrease is more rapid from 27% to 11% as compared to the rural areas where the decline is from 33% to 25%. The per capita housing shortage has declined by 24% between 1960 and 1980 in our country.
Adams, Richard H, Jr (1991)	Data on three villages of Egypt in 1986-87.	Regression analysis was used to observe the household expenditure and household income with and without remittances.	Annual per capita household income, expenditure on household consumption, investment in the business, and household size.	This study concludes that migrant households revealed a higher propensity of consumption on housing than nonimmigrant households.
Lodhi and Pasha (1991)	A sample of 5884 households based on Social, Demographic and economic factors. Survey in Metropolitan city Karachi, Pakistan in 1987-88.	Estimation of a Hedonic rent equation through a generalized functional form of the Box-Cox technique.	Household characteristics is based on income, wealth, age of head, schooling of head and rent, number of rooms and amenities available to house.	The study concludes that current income elasticity is less than the permanent income elasticity. Income elasticity calculated for the families living in rented house is lesser for owners.
Tiwari and Parikh (1998)	National survey1991, 43rdround. 18 States of India.	Hedonic Regression techniques are used.	Price of housing units, household income, housing expenditure, age of the household head and household size.	The demand for housing in India is inelastic with respect to income and elastic with respect to price.
Arif and Ibrahim (1998)	Population Census of Pakistan for 1951,1961,1972, 1981 and 1998.	Analysis through the tables by calculating growth rates and Tempo of Urbanization.	Urban and rural population,	The quickly increasing urbanization is the cause of shortage in supply of housing units.
Oliveira and Morais (2000)	National Housing Survey 1997 of 10 Brazilian metropolitan areas.	Hedonic prices and Weighted Least Square Regression are Use.	Property monthly rent, water, sewerage system, electricity, household per capita income, number of bedrooms, number of other rooms, phone connection.	Housing provision and infrastructure services in urban areas helps to reducing urban poverty in Brazil.
Osili (2004)	Sample of 112 Nigerian migrant households in Chicago. Migration survey conducted in 1997.	Tobit maximum likelihood specification.	Age, years of schooling, occupation, household income, remittances sent, no. of building owned.	Investments in the housing sector are the first stage of a comprehensive investment relationship between migrants and their home country.

2.6 Remittances and Housing Demand

Migrants send remittances to their families living in the home country to satisfy their daily consumption and health needs. They also focus on savings for their future needs such as higher education of their children, marriages and constructing a house. Remittances received are the major source of investment in buying and constructing a new house. The studies discussing the influence of remittances on demand for housing are reviewed in this section.

Gilani et al (1981) statedthat the Pakistani working abroad send their remittances to support the consumption needs of their family. In case of Pakistani economy, the study found that the major share of remittances is used in the expenditures of families' daily consumption needs (62%), whereas 22% of its share is invested into real estate and housing, the rest is used in financial investment.

Additionally, major share of remittances from the foreign migrants is spent on buying housing units, along with other durable goods for their consumption needs in Pakistan. Amjad (1986) concluded that a major share of the remittances received from the Middle East migrants is spent on recurring consumption, marriages and consumption of durable goods, whereas 21.68% is spent on the real estate and housing expenses, these results are similar to the findings of Gilani *et al*. (1981).

Investment in the housing market is common for the families that fail to enjoy the benefits of living in their own house for various reasons. Findlay and Samha (1986) found that it is a common trend in Amman, Jordan that the remittances received are invested in the housing market. Though these houses remain empty for most of the year

and are used only when the migrants visit their home country. Lawless (1986) also found similar investment trends for Algerian immigrants. Concluding the facts that the migrants try to secure their future needs on repatriation to their homelands. Massey *et al.* (1987) highlighted the similar results for the Mexican migrants in the United States where the major share of remittances is spent on housing investment, business and on purchasing land.

Investment trends for the migrants of rural Egypt were investigated by Adam (1991) and found that more than half of the remittances received were spent on construction and maintenance of their houses. It was also observed that the ratio of spending on housing investment was higher in migrants as compared to the local residents. Osili (2004) used data on Nigerian migrants living in the USA to investigate the relationship between migrants and their native communities. The study found a common trend of investing remittances in real estate, housing market and business and to acquire financial assets in their country of origin. Similarly, Serageldin *et al.* (2004) found matching trend in Cuenca city, where 50 percent of remittance flows during construction, housing and asset purchasing, as the investment is considered non-risky for the migrants in Latin America. Such investment trend, nonetheless, is the cause of high prices in real estate and housing market.

Spending trend of remittances in Pakistan is investigated by Arif (2009) for the migrants living in Saudi Arabia. Other than the common use of remittances on daily consumption, education, housing and land purchase are identified as a few other areas of spending. It was found that remittances in Pakistan are used to repay the loans, buying agricultural machinery and to meet marriage expenditures. The Major share of

remittances is used to buy agricultural machinery and land, whereas the house ownership trend increased because of migration of any of the family members. Therefore, migration has considerable influence on house ownership and quality of housing.

Bendixen (2010) examined the effect of remittances on the consumption pattern of families living in Kenya. According to surveys' findings half of the total remittances received by the migrant families was spent on food, housing and medical care. Whereas the rest was spent on education, small business investment and on buying or constructing houses. The consumption patterns indicted that saving was encouraged in Kenya. Following the pattern of other African countries, inflow of remittances has been high in Kenya, which was diverted into an investment opportunity for the housing market.

Ahmed et al (2010), examined in their study the welfare of housing sector in Pakistan. In their view of the general equilibrium of the economy, remittances played a very important role. The study concluded that a major share of remittances was spent on health issues, educational expenditure and on durables such as buying a new house. Whereas, minor expenditures were incurred on food, house maintenance, clothing, tobacco and transport. Evidently, the major share of remittances was spent on durable goods. Similarly, Kagochi and Kiambigi (2012) investigated the impact of remittances on the housing sector of Kenya. Results indicated a positive effect of remittances on the development of the housing sector while increasing the demand for housing construction.

2.7 Conclusion

The literature reviewed thus far clearly indicates that the majority of the households are in consumption saving disequilibrium. Some households possess houses larger than their immediate needs to avoid shifting later or renting a portion of their house

for the income sake. Whereas there are others who have a smaller housing unit as compared to their family size (Hanushek and Quigley, 1979). As a result of disequilibrium that exists between family and household size, it leads to switching of housing unit over the lifecycle (Weinberg et al, 1981).

The household characteristics discussed in literature provide ample matter for the theoretical development of appropriate models for decision making related to housing. The factors pertaining to housing demand discussed by a majority of the researchers are mainly income, price, taste and preferences. Owing to difference in social, economic and demographic features such as age, gender, consumption pattern, marital status and taste the demand for housing consumption differs. Furthermore, the difference in demand was also based on the location– urban or rural – based on economies– developed or developing – based on households' source and level of income as well as their current and permanent income (wealth).

The housing demand was also expressed through residential mobility as the housing units are fixed and when an individual or family makes a decision to relocate, it indications a need for a new housing unit. Hence, shifting was a visible act which represents a preference of individuals. The linkage between demographic features and housing decisions, nevertheless, cannot be considered a reasonable factor for the change in the flow of earnings over the lifespan. Though researchers in the housing demand market are unable to combine all the features of housing in to a single comprehensive model, yet the literature discussed has identified many characteristics of housing. This chapter provides a basis for further analysis.

CHAPTER 3

STYLIZED FACTS ABOUT HOUSING IN PAKISTAN

3.1 Introduction

Pakistan is a developing country which accommodates world's sixth largest population. The housing situation has remained under pressure in Pakistan because of rapid urbanization, industrialization, high population growth and rising per capita income. Population growth, rising urbanization, and economic development have created huge housing backlog, especially in big cities. The population of Pakistan was only 32.5 million at the time of inception that rose to 184.4 million with the growth rate of 2.0 percent during 2012-13 (GoP, 2013). This growth has led to an increase in the process of urbanization. The urban population has increased from 17.8 percent of the total population in 1951 to 38 percent of total population in 2013. The total urban population was 69.9 million in 2013 (GoP, 2013). The level of urbanization is highest among the Asian countries. It is projected that about half of the population will be urbanized by the 2030. Migration plays a significant role in urbanization. Population growth coupled with rural urban migration increases density and creates higher urban agglomeration. This not only increased the need for new housing units, but it also created a huge burden on the existing housing units.

Pakistan is faced with a severe shortage of housing, particularly for low and middle-income groups. Estimates disclosed that there is a shortage of about 7.5 million housing units (SBP, 2013). The gap between supply and demand is increasing by more

than 0.35 million units per annum based on the estimates furnished by the Population Census 1998 (Tatiana, 2010).

The objective of this chapter is to review the stylized facts of housing sector in Pakistan using various datasets such as Population Census 1998 and Pakistan Social and Living Standards Measurement (PSLM) survey 2004-05 and 2010-11. This chapter critically reviews the National Housing Policy 2001 as well as the housing finance system. This chapter also attempts to review the historical trend of remittances in Pakistan and their role in housing demand.

The rest of the chapter is structured as follows: Section 3.2 provides the snapshot of housing market in Pakistan. This section discusses the housing stock, nature of housing units and congestion issues related to housing sector. Section 3.3 provides the critical review of National Housing Policy 2001. Section 3.4 discusses the housing finance issues in Pakistan. Section 3.5 provides the historical trend of remittances and its impact on housing demand. This section first provides the snapshot of migration history of Pakistan; second provides the trend analysis of remittances; and last reviews the importance of remittances for housing demand. Last section concludes the chapter.

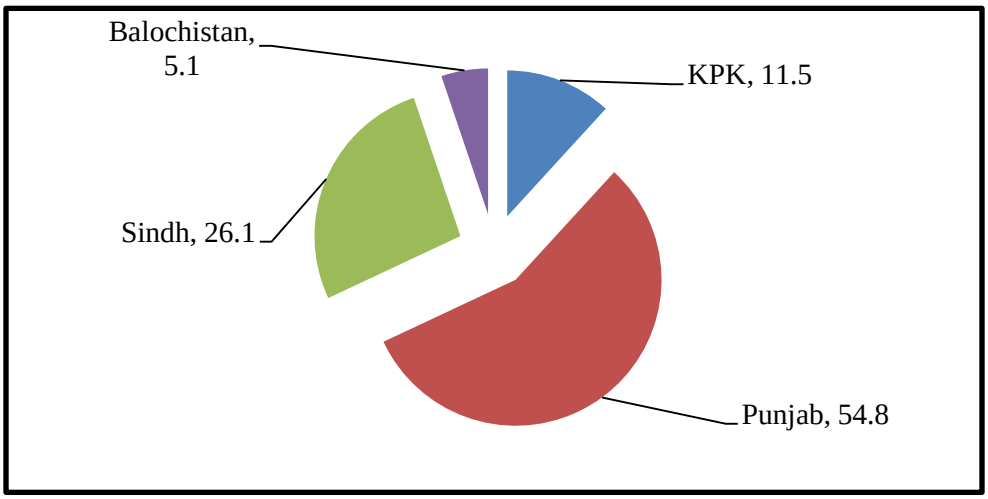
3.2The State of Housing in Pakistan

3.2.1. Housing Stock

According to Population Census 1998, the stock of housing units was 19.2 million in 1998. The housing unit means "a separate and independent place of abode," inhabited by one household and if vacant, meant for habitation by one household. It does not

necessarily mean a separate building. A building may have one or more housing units and any place not intended for habitation but occupied by a household at the time of census was also treated as a housing unit" (Zahir, 2003). The figure 3.1 presents the distribution of housing units across the provinces. The figure 3.1 indicates that in 1998, 55 percent housing units were in Punjab, 26 percent in Sindh, 11.5 percent in KPK and 5.1 percent in Balochistan. The stock of housing units was 12.5 million in 1981 (table 3.1).

Figure 3.1: Distribution of Housing Units across Provinces



Source: Authors' own calculation based on the "Population Census 1998"

The table 3.1 indicates that the housing units as percentage of total population are 14.8 percent in 1981 and 14.5 percent in 1998 in Pakistan. This highlights a decline in terms of the availability of housing units during that period. This decrease indicates that the construction of new housing units is less as compared to the need of the population. Similar trend has been observed across rural and urban areas of Pakistan. The ratio, nonetheless, has declined substantially in urban areas of Pakistan. The housing units as percent of total population have declined from 14.7 percent in 1981 to 14.0 percent in 1998 in urban areas.

The province-wise analysis demonstrates that the stock of housing units has increased from 1.61 million in 1981 to 2.21 million in 1998 in KPK. The stock of housing units has increased from 1.38 million and 0.23 million in 1981 to 1.84 million and 0.37 million in 1998 in rural and urban areas of KPK respectively. The table 3.1 presents that Punjab has registered an increase from 7.53 million housing units (5.57 million in rural area and 1.96 million in urban areas) in 1981 to 10.54 million housing units (7.34 million in rural area and 3.20 million in urban areas) in 1998. Sindh has registered increase from 2.78 million housing units (1.56 million in rural area and 1.22 million in urban areas) in 1981 to 10.54 million housing units (2.85 million in rural area and 2.17 million in urban areas) in 1998. Similar pattern has been observed in Baluchistan.

The housing units as percent of total population remained the same across the provinces. The housing units as percentage of total population have declined from 14.6 percent in 1981 to 12.5 percent in 1998 in KPK. The housing units as percentage of total population have declined from 15.9 percent in 1981 to 14.3 percent in 1998 in Punjab. On the other hand, the housing units as percentage of total population have increased from 14.6 percent in 1981 to 16.5 percent in 1998 in Sindh and from 13.6 percent in 1981 to 14.8 percent in 1998 in Baluchistan. The increase in housing units was primarily observed in rural areas of Sindh and Baluchistan during that period. But, on the other hand, decline has been recorded in urban areas of Sindh and Baluchistan during this period (table 3.1).

Table [3.1]: Housing Units (Trend Analysis)

Region	All Areas		Rural		Urban	
	1981	1998	1981	1998	1981	1998
Housing units (million)						
Pakistan	12.51	19.21	9.01	13.18	3.50	6.03
KPK	1.61	2.21	1.38	1.84	0.23	0.37
Punjab	7.53	10.54	5.57	7.34	1.96	3.20
Sindh	2.78	5.02	1.56	2.85	1.22	2.17
Balochistan	0.59	0.97	0.50	0.78	0.09	0.20
Housing units as percent of total across the rural urban						
Pakistan	100.0	100.0	72.0	68.6	28.0	31.4
KPK	100.0	100.0	85.7	83.3	14.3	16.7
Punjab	100.0	100.0	74.0	69.6	26.0	30.4
Sindh	100.0	100.0	56.1	56.8	43.9	43.2
Baluchistan	100.0	100.0	84.7	79.9	15.3	20.1
Housing units as percent of total across the provinces						
Pakistan	100.0	100.0	100.0	100.0	100.0	100.0
KPK	12.9	11.5	15.3	14.0	6.6	6.1
Punjab	60.2	54.8	61.8	55.7	56.0	53.1
Sindh	22.2	26.1	17.3	21.6	34.9	36.0
Baluchistan	4.7	5.1	5.5	5.9	2.6	3.2
Persons per Housing unit						
Pakistan	6.73	6.89	6.70	6.78	6.83	7.14
KPK	6.87	8.03	6.81	8.01	7.39	8.08
Punjab	6.28	6.98	6.16	6.89	6.63	7.19
Sindh	6.84	6.06	5.26	5.47	8.85	6.84
Baluchistan	7.32	6.76	7.40	6.40	7.78	7.85

Note: This table was prepared on the basis of data taken form Population and Housing Census of Pakistan 1981 and 1998.

3.2.2. Nature of Housing Units

The table 3.2 presents the "nature of tenure" at the national level across the rural and urban areas. The nature of tenure was measured using three categories including "owned house", "rented house" and "rent free house". The data uncovered that the owned dwellings have increased from 78.4 percent in 1981 to 81.2 percent in 1998. After

1998, there was no significant change in the ratio towards owned houses from 1998 to 2012-13. The statistics have established that around 86 percent dwellings are owned in nature (table 3.2). Similar pattern has been observed across rural and urban areas of Pakistan. There was no substantial change across rural and urban areas in the ratio of owned houses from 1981 to 1998. To understand the pattern through PSLM 2004-05 and 2010-11 see table 3.2.

Table 3.2: Nature of Tenure (Percentages) by Rural/Urban Areas

	1981			1998			2004-05			2010-11		
Nature of Tenure	All areas	Rural	Urban	All areas	Rural	Urban	All areas	Rural	Urban	All areas	Rural	Urban
All types	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Owned	78.4	82.6	67.7	81.2	86.8	68.9	86.6	92.8	78.4	85.9	91.2	75.7
Rented	7.7	2.2	21.9	8.6	2.2	22.7	8.1	1.5	16.8	8.1	2.0	19.9
Rent Free	13.9	15.2	10.5	10.2	11.0	8.4	5.3	5.7	4.8	6.0	6.8	4.4

Source: Population Census 1981, 1998; PSLM 2004-05 and 2010-11.

Apart from ownership, the quality of housing unit plays an important role in determining the quality of household living standard. The quality of housing units is determined by the material used in the construction of housing unit. To gauge the quality of housing unit, we divided the housing unit into three categories that include: i) “Pukka”; ii) “Semi-Pukka” and iii) “Kacha”. The overall housing unit stock comprised of 58.5 percent “Pukka” houses, 34.5 percent semi-Pukka” houses and 7 percent “Kacha” housing units in 1998.The census of 1980 unveiled that 43.55 percent are “Pukka”houses which increased to 58.46 percent in the census of 1998. On the other hand, a decrease in percentage of“Semi-Pukka” and “Kacha” was found in Pakistan (Table 3.3).

Table 3.3: Types of Housing Units (Percentages):

	1981			1998		
Construction Material	All areas	Rural	Urban	All areas	Rural	Urban
All Categories	100.0	100.0	100.0	100.0	100.0	100.0
Pukka	43.6	29.8	78.6	58.5	46.0	85.8
Semi Pukka	47.6	59.1	18.2	34.5	44.7	12.2
Kacha	8.9	11.1	3.2	7.1	9.3	2.0

Source: Population Census 1981 and 1998.

Table 3.4 features the distribution of housing units across the provinces with respect to quality of housing unit. The distribution unveils that in Punjab, around 62 percent houses fall under the category of "Pukka" houses, 8 percent under the category of "semi-Pukka" houses and 30 percent under the category of "Kacha" houses (Pukka and Kacha respectively mean conventional construction and non-conventional construction). In case of Sindh, 47 percent houses fall under the category of "Pukka" houses, 19 percent under the category of "semi-Pukka" houses and 34 percent under the category of "Kacha" houses. Only 16 percent houses fall under the category of "Pukka" houses in Balochistan and 56 percent in KPK. These statistics present a huge variation across the provinces in terms of housing quality. The housing quality is very low in Baluchistan and high in Punjab.

Table 3.4: Types of Housing Units (Percentages) Across the Provinces

Province	Region	Housing by Types		
		Pukka	Semi Pukka	Kacha
Punjab	All Area	62.0	8.0	30.0
	Rural	52.2	8.6	39.2
	Urban	84.4	6.7	8.9
Sindh	All Area	46.7	19.0	34.4
	Rural	17.9	28.6	53.4
	Urban	84.5	6.2	9.3
Baluchistan	All Area	14.2	14.0	71.8
	Rural	8.4	14.2	77.4
	Urban	37.2	13.6	49.2
KPK	All Area	56.2	5.6	38.3
	Rural	53.0	5.9	41.1
	Urban	71.9	4.1	24.0

Source: Population Census 1998.

The table 3.5 highlights the quality of housing units in terms of material used in outer walls and material used in making of roofs. The material used on walls includes baked bricks/block stone, Baked Brick/ Earth Bound, wood and others. On the other hand, there are four types of material used in making of roofs which includes RCC/RBC, Cement/iron sheet, wood/Bamboo and others. The table 3.5 bares that baked bricks block/stone are used 58.46 percent in the construction of houses (for rural 45.96 percent and 85.76 percent urban). Baked or earth bound brick are used by 34.48 percent of the housing owners (44.69 percent rural and 12.16 urban). The houses constructed by using wood or bamboo are 5.42 percent (7.20 percent rural and 1.53 percent urban). Others contain a total of 1.64 percent (2.14 percent rural and 0.54 percent urban).

The table 3.5 indicates that around 21.39 percent (from which 10.43 percent rural and 45.35 percent urban) houses use RCC/RBC for making roofs. Cement/ Iron sheet are

used with a percentage of 13.07 overall (10.05 percent rural and 19.69 percent urban). The roof of wood consists of 57.35 percent (in which, 69.76 rural and 30.23 urban). Values in the table are rounded and given in single digit after the decimal.

Table 3.5: Housing Units by Construction Material (Percentages)

Material used in Outer Walls					
Province	Region	Baked Bricks/ Blocks/Stone	Baked Brick/ Earth Bound	Wood/ Bamboo	Others
Pakistan	All areas	58.5	34.5	5.4	1.6
	Rural	46.0	44.7	7.2	2.1
	Urban	85.8	12.2	1.5	0.5
KPK	All areas	58.0	37.3	2.3	2.4
	Rural	54.9	39.9	2.5	2.7
	Urban	73.4	24.3	1.3	1.0
Punjab	All areas	68.0	30.4	0.7	0.9
	Rural	58.4	39.7	0.8	1.1
	Urban	89.9	9.1	0.5	0.5
Sindh	All areas	47.7	34.5	15.7	2.1
	Rural	18.5	52.5	25.7	3.3
	Urban	86.0	10.9	2.6	0.4
Baluchistan	All areas	14.8	67.9	12.2	5.1
	Rural	9.0	71.7	13.3	6.0
	Urban	37.9	52.8	7.9	1.4
Material Used in Roofs					
		RCC/ RBC	Cement Iron Sheet	Wood Bamboo	Others
Pakistan	All areas	21.4	13.1	57.4	8.2
	Rural	10.4	10.1	69.8	9.8
	Urban	45.4	19.7	30.2	4.7
KPK	All areas	16.4	9.2	69.4	5.0
	Rural	11.8	8.5	74.3	5.5
	Urban	39.2	12.6	45.2	3.0
Punjab	All areas	21.9	11.2	56.3	10.6
	Rural	12.6	10.7	64.4	12.3
	Urban	43.3	12.4	37.7	6.6
Sindh	All areas	25.5	20.9	48.9	4.7
	Rural	6.4	12.2	74.9	6.5
	Urban	50.6	32.3	14.8	2.4
Baluchistan	All areas	5.2	5.7	80.6	8.5

	Rural	1.4	2.6	86.2	9.8
	Urban	20.2	18.0	58.2	3.7

Source: Population Census 1998.

The table (3.6)offers the quality of material used in making of roofs and housing units in terms of material used in outer walls. This data was gathered by the help of PSLM reports of (2004-2005) and (2010-2011). The material used for constructing roofs includes: RCC/RBC, wood/bamboo, sheet/ Iron cement and other materials and lastly the column for total. Data was gathered from urban and rural areas of all provinces from Pakistan. Roof made up of Rcc/Rbc in Pakistan are 39.39 percent (urban was 50.71 and rural 14.88 percent), whereas wood/bamboo used in making of 49.87 percent (urban was 28.71 and rural 66.02 percent) in Pakistan, thirdly sheet/iron cement used to build 19.74 percent (urban was 20.58 and rural 19.10 percent) in Pakistan. On the other hand, the material used for outer walls includes: Burnt bricks/ blocks, Mud bricks/ Mud, wood/ bamboo, other material and one last column for total. Data was gathered from urban and rural areas of all provinces from Pakistan. The data proves that 83.02 percent of walls were made up of burnt bricks/blocks (urban was 87.84 and 45.75 percent rural), whereas 27.24 percent walls were done by the help of mud bricks (urban was 10.21 and 40.24 rural), wall consists of wood/bamboo were 3.16 percent (urban was 0.90 and 4.88 percent rural) and other materials were used with a percentage of 5.63 (urban was 1.05 and 9.13 percent rural). For further understanding on the provincial level, please see table (3.6).

Table 3.6: Housing Units by Construction Material (Percentages)

	Material used for Roof (2004-2005)				Material uses for Roof (2010-2011)			
Region (Province)	RCC/RBC	Wood/ Bamboo	Sheet/ Iron Cement and other	Total	RCC/RBC	Wood/ Bamboo	Sheet/Iron Cement and other	Total
Urban Areas	50.71	28.71	20.58	100	59.53	13.02	27.45	100
Punjab	46.89	32.37	20.74	100	54.41	15.29	30.30	100
Sindh	62.68	13.53	23.78	100	69.76	5.57	24.68	100
KPK	52.56	35.65	11.79	100	63.39	25.19	11.42	100
Balochistan	26.63	52.99	20.38	100	27.10	32.34	40.56	100
Rural Areas	14.88	66.02	19.10	100	11.47	47.82	40.71	100
Punjab	17.41	55.55	27.04	100	11.23	38.57	50.20	100
Sindh	15.20	66.72	18.07	100	3.25	60.16	36.59	100
KPK	17.46	70.75	11.79	100	25.04	56.04	18.92	100
Balochistan	3.45	89.39	7.16	100	1.34	84.31	14.35	100
PAKISTAN	39.39	49.87	19.74	100	27.80	36.00	36.21	100
Punjab	31.56	44.42	24.02	100	24.91	31.20	43.89	100
Sindh	38.16	41.01	20.83	100	37.52	32.03	30.46	100
KPK	28.54	59.67	11.79	100	31.48	50.86	17.66	100
Balochistan	10.10	78.95	10.95	100	7.09	72.71	20.20	100

	Material Used for Outer Walls (PSLM 2004-2005)					Material Used for Outer Walls (PSLM 2010-2011)				
Region (Province)	Burnt Bricks/ Blocks	Mud Bricks/ Mud	Wood/ Bamboo	Other	Total	Burnt Bricks/ Blocks	Mud Bricks/ Mud	Wood/ Bamboo	Other	Total
Urban Areas	87.84	10.21	0.90	1.05	100	94.53	4.78	0.24	0.45	100
Punjab	94.89	4.42	0.21	0.48	100	97.28	2.38	0.09	0.24	100
Sindh	88.65	9.05	2.08	0.23	100	94.48	4.95	0.45	0.11	100
KPK	81.09	12.78	0.28	5.84	100	87.30	9.44	0.18	3.08	100
Balochistan	47.19	50.08	1.93	0.79	100	63.33	33.61	0.53	2.53	100
Rural Areas	45.75	40.24	4.88	9.13	100	60.73	30.43	2.81	6.04	100
Punjab	72.06	25.96	0.49	1.49	100	76.38	21.05	0.21	2.36	100
Sindh	31.71	53.05	14.04	1.20	100	34.82	51.55	11.96	1.66	100
KPK	34.28	28.41	1.06	36.25	100	47.74	25.47	1.21	25.58	100
Balochistan	7.19	76.57	7.48	8.76	100	11.11	78.08	7.08	3.74	100
PAKISTAN	63.97	27.24	3.16	5.63	100	72.21	21.72	1.94	4.14	100
Punjab	83.02	15.62	0.35	1.01	100	83.00	15.14	0.17	1.69	100
Sindh	59.24	31.78	8.26	0.73	100	65.56	27.54	6.03	0.86	100
KPK	49.05	23.48	0.82	26.65	100	54.38	22.78	1.04	21.80	100
Balochistan	18.65	68.98	5.89	6.47	100	22.76	68.15	5.62	3.47	10

Source: PSLM (2004-2005) and (2010-11)

3.2.3. Congestion

Various indicators are used to examine the level of congestions within the housing unit. In this context, we use persons per housing unit, person per room, single room housing units, two rooms housing units and three to four rooms housing units. Census of 1981 and 1998 established that in Pakistan persons per housing unit were 6.70 and 6.80 percent and number of persons per room was 3.50 and 3.13. On the other hand, it was noticed that 51.54 and 38.11 percent people were living in one room, whereas 44.83 and 30.54 percent, 3.63 and 24.43percent, 6.70 and 6.92 percent people were living in two rooms, three to four rooms and five or more rooms respectively. For further understanding provincially (Punjab, KPK, Sindh, Baluchistan) kindly see the table (3.7) and (3.8).

Table 3.7: Congestion of Housing Units

	1981				
Indicators	Pakistan	KPK	Punjab	Sindh	Baluchistan
Persons Per Housing Unit	6.70	7.00	6.50	7.10	7.60
Persons Per Room	3.50	3.60	3.30	4.00	4.20
Single Room Housing units (%)	51.54	50.00	48.00	61.00	60.00
Two Rooms Housing units (%)	44.83	4.00	48.00	36.00	36.00
3-4 Rooms Housing units (%)	3.63	46.00	4.00	3.00	4.00
5 & more Rooms Housing units (%)	6.70	7.00	6.50	7.10	7.60
	1998				
Persons Per Housing Unit	6.80	8.00	6.90	6.00	6.70
Persons Per Room	3.13	3.34	3.04	3.37	3.07
Single Room Housing units (%)	38.11	27.71	31.97	56.93	42.77
Two Rooms Housing units (%)	30.54	34.50	33.54	23.87	25.18
3-4 Rooms Housing units (%)	24.43	29.11	27.12.	17.00	22.69
5 & more Rooms Housing units (%)	6.92	8.67	7.36	3.56	9.36

Source: Population Census of 1981 and 1998.

Table 3.8: Congestion of Housing Units

	2004-05				
Indicators	Pakistan	KPK	Punjab	Sindh	Baluchistan
Persons Per Housing Unit	6.75	7.71	6.55	6.71	6.88
Single Room Housing units (%)	24.20	18.35	24.75	30.76	14.79
2-4 rooms Housing units (%)	68.71	69.90	68.69	65.00	75.78
5 & more Rooms Housing units (%)	7.09	11.75	6.56	4.24	9.43
	2010-11				
Persons Per Housing Unit	6.38	7.17	6.16	6.39	7.08
Single Room Housing units (%)	24.83	19.03	26.09	25.67	20.89
2-4 rooms Housing units (%)	69.33	72.62	67.49	70.94	75.02
5 & more Rooms Housing units (%)	5.84	8.32	6.43	3.39	4.09

Source: PSLM 2004-05 and 2010-11

3.3. National Housing Policy (NHP)

The gap between supply and demand for housing is persistently rising in Pakistan. Previous section clearly indicates that per annum housing demand is around 0.35 million. The unavailability of new housing unit increases the congestion and homeless peoples in the country. This calls for governmental intervention to provide decent accommodation to every household. Pakistan had no housing policy at national and even provincial level till 1992. First National Housing Policy was developed in 1992 which was revised in 1994. This policy proposed various innovative methods for increasing housing stock and improving the quality of existing housing units. The government, nevertheless, failed in implementing this policy. Later on, the government of Pakistan had formulated a National Housing Policy (NHP) in 2001.

The NHP 2001covers all major issues related to housing market such as land issues, housing finance, construction service sector, low cost rural housing, building material, infrastructure development, zoning regulations, and institutional arrangements.

The NHP 2001 highlights key challenges to housing sector and proposes some strategies to resolve those issues and challenges and spells out the aims with key objectives. The following are the key problems and issues that were highlighted in the NHP 2001:

i) The housing related issues are mainly generated by huge population growth

ii) The per annum housing requirement is 0.57 million

iii) The unchecked growth of squatter settlements, *KatchiAbadis*, encroachment of state and vacant land are held responsible for housing shortages

iv) Scarcity of suitable land for housing particularly in and around the urban centers

v) Affordability issues specially for low-income group

vi) The housing stock is also rapidly aging

vii) Shortage of affordable housing finance to be major obstacle in housing production

viii) Tremendous rise in price of housing material because of inflationary pressure

ix) Lack of the use of technology

To overcome these issues and meet the future housing requirements with low cost and high quality, the proposed NHP 2001 was intended to achieve the following aims and objectives:

i) To propose an enabling strategy for capacity building and institutional arrangements

ii) Empowering all stakeholders including public as well as private sector for

housing market development

iii) To propose a strategy for easing housing finance and home improvement credits which are compatible with affordability, especially for low-income group.

iv) Strategy to improve the housing conditions through development, capacity building and initiation of innovative ideas

v) Strategy to upgrade the existing cities with better planning through the improvement of infrastructure

vi) Encourage research and development activities to design low cost houses

vii) Provision of safeguard against malpractices and resource mobilization

viii) Provision of incentives through tax rationalization

ix) A countrywide program of developing small and medium size towns having growth potential.

3.4. Housing Finance in Pakistan

It is believed that house financing plays an important role in the efficiency and stability of the economic and financial system (Sheng, 2003). Expansion and development of house financing provides opportunities for broadening the capital market. Housing construction is considered an important domestic engine of economic development. Construction activities provide employment opportunities to skilled as well as unskilled laborers because of its labor intensive nature (Erbas and Nothaft, 2002).

Evidence stresses that the share of housing investment through formal financial institutions is very small in developing countries and house financing only constitute a small fraction of financial assets (Buckley, 1994). The reason behind low investment was either nonexistent mortgage market or falls to serve the large home buyers. The mortgage credit supply by the formal institutions was less than 16 percent of the total housing investment in developing countries (Buckley, 1994).

The total outstanding finance to housing sector both by HBFC and commercial banks together was recorded Rs. 70.34 billion as on June 30, 2010. Table [3.9] provides an overview of the housing finance in Pakistan. The gross outstanding finance to housing sector has increased from 55.29 billion in 2005 to 70.34 billion in 2010. The share of commercial banks and other DFIs has increased from 65 percent in 2005 to 80 percent in 2010. On the other hand, the share of HBFC has declined from 35 percent in 2005 to 20 percent in 2010. The number of outstanding borrowers has declined from 135,689 in 2005 to 101,632 in 2010. Around 68 percent borrowers are obtaining housing finance from HBFC. The average interest rate has increased from 10.10 percent in 2005 to 15.76 percent in 2010. Whereas in 2005 the real rate of interest was 2.2 percent and -3.74 percent in 2010. The decline in borrowers was primarily because of high inflationary rate on housing finance.

Table 3.9: Snapshot of Housing Finance in Pakistan

Indicators	2005	2006	2007	2008	2009	2010
Gross Outstanding (Rs million)	55,293	61,957	76,004	83,786	76,663	70,337
Share of All Banks & Other DFIs	65%	82%	84%	80%	79%	80%
Share of HBFC	35%	18%	16%	20%	21%	20%
No. of Outstanding Borrowers	135,689	99,671	125,490	123,107	115,959	101,632
All Banks & Other DFIs	19,112	23,416	26,073	28,624	27,372	24,855
Average Loan Size						
HBFC	116,577	76,2555	99,417	94,483	88,587	76,777
Weighted Average Interest Rate (%)	10.10	10.31	12.14	14.65	16.15	15.76
Average Maturity Periods (Years)	13.2	13.6	12.8	12.2	12.6	13.6
HBFC (Rs. Millions)	0.083	0.087	0.092	0.86	0.74	1.22
Commercial Banks (Rs. Millions)	1.95	2.33	2.60	2.35	2.49	3.55
Non-Performing Loans (Rs million)	N.A	N.A	N.A	12,314	15,260	17,368
NPLs as a % of Total Outstanding -Overall	N.A	N.A	N.A	14.7%	19.90%	24.71%
All Banks & Other DFIs	N.A	N.A	N.A	9.1%	14.42%	19.57%
HBFC	N.A	N.A	N.A	37.6%	40.97%	44.82%

Source: SBP (2013)

3.5. Remittances and Housing Demand

International migration was growing rapidly at the rate of 1.8 percent because of increasing integration of the world economies and the changing needs in both the countries of destination and of origin. It was estimated that 3.1 percent of world population had turned into international migrants in 2010 and approximately half of them were women (UN, 2010). Pakistan has a long history of international migration to the different parts of the world. Pakistani migrants are mostly concentrated in developed world and Gulf States. Pakistani workers have been immigrating to the European countries: mostly to the United Kingdom (UK) during 1950s and 1960s. Young men of working age began to migrate in large numbers during that period and a majority of them were unskilled and uneducated and being absorbed in the low-paid jobs in the industrial

and services sectors. The movement was largely of permanent nature that also saw families joining the migrant workers. North America and Western Europe were the other destinations of Pakistani migrants during that period. The emigrants to North America were initially educated men with professional training.

The wave of migration that began in the early 1970s, in response to the OPEC-induced economic boom in the region, dramatically changed the pattern of migration from Pakistan. It was estimated that as many as 2 million Pakistanis had immigrated to the oil rich region during the 1970s and 1980s. The main destinations were Saudi Arabia, Kuwait, and the United Arab Emirates, but there were substantial migration to other countries as well including Qatar, Bahrain, and Oman etc.

The emigration flows from Pakistan recorded at around 4.6 million during 1971-2008, while most of them were geared towards the Middle East. In 2004, approximately 4 million Pakistanis were abroad and about half of them (48%) were in the Middle East, with a concentration in Saudi Arabia (27.7 percent) and United Arab Emirate (12.6 percent). Europe and North America were the destinations of 28 percent and 21 percent overseas Pakistanis respectively. In Europe, Pakistanis are concentrated in United Kingdom (UK). It was estimated that 0.6 million Pakistanis were in the USA in 2004 (GoP, 2005).

The remittances sent by the international migrants worldwide are an important source of external finance for many developing countries (Mohapatra and Ratha, 2010). Remittances, which make up a considerable percentage of GDP in developing countries, contribute effectively in the economic growth through enhancing investment, providing balance of payment supports and building foreign exchange reserves (Siddique, 2005; Adams, 2006; Piotrowski, 2009 and Arif, 2009). Remittances are also important for the well-being of household because their inflows reduce poverty and allow recipients to

ensure smooth consumption (World Bank, 2006). They reduce the risk and increase investment opportunities at the household level, especially in the areas where credit, insurance and capital markets are absent or imperfect (Taylor and Martin, 2001).

In case of Pakistan, the availability of foreign exchange through remittances helped in reducing current account deficit, external borrowings and external debt burden (Amjad and Kemal, 1997; Iqbal and Sattar, 2005; Ahmed, 2009). Workers' remittances have remained an important source of foreign exchange earnings over the years and for the last eight years or so it remained the dominant factorin keeping the current account deficit at a manageable level (GoP, 2009). This section focuses on the relationship between remittances (foreign remittances) and housing demand in Pakistan. First, we analyze the historical trend of remittances and the major source countries. Secondly, we review the impact of remittances on housing demand i.e. investment in housing sector, housing ownership, quality of housing and housing congestions.

3.5.1. Remittances: Trend Analysis

The annual inflows of remittances to Pakistan through the formal banking channel are reported regularly in the Economic Survey of Pakistan and State Bank of Pakistan's bulletins. Remittances transferred through informal channels such as HUNDI are not reported and not included in the official figures. The actual value of funds remitted, therefore, is likely to be higher than the figure reported by the SBP. Huge fluctuations were noted in the inflows of remittances. Table (3.10) displayed that the remittances have increased from 4152 million US$ in 2005 to 13922 million US$ in 2013. The region-wise analysis discloses that the USA (2186 million US$), the UK (1946 million US$), Saudi Arabia (4105 million US$), UAE (2750 million US$) and other GCC countries (1608 million US$) are the main source countries. Moreover, the analysis reveals that the share of remittances from the USA has declined from 31.2 percent in 2005 to 15.7 percent in 2013. On the other hand, remittances

sent from the UK and Saudi Arabia underlined increasing trend over the last decade. Table (3.10)indicates that the share of remittances has increased from 9 percent in 2005 to 14 percent in 2013 from the UK and has increased from 15.1 percent in 2005 to 29.5 percent in 2013 from Saudi Arabia. The share of remittances, nonetheless, has remained consistent from the UAE and other GCC countries.

Table 3.10: Trend in Remittances

Country/Region	2005	2006	2007	2008	2009	2010	2011	2012	2013
	US $ Million								
Total	4152	4588	5491	6449	7811	8905	11201	13187	13922
USA	1294	1242	1460	1762	1736	1771	2069	2334	2186
UK	372	439	430	459	606	876	1200	1521	1946
Saudi Arabia	627	750	1024	1251	1560	1918	2670	3687	4105
U.A.E.	713	716	866	1090	1689	2039	2598	2849	2750
Other GCC Country	512	596	757	983	1203	1238	1306	1495	1608
EU Countries	102	120	149	177	248	252	355	365	357
Norway	18	17	22	29	25	35	37	38	38
Switzerland	23	21	18	23	19	22	32	34	30
Australia	20	25	31	39	34	56	89	114	150
Canada	48	82	87	101	79	115	185	178	177
Japan	7	7	4	5	5	6	8	9	5
Others Countries	417	573	642	530	609	577	653	562	569
Percentage share in total									
Total	100	100	100	100	100	100	100	100	100
USA	31.2	27.1	26.6	27.3	22.2	19.9	18.5	17.7	15.7
UK	9.0	9.6	7.8	7.1	7.8	9.8	10.7	11.5	14.0
Saudi Arabia	15.1	16.4	18.6	19.4	20.0	21.5	23.8	28.0	29.5
U.A.E.	17.2	15.6	15.8	16.9	21.6	22.9	23.2	21.6	19.8
Other GCC Country	12.3	13.0	13.8	15.2	15.4	13.9	11.7	11.3	11.5
EU Countries	2.4	2.6	2.7	2.7	3.2	2.8	3.2	2.8	2.6
Norway	0.4	0.4	0.4	0.4	0.3	0.4	0.3	0.3	0.3
Switzerland	0.5	0.4	0.3	0.4	0.2	0.2	0.3	0.3	0.2
Australia	0.5	0.5	0.6	0.6	0.4	0.6	0.8	0.9	1.1
Canada	1.2	1.8	1.6	1.6	1.0	1.3	1.6	1.3	1.3
Japan	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0
Others Countries	10.0	12.5	11.7	8.2	7.8	6.5	5.8	4.3	4.1

Source: SBP (2014)

3.5.2. Remittances and Housing demand Nexus in Pakistan

A great body of literature has established the interest of migrant workers and their families to improve their housing conditions by investing the remittances (Gilani et al.,

1981; Arif, 1999; Ballard, 2005). Arif (2009) concluded that housing facilities have been improved as compared to pre migration facilities among the migrant households. Arif (2009) stresses that a large proportion of remittances are spent on four sectors: real estate and agricultural machinery, food, marriages and savings. The table (3.11) denotes that 17 percent remittances were used in real estate and agriculture machinery, 13 percent were used in marriages, 20 percent remittances were used in savings, and the rest for obtaining other items. Additionally, the analysis discloses that food, real estate, savings and marriages remained the important aspects for the use of remittances in both rural and urban areas. The pattern across the regions/provinces was also the same.

Table 3.11: Uses of total remittances received by regions (Percentage distribution)

						(From August 2008-July 2009)
Items	Total	Urban	Rural	Punjab	Sindh	Others
Food	9.13	7.46	12.16	7.26	6.02	15.48
Health	2.47	2.39	2.78	1.34	1.74	6.67
Education	2.95	3.13	2.98	1.55	2.95	5.49
Real Estate/agriculture machinery	16.68	19.54	13.43	12.90	20.07	12.91
Durable items	10.53	12.34	8.38	10.68	9.80	7.07
Marriage	12.86	14.03	10.68	9.37	20.13	7.10
Loan return	8.34	8.00	9.68	7.47	7.61	9.49
Savings	21.05	22.33	17.99	17.57	23.91	7.73
Donations	2.69	3.11	2.15	2.33	3.06	2.06
Others	13.32	7.68	19.77	29.54	4.71	26.00
All	100.0	100.0	100.0	100.0	100.0	100.0

Source: Arif (2009)

Arif (2009) further highlights that remittances have a positive relation with the quality of housing. The ownership of a residential house has increased from 87 percent pre-migration to 91 percent post-migration. The ownership of a residential house has increased from 78 percent to 85 percent in urban areas and from 96 to 98 per cent in rural areas. The major change was in repairing the housing unit. Remittances money has

enabled household to make their houses cemented *(Pukka)*. In rural areas the proportion of *Pukka* houses increased from 42 per cent before migration to 62 per cent after migration. The change was also considerable in urban areas. The other major change was the addition of new rooms in the existing housing units. On average, there was an addition of one room in the dwelling unit in both urban and rural areas. The proportion of large houses having five or more rooms more than doubled in rural as well as urban areas. While access to electricity was universal before migration, whereas the availability of gas has modestly improved in both urban and rural areas. As compared to 17 per cent of rural households having telephone before migration, 48 per cent reported this facility at the time of survey. A modest improvement was also observed in water supply and sewerage Table (3.12).This analysis indicates that remittances played a significant role in enhancing the quality of housing and increasing overall housing demand.

Table 3.12: Migration and change in housing conditions

(From August 2008-July 2009)

Housing characteristics	Total Sample		Urban Areas		Rural Areas	
	Before migration	After migration	Before migration	After migration	Before migration	After migration
% owned house	87.2	91.2	78.0	84.5	95.8	97.5
% Pukka house	59.5	74.6	78.0	87.9	42.3	62.3
% had electricity	99.1	99.3	99.6	99.6	98.6	99.3
% had gas connection	52.6	57.8	85.2	90.5	22.2	27.5
% had telephone	39.1	65.3	62.9	83.7	16.9	48.2
% had water supply	52.0	54.6	83.3	87.1	22.9	24.3
% had sewerage	59.3	68.6	84.8	91.3	35.6	47.5
Number of rooms (mean)	3.4	4.5	3.5	4.6	3.3	4.3
House with 5 and more rooms 9%)	15.3	37.2	16.7	41.3	14.1	33.5

Source: Arif (2009)

3.6. Conclusion

This chapter has provided stylized facts of the housing sector in Pakistan. The chapter has uncovered that there is a huge gap between the supply and demand for housing in Pakistan. Because of fast urbanization and high population growth, the demand for housing has increased exponentially. The government of Pakistan has failed to design an appropriate national housing policy to address the challenges faced by the housing market. Weak implementation of National Housing Policy 2001 has further worsened the situation. Housing finance has remained very low because of stringent procedures and high interest rates. On the other hand, migration has also significant role in increasing housing demand in Pakistan. Remittances are spent on the housing sector either through developing new housing units or through increasing the quality of existing housing units. This chapter has highlighted the important determinants of housing demand in Pakistan. Based on this information, we will develop a conceptual framework to analyze the role of these factors in housing demand in next chapter.

CHAPTER 4

MODELING FRAMEWORK, DATA AND ESTIMATION METHODLOGY

4.1. Introduction

From the theoretical and empirical literature discussed in chapter 2 it is clear that the housing demand is influenced by various economic and demographic factors such as rising income, population growth, prices, and migration etcetera. The first objective of this chapter is to develop a conceptual framework to analyze the determinants of housing demand in Pakistan. The conceptual framework follows the work of Goodman (1998), Zabel (2004) and Fontenla and Gonzalez (2009). The second objective is to discuss the data and methodology used for analysis. The last objective of the chapter is to provide descriptive analysis of the variable at national level as well as disaggregated by income group.

The rest of the chapter is organized as follows: In section 4.2 we discuss the basic theory behind the determinants of housing demand and model to give effect to the relationship between housing demand and its determinants. Section 4.3 discusses the methodology applied to measure housing demand. ,more, model to estimate standardized housing unit, total income, housing price and imputed rent are discussed in sub sections. In section 4.4 and 4.5 data, its sources and data construction are discoursed. Section 4.6 discusses the descriptive statistics of the sample selected and the last section concludes the chapter.

4.2.1 Conceptual Framework

The neoclassical consumer theory of housing demand provides the basis for housing demand analysis. For housing demand analysis, this theory uses various assumptions in regards to consumer behavior, the nature of housing commodity and the housing market. First, consumers maximize their utility in the light of the income and price constraints they face in the marketplace. Second, the object of consumer decision-making is considered not to be the observable heterogeneous commodity of housing but rather an unobservable homogeneous commodity called housing services. Third, a perfectly competitive market in housing services is assumed to exist. In addition, the housing market was assumed to operate in a tax-free world where capital and asset markets were perfect and in equilibrium (Megbolugbe et al, 1991).

Initially, this framework was applied by Muth (1960) and Olsen (1969) to examine the housing market. According to this theory, the determinants of housing demand are principally income, price and taste. According to this theory, rational consumers maximize their utility with respect to different goods and services including housing services, which they can purchase. Market prices and consumer income act as binding constraints in this maximization solution. Every household chooses between non-housing commodities and housing commodities. The objective of household is to maximize its utility with respect to non-housing commodities and housing commodities. This defines the housing demand equation.

Megbolugbe, et al. (1991) featured that housing consumption was determined by household income, relative price of housing, prices of other goods and services

and the taste factors. As there is no direct measure of the household taste, various studies included several demographic household characteristics such as age, marital status, and household composition in the housing demand equation as proxy to quantify the role of the taste. Several studies include housing characteristics in the housing demand equation on the basis that they affect the income and effective price of housing to the household. Several modifications have been made in the neoclassical consumer theory of housing demand for better understanding of housing demand phenomenon. Various assumptions have been relaxed on the face of such perfectly competitive features of the housing market. The objective of these modifications was to broaden the modeling framework of housing demand determinants that provide conceptually correct analysis of the housing market.

Recently the neoclassical model of housing demand has been improved by incorporating various dimensions of the housing commodity. Housing as a commodity is different from other traded goods as of its high cost of supply, its durability, its heterogeneity and its spatial fixity. Megbolugbe, et al. (1991) outlined three of the main features of the housing demand that have been included into the neoclassical housing demand. These are:

- Durability
- Heterogeneity of housing
- Locational factors

4.2.2. Durability

Durability means that the existing stock of house plays an important role in determining the required amount of accommodation in the future owing to long life and slow depreciation. This implies that the rate of construction of new housing is very low. The durability of housing units is a dominant characteristic of standing stock (Megbolugbe, et al. 1991). This means that the rate of disinvestment was very low in the housing sector. The durability of housing raises several issues in modeling housing demand. The durability of housing has direct implications for: i) how demand should be modeled; ii) the method in which housing decisions should be defined in the utility function; and iii) how income and prices constraints should be defined.

The demand for housing is interpreted as the demand for the services available to household from the housing. This definition does not differentiate the demand for housing services from the demand for housing stock. Robinson (1979) and Smith et al. (1988) argue that this issue can be resolved by distinguishing between 'housing stock' and the 'flow of housing services'. Housing stock is produced using land, labor and building materials, whereas, flow of housing services is produced using housing stock, labor and amenities such as heat, light, water, sanitation and other essential services. Zabel (2004) indicates that stock plus amenities can be used jointly as housing stock.

This division helps to measure rent and price separately. Rent is defined as payment made for the flow of housing services and price as the capital value associated with a particular unit of stock (Robinson, 1979). The existence of housing stock and housing services leads to separation of ownership and use of housing i.e. an owner-occupied and a rental housing stock. This division also creates a rental market to provide

dwellings. High prices of owned housing make renting an important feature of the housing market. The housing choice decisions are based on tenure, structure type and amenity package. The choice mainly occurs where these factors interest each other. In this context, it is important to incorporate the derived demand for houses an asset. The model lacking these dimensions generally produce biased estimates on income and price elasticity of housing demand (Megbolugbe et al, 1991).

Income is a fundamental determinant in explaining housing demand as it is the source of funds for payments in shape of rent or costs of housing. Difficulties, nonetheless, arise in measuring the income. Some studies exhibited that the appropriate income measure should be the long run permanent income of household in modeling housing demand. While others dilated that the use of current income in housing demand model is useful owing to difficulties in measuring permanent income (see e.g. Lee, 1968; Henderson and Loannides, 1986). Similarly, housing price has been quantified in many ways. Prices are not directly observed in the housing market rather they are an estimate of either rent or market value. Proper price measure is critical in determining the price elasticity of housing demand.

Glaeser and Gyourko (2005) highlight the role of asymmetric responses of housing prices and population growth in determining housing demand. Durable housing assumes the exogenous shock approach to different asymmetric responses of house prices and population. The positive shock creates a large impact on the population growth, because new supply dampens the effect on prices. Both asymmetries are borne out in the data. Another implication of durable housing is that the distributions of housing prices are an excellent predictor of future population growth. Whereas, in case of negative shock it

is totally opposite and in case of declining cities, the durability of housing demand leads to decline in demand being reflected more in prices as compared to in people.

4.2.3. Heterogeneity of Housing

The basic neoclassical model for housing demand is based on the concept of homogeneous composite commodity. The housing markets, nonetheless, have been characterized as being heterogeneous implying that housing units that have the same price may differ in their size, age, design, access, and to other factors. The modeling of housing heterogeneity was based on the assumption that households value goods for their characteristics (Becker, 1965) and (Smith et al. 1988) argues that households value goods for their characteristics which yields utility or are combined with other inputs including household time according to a production function to produce services that yield utility.

4.2.4. Locational Factors

Recent studies incorporate the role of locational factors in modeling housing demand. Location as a characteristic of the housing stock is also part of the stock's heterogeneity. Locational factors involve aspects such as, distance from city center and site of employment, nature of land use in the neighborhood of the housing and the choice of local government. The inclusion of neighborhood choices has recently gained considerable momentum as an additional aspect to the determinants of housing demand. Some of the studies including neighborhood choices are by Muth and Goodman (1989), Cheshire and Sheppard (1998), Loannides and Zabel (2002) and Zabel (2004).

Apart from durability, heterogeneity and spatial fixity, various other features shape the housing demand function. The effects of a potential capital gain on housing demand has created a strand of both theoretical and empirical literature establishing that

an increase in house price, contrary to standard demand theory, leads to an increase in the demand for owner-occupied housing. Dusansky and Wilson (1993) and Dusansky and Koc(2007) carryout a study to determine the properties of housing demand function with the former drawing a theoretical framework followed by the later testing the theoretical framework using empirical analysis. Dusansky and Wilson (1993) in constructing a theoretical framework study the inter-temporal demand for housing under uncertainty and found that Slutsky equation for housing demand does not yield the traditional predictions of a downward sloping own-demand curve. The authors believe that in order for housing to mimic traditional demand properties (downward sloping) it is necessary to impose additional structure on the model. Dusansky and Koc (2007) follow the theoretical model of owner-occupied housing demand that captures the dual characteristics and carry an empirical study that found that an increase in house price increases the demand for owner-occupied housing services.

It can be said that wider components of housing studies include, determining the quantity of housing services demanded, the decision of whether to own or rent (known as tenure choice), and, to account for capital gains effect and flow equilibrium of housing stock. Zabel (2004) argued that despite a vast amount of literature on housing demand, the concept of housing remains to be clearly defined. He points out that the literature so far falls into four main categories: (1) the demand for housing services, (2) the demand for individual housing attributes, (3) the demand for owner occupancy versus renting (tenure choice), and (4) the spatial allocation of households. Two consequential measures used in the above studies include estimating unobservable, such as house price for services and permanent income.

4.3. Mathematical Model

To put the above discussion in a framework, we followed the work of Goodman (1998), Zabel (2004) and Fontenla and Gonzalez (2009). These studies have used the utility maximization approach as a framework to understand the housing demand dynamics. Let individual i's utility function in market j depends on two goods: i) non-housing composite consumption denoted by C_{ij} and ii) the amount of housing units denoted by q_{ij}. We also assume that households have the same utility function but differ in their socio-demographic characteristics. These socio-demographic characteristics are denoted by the z_i. The vector z includes variables such as the age of the head of household, gender and education, social status, and migration. The utility function of the household can be written as follows:

$$U_{ij} = U(C_{ij} \quad q_{ij} \quad z_i) \qquad (4.1)$$

Assuming a static setting, the objective of an individual is to maximize the utility given the budget constraints. An individual chooses how to allocate his/her income to non-housing composite consumption (C_{ij}) and the housing services(q_{ij}). The budget constraint of an individual can be defined as follows:

$$C_{ij} + p_j q_{ij} = m_{ij} \qquad (4.2)$$

Where m is the household's income, p is the price of housing services and the price of non-housing consumption is normalized to one. We allow housing prices to be different across markets.

The household's utility maximization problem is defined as follows:

$$\text{Max}_{C_{ij},q_{ij}} U(C_{ij} \quad q_{ij} \quad z_i) \quad st \quad C_{ij} + p_j q_{ij} = m_{ij} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4.3)$$

Solving the budget constraint for C_{ij} and substituting into the utility function gives the indirect utility function. The budget constraint can be written as follows:

$$C_{ij} = m_{ij} - p_j q_{ij} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4.4)$$

Now substituting equation 4.4 in the utility function we get the following indirect utility function

$$V_{ij} = \text{Max}_{q_{ij}} U(m_{ij} - p_j q_{ij}, \quad q_{ij}, \quad z_i) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4.5)$$

Solving equation (4.5) yields the (implicit) housing demand equation

$$p = \frac{\frac{\partial V}{\partial q_i}}{\frac{\partial V}{\partial m_i}} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4.6)$$

Providing a specific form for the utility function (4.1) will give rise to an explicit housing demand equation. While many utility functions result in non-linear demand equations, typically a log-linear housing demand equation is specified

$$\ln q_{ij} = \beta_0 + \beta_1 \ln p + \beta_2 \ln z_i \ldots\ldots\ldots\ldots\ldots (4.7)$$

This equation can be assumed to be an approximation to the underlying (non-linear) housing demand equation. We analyzed the housing demand in Pakistan with the use of this model. Estimating the implicit parameters of equation (4.7) is the main purpose. We usually observe the value of the housing unit rather than the quantity. Thus, q_{ij} has to be estimated in order to obtain equation (4.7). An important feature of housing market is that the physical and surrounding characteristics of the housing units are important yet they vary widely across housing units.

Define H_n as the vector that represents housing characteristics for housing unit n. Similarly, β_j is defined as the parameter vector, which is allowed to vary across markets, for each of the housing unit characteristics in H_n. Thus the value v of a housing unit n in market j consumed by household i is given by the following expression:

$$V_{nj}^{i} = V\left(H_n; \beta_j\right) \quad \text{(4.8)}$$

If the characteristics H_n and the value $v_{n,j}^{i}$ of each housing unit are known, then it is possible to estimate β_j using a hedonic price model. In addition, defining H_n^* as the standard unit we can compute the price index p_j as follows:

$$p_j = \frac{V\left(H_n^*; \beta_j\right)}{V\left(H_n^*; \beta_1\right)} \quad \text{(4.9)}$$

The value of the housing unit n in market j consumed by the household i can be expressed as $v_{n,j}^{i} = q_{ij}.p_j$. The quantity, therefore, of housing is obtained as follows:

$$q_{ij} = \frac{V_{nj}^{i}}{p_j} \quad \text{(4.10)}$$

Once we now theq_{ij}, we can estimate the equation 4.7

4.4. Econometric Methodology

In this study, we seek to determine the factors that impact the demand for housing and its services across income groups. Additionally, welfare impact across income groups is also determined for 2004-2005 and 2010-2011, that will clarify whether the housing units owned by the income-based groups are better off or worse off. For the purpose of analysis, this model includes $m = 1 \ldots M$ urban areas. In each urban area there are $i = 1 \ldots I_m$ individual household heads and $j = 1 \ldots J_m$ housing units. The analysis, therefore, is done considering each city as a separate entity across income groups.

4.4.1 Housing Demand Model

The model explained in previous section indicates that various socio-economic variables explain the housing demand. These factors include different physical and community attributes such as number of rooms, dummy variable for owner occupied or rented unit as well as the availability of housing services including pipe-water, motors, hand pump or others. The community attributes include weather housing unit is located in a city, number of earners and educated members in the household. Moreover, attributes related to head of the household are age, gender, education, marital status, employment status and occupation. In this study, we consider the household head as a special case. Thus demand for housing can be represented as a function of personal characteristic of household head, background of the household and the price of housing. The functional form of housing demand highlighted in equation 4.7 at maximum utility level is given below:

$$q(z) = f(X_1, Y, C, p_j(z)) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (4.11)$$

Where, for each housing characteristics "$\mathbf{z}_{ij}$" the $q(z)$presents the quantity of individual housing unit, which is to be estimated. X_1 referred to the household characteristics such as family size, income group it belongs to, and the number of earners. Income of household is represented by Y which is the sum of permanent income and transitory income. Characteristics of the head of the household is represented by C, including education of the household head, age of the household head, occupation, marital status and gender. Finally, $p_j(z)$ denotes the price of the individual household which is not available for household data. A proxy, therefore, is used to capture the price of house estimated using hedonic price model. In order to estimate the demand for housing, we first need to calculate the quantity of housing unit (q (z)), house price ($p_j(z)$), permanent income (Y_P) and transitory income (Y_T).Thus the demand for housing is determined as

$$Y_i = x_i'\beta + e_i \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (4.12)$$

In equation (4.12), Y_i represents the housing quantity and $x_i'$is a vector with dimensions 1 x M representing all exogenous variable included in the model. $\beta$is a vector of parameters with M x 1 dimensions. The following Ordinary Least Square (OLS) regression equation specifications used for housing demand in log-linear form is given as:

$$q(z) = \beta_0 + \beta_1 lnY_P + \beta_2 lnY_T + \beta_3 \ln\left(p_j(z)\right) + \beta_4 lnA_{R/Y} + \beta_5 lnA + \beta_6 lnE_r +$$

$$\beta_7 lnE_d + \beta_8 lnF_s + \delta_1 ln(male) + \delta_2 lnM + \delta_3 lnY_M + \delta_4 lnY_H + \sum_{m=1}^{14} \delta_m Ct + e_i \quad (4.13)$$

Where, β is the coefficient of exogenous variables and δ is the coefficient used for dummies. The interpretation of the variable is as: $q(z)$ is the quantity of housing unit (defined in equation 4.10), Y_P is the permanent income of the household, Y_T represents the transitory income, $p_j(z)$ is the price of housing unit, $A_{R/Y}$ is the affordability of the individual household head, A is the age of the household head, E_r represents the number of earners in a household, E_d is the education of the household head, F_s is the family size (children and adults), *male* is the dummy represent the gender of the household head (=1 if male; = 0 if female), M is the marital status (=1 if married; =0 otherwise), Y_M is the dummy for middle-income group (=1 if middle-income group; = 0 otherwise), Y_H is the dummy for high-income group (=1 if high-income group; = 0 otherwise), *Ct* represents the dummy for the 14 urban cities of Pakistan selected in this study and e_i is the error term. Moreover, all the variables used are in its log form for reducing changes including extreme values in parametric estimation. Additionally, it also reduces the heterosedasticity in data.

4.4.2Housing Quality

In order to estimate the housing demand, dependent variable i.e. quality of housing units is first calculatedfollowingDusansky and Koc (2007).

$$Standardized\ Housing\ unit\ \big(q(z)\big) = \frac{(owner-occupied\ housing\ value\ )}{house\ price\ per\ unit\ p_j} \quad (4.14)$$

The market value of the house is used as the proxy to measure the owner-occupied housing value (equation 4.8 defines the house value), which refers to the price of the house acceptable if he wishes to sell his property. The housing price per unit

represents the hedonic price$p_j(z)$. Some studies also used rent (rent equivalent) instead of owner-occupied housing value for the calculation of housing units (Hernández &García, 2006; Garabato& Ramada, 2011). The demanded quantity of housing calculated in equation (4.14) is used to calculate the factors that affect housing demand.

4.4.3 Permanent and Transitory Income

There are many views regarding the modeling of the unobservable variables such as permanent income and transitory income. Friedman (1957) states that the consumption is the function of permanent income, but his point of view was criticized as the consumption decision of the household are forward looking. It was looked at as a poor determinant to measure the permanent income. Though, permanent income cannot be measured directly, it is estimated using physical and human resources such as education, property and experience, which contribute in generating income. Singh *et al.* (1986) state that the determinants of permanent income are the household characteristics, physical assets, education, community and environmental attributes. It was, nonetheless, argued that the physical assets are a weak determinant of permanent income as physical assets may underline a different level of permanent income in different countries. Because of the environmental and economic factors, the price of physical assets is distorted and represents different proportion of ownership, thus the level of permanent income. Many different approaches are discussed in literature to measure permanent income, Townsend *et al.* (1985). Some used qualitative approach while others used rapid rural appraisal (RRA) approach (Takasaki *et al.,* 2000). Shefer (1990), Ahmed (1994) and Ballesteros (2001) used the expenditures on consumption as a proxy to measure permanent income.

There are some studies, nevertheless, that used a set of different individual characteristics such as education, age, skills, wages, bonus, pension, on job training capital gain, inheritance and savings (Goodman and Kawai, 1984; Ahmed, 1994; Wang, 1995; Goodman, 2002).Thus, following Goodman and Kawai (1984) and Goodman (2002), we expressed permanent income as a function of human and non-human wealth:

$$Y_P = f(H, N) \qquad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (4.15)$$

Where, H is the human wealth and N represent the non- human wealth. The human wealth demands on the expected future income such as bonus and increments (annual increase in income on constant rate) and the current income that depends on the individual household characteristics such as age, education, gender, marital status, occupation, employment status, number or earners in a household and family size. Non-human wealth accounts for the income received from other resources such as remittances and income from commercial or non- agricultural property.

Thus, the permanent income measure represent the potential lifetime earnings and by regressing the real observed total income on the independent variables provides the permanent income as fitted value of the regression and transitory income as residual. Observed total income is indicated as the sum of permanent and transitory income is highlighted in equation (4.16) as:

$$Y = Y_P(H, N) + Y_T \qquad (4.16)$$

Linear regression model is represented as:

$$Y = \beta_0 + \beta_1 lnA + \beta_2 lnE_r + \beta_3 lnE_d + \beta_4 lnF_s + \beta_5 lnR_m + \delta_1 ln(male) + \delta_2 lnM + \delta_3 lnE_P + \delta_4 O_C + \delta_5 lnY_M + \delta_6 lnY_H + \sum_{m=1}^{14} \delta_m Ct + e_i \quad (4.17)$$

Where, β is the coefficient of exogenous variables and δ is the coefficient used for dummies. Y represents the observed total income,A is the age of the household head, E_r represents the number of earners in a household, E_d is the education of the household head, F_s is the family size (children and adults),$R_m$is the remittances, *male* is the dummy represent the gender of the household head (=1 if male; = 0 if female), M is the marital status (=1 if married; = 0 otherwise), E_P is the dummy for employment status (=1 if employed; = 0 otherwise), O_C represents the occupancy: whether the housing unit is owner occupied, rented, subsidized rent or rent free, Y_M is the dummy for middle-income group (=1 if middle-income group; = 0 otherwise), Y_H is the dummy for high-income group (=1 if high-income group; = 0 otherwise), *Ct* represents the dummy for the cities and e_i is the error term. Thus the predicted income is the required permanent income (Y_P) and the residual is saved as transitory income (Y_T).

Various income measures can be estimated using different sets of explanatory variables, but the best fitted regression model for which the standard error is minimum, is chosen for the analysis.

4.4.4 House Price

Since house prices are not available in the data set of PSLM, it is estimated using the hedonic price model. The price of the house is determined by the internal characteristics as well as the external factors. There are other underlying issues that cause difficulties towards calculating the price of unobserved variable. Firstly, price of the

property is not the same in each period; the house price varies because of the supply and demand factors that determine the price. Thus, the price is not same for two consecutive periods. Secondly, such as many products, properties of house traded in market are not identical. The price changes, therefore, because o the characteristics of property (number of rooms, appearance, source of water, availability of gas, electricity, telephone, means of sewage), location attributes (close to market area, office, school, hospital, neighborhood and others) and environmental attributes (urban, rural, industrial area, air or water pollution) (Herath, & Maier, 2010).Thus, these attributes cannot be ignored while calculating the house price.

The household survey data provide information about the expected value of the house/property if they put up to sale and is reported as the owner-occupied housing value. Owner-occupied housing value represents the product of housing price per unit and standardized housing unit. The value of the housing price is extracted from the owner-occupied housing value using hedonic regression. Following Goodman and Kawai (1984) and Goodman (2002), house price per unit can be calculated using hedonic price model which is a more sophisticated form of mix adjustment. The hedonic regression in terms of set of features that contributes to the value of house is as follows:

$$lnP = \alpha + \beta_1 lnH_S + \beta_2 lnT_H + \gamma_1 lnW_P + \gamma_2 lnW_{HP} + \gamma_3 lnW_M + \gamma_4 lnG_{AS} + \gamma_5 lnTS + \gamma_6 lnTPT + \gamma_7 lnTPS + \gamma_8 lnTMS + \gamma_9 lnTHS + \gamma_{10} lnTHP + \delta_3 lnY_M + \delta_4 lnY_H + \sum_{m=1}^{14} \delta_m lnCt + e \quad (4.18)$$

Where, P is the owner-occupied housing value, number of rooms is used as a proxy to measure the house size and is represented by H_S, T_H is the house tax, W_P is the

dummy for piped water (= 1 if piped water; = 0 otherwise), W_{HP} is the dummy for water from hand pump (= 1 if water from hand pump; = 0 otherwise), W_M represents the dummy for water availability from motor (= 1 if water from motor; = 0 otherwise), G_{AS} is the dummy for availability of gas (= 1 if gas is available; = 0 otherwise), *TS* denotes the time (in minutes) required to reach a grocery shop, *TPT* represents the time (in minutes) required to reach a public transport, *TPS* characterizes the time (in minutes) required to reach a primary school, *TMS* represents the time (in minutes) required to reach a middle school, *THS* represents the time (in minutes) required to reach a high school, *THP* symbolizes the time (in minutes) required to reach a hospital, Y_M is the dummy for middle-income group (=1 if middle-income group; = 0 otherwise), Y_H is the dummy for high-income group (=1 if high-income group; = 0 otherwise), *Ct* represents the dummy for the 14 urban cities and *e* is the error term. $\beta$is the coefficient of exogenous variables and δ is the coefficient used for dummies. Taking logs of variables are considered to ensure that the prices are non-negative. This regression model used value of the above mentioned features to predict the price of housing unit during a particular period. The fitted values generated from the hedonic regression are the required price per house for the standardized housing units. Dusansky and Koc (2007) are of the view that price generated from hedonic method represent the price of same sized house across cities. Hedonic price modeling is commonly used in real estate for sales comparison. Thus, allow the comparison between prices of constant quality housing across cities over a particular time period.

4.4.5. Imputed Rent

For the calculation of standardized unit of housing, we also need to estimate affordability. In literature, affordability is defined as the ratio of rent to total income (Tiwari, and Parikh, 1998). Housing expense is commonly measured through rent. Malpezzi and mayo (1985) considered rent as the product of unit price and quantity consumed but depending on the housing services. It varies for individual household depending on the shelter, type of construction, dwelling and neighborhood. The conventional hedonic regression model can also be used to measure imputed rent. The hedonic equation for house rent is specified as:

$$R = f(R_T, W_T, G_{AS}, T_F, W) \tag{4.19}$$

The house rent is measured against the set of characteristics of the housing unit, which are specified as follows: R_T is the type of roof, it may be made of rcc/rbc, wood/bamboo, steel/cement or other; G_{AS} represent the dummy for availability of gas, T_F represents the toilet facility (outdoor, flush, pit/latrine or others), W represents the water availability (piped, hand pump, motor or other) and W_T refers to type of walls i.e. brick, cement, stone, wood, bamboo or mud. After the hedonic regress, fitted value of imputed rent is generated for the sample of housing units (Malpezzi, 2003). Imputed rent is used for only owner-occupied housing unit for which only market value of housing is available.

Following Greene (2003) and Wooldridge (2006), we applied Heckman's two-step model (Heckman, 1978, 1979) of sample selection. In order to select sample, two equations are used, first is the equation that determines the outcome variable. Second

equation only uses selected sample and mechanisms determining the selection process. The dependent variable standardized housing unit is only observed for those household heads that are the owner of their houses and are not observed for those rented units. Regressing an OLS model on the standardized housing unit will cause sensitivity biasness. Thus, the model will estimate biased and incontinent value ofβ.In order to deal with the problem of non-random selection and to control the sensitivity bias between household quantity of service demand and tenure, the Heckman two-step selection model was applied.

For data generation, the Heckman model applies the moments of incidentally reduced by variant normal distribution. The basic Heckman model equation is specified as:

$$z_i^* = w_i\gamma + u_i \tag{4.20}$$

$$z_i = \begin{cases} 1, & if\ z_i^* > 0 \\ 0, & if\ z_i^* \leq 0 \end{cases}$$

The basic demand equation is

$$y_i = \begin{cases} x_i\beta + \varepsilon_i, & if\ z_i^* > 0 \\ - & if\ z_i^* \leq 0 \end{cases} \tag{4.21}$$

z_i^*Refer to those households who own their houses and is 0 for rented households. $w_i$is the 1xk row vector for the selected exogenous variables used in Heckman model and in the demand equation. γ is the parameter to be estimated with kx1 dimensions. For a special if the error terms of both equations are correlated then the problem of selectivity arise and additional assumptions are imposed:

$$u_i \sim N(0,1)$$

$\varepsilon_i \sim N(0, \sigma^2)$

$$corr(u_i, \varepsilon_i) = \rho \quad (4.22)$$

Here we assume normal distribution with mean zero and correlationρ. Following Goodman (1988), Ahmad (1994) and Dusansky and Koc (2007) the selectivity biasness was removed through Heckman process.

4.5Data source

For estimating the demand for housing, data of various social and economic indicators was taken at district level from Pakistan Social and Living Standards Measurement Survey (PSLM) conducted by Pakistan Bureau of Statistics (PBS). Specifically, the household data was taken from Household Integrated Economic Survey (HIES) that additionally focus on the income and consumption indicators that work under the umbrella of PSLM. In this study, PSLM survey data for the year 2004-2005 and 2010-2011 is taken[1].

We are using a set of population based social indicators for 16341 households from PSLM/HIES national level data. The data on household information covers education, health, employment and income as well as ownership of assets, household details, immunization, married women, facilities and services. Additionally, it offers data on household consumption expenditures (including consumption on durable items owned/sold), transfer received and paid out and buildings and land owned. Population of

[1] Data was taken from Pakistan Bureau of Statistics.

all the four provinces is considered as the universal sample. Under the framework of PSLM/HIES each city/town was sub divided in to enumeration blocks. Urban areas were divided into 26698 blocks and rural areas were comprised of 50588 blocks. Each urban block was categorized on the base of income groups. The selection of Primary Sample Units (PSU) and Secondary Sample Units (SSUs) data from urban and rural areas of each province are discussed in table (4.1).

Table (4.1) indicates that the entire sample of households has been drawn from 1045 Primary Sample Units (PSUs) in 2004-05 out of which 486 are urban and 559 are rural and 1180 Primary Sample Units (PSUs) in 2010-11 out of which 564 are urban and 616 are rural. The total sample is 14777 in 2004-05 and 16341. This sample size has been considered sufficient to produce estimates of key variables at national and provincial levels (PBS, 2012).

Table 4.1: Profile of the Sample of PSLM Survey (2004-05 and 2010-11)

Province/Area	Sample PSUs			Sample SSUs		
	Urban	Rural	Total	Urban	Rural	Total
		2010-11				
Punjab	256	256	512	2935	4019	6954
Sindh	152	144	296	1802	2296	4098
Khyber Pakhtunkhwa	88	120	208	1041	1913	2954
Baluchistan	68	96	164	811	1524	2335
Total	564	616	1180	6589	9752	16341
		2004-05				
Punjab	210	226	436	2511	3607	6118
Sindh	125	125	250	1497	1980	3477
Khyber Pakhtunkhwa	91	118	209	1088	1878	2966
Baluchistan	60	90	150	713	1434	2147
Total	486	559	1045	5809	8899	14708

Note: This table is calculated on the basis of data taken from PSLM/HIES2004-05 and 2010-11.

Urban areas with population of 500,000 and above were grouped together and they were considered as an independent stratum. Total sample consists of 40% of the urban area and the rest is rural, out of which this study considered the 14 large urban cities as a sample. These cities are selected on the basis of being federal capital, provincial capital and metropolitan cities. The cities considered were: Bahawalpur, Faisalabad, Gujranwala, Hyderabad, Islamabad, Karachi, Lahore, Multan, Sialkot, Sargodha, Sukkur, Peshawar, Quetta and Rawalpindi. Each of the urban cities was sub divided into Primary Sampling Units (PSU).The large urban cities were considered as they represent the housing market's center and it was the significant data for the estimation of housing demand. Each of this (PSU) comprises of 200 to 250 households and each has been categorized into low, middle and high income groups. The selection of only 14 urban areas is motivated by the fact that the housing market in the in the urban cities of Pakistan are purported to display greater and differing dynamics across income groups; low, middle and high. Distribution of cities sample based on income groups for the selected sample is presented in table (4.2) and table (4.3).

Table 4.2 establishes that the 51 % was taken alone from middle-income group, 29.79 % represents the low-income group and 19 % samples are taken from high-income group for survey of 2004-05. Overall, the sample distribution dependents on the size of the city so, 26.5 % sample is taken from Karachi, 13 % from Lahore and 8% from Peshawar, representing the major part of survey. The sample selection also depends on the population of the individual city. 24.8 % data, therefore, was taken from Karachi

alone and approximately 10% sample was taken from Lahore for 2010-11. The data distribution also reveals that 31% households belong to low-income group, 48.5% belong to middle-income group and 20.5% sample belongs to high-income group (2010-11).

Table 4.2: Urban Data Sample Distribution across Income Groups (2004-05)

City	Low-Income	Middle-Income	High-Income	Total
Islamabad	36	54	26	116
Rawalpindi	35	71	46	152
Sargodha	48	48	47	143
Faisalabad	47	95	47	189
Gujranwala	48	47	21	116
Sialkot	24	24	24	72
Lahore	92	230	38	360
Multan	48	71	48	167
Bahawalpur	24	23	23	70
Sukkur	24	48	0	72
Hyderabad	48	72	48	168
Karachi	228	419	84	731
Peshawar	72	107	55	234
Quetta	46	93	23	162
Total	820	1402	530	2752

Note: This table was calculated on the basis of data taken from PSLM/HIES 2004-05.

Table 4.3: Urban Data Sample Distribution across Income Groups (2010-11)

City	Low-Income	Middle-Income	High-Income	Total
Islamabad	46	43	45	134
Rawalpindi	46	91	44	181
Sargodha	47	47	43	137
Faisalabad	47	96	45	188
Gujranwala	47	45	40	132
Sialkot	46	44	42	132
Lahore	90	174	39	303
Multan	48	96	48	192
Bahawalpur	48	47	48	143
Sukkur	48	48	0	96
Hyderabad	96	94	46	236
Karachi	239	426	93	758
Peshawar	48	140	43	231
Quetta	48	94	48	190
Total	944	1485	624	3053

Note: This table was calculated on the basis of data taken from PSLM/HIES 2010-11.

4.6. CONSTRUCTION OF VARIABLES

Two data sets were opted from the PSLM/HIES survey, which involve different indicators from household roster such as, education status, employment, assets in possession, family detail, household expenditure (monthly and yearly), transfer payments and land ownership. Data was, then, observed for possible human errors, missing values were addressed. Additionally, data was recorded, dummies were generatedand variables were estimates as well as labeled. Information Irrelevant to housing demand was dropped and the individuals whose income related information was not available were also dropped.

Missing values were predicted for variables that were not removed because of their importance. Variables with missing values: house market value, rent for owner-occupied houses, household head's income and household head's occupation. After careful analysis it was observed that 29 % data for house market value was missing, 22 % data on house rent was missing and 51% data for household heads' income was also missing as they were considered retired or over-aged. Variables considered for the housing demand can be divided into five categories which are as follows:

Household characteristics: (province, city, income group, household size, affordability)Household can be of a single person or a group of persons living and eating together and having no other place to live. The household characteristics used in this study pertain to their location. We considered the data from all four provinces and major fourteen urban cities. Moreover, the information about the income group of the

households was also recorded. Income groups were divided into low-income group, middle-income group and high-income group. Household size includes the information about the number of members in a household. Affordability was also included and that refers to the financial ability of acquiring a house based on the monetary means. Following Tiwari and Parikh (1998), we calculated affordability by dividing house rent on the total income.

Household head information: (age, marital status, education level, employment, job status, occupation, industry) Household head was considered as the representative for an individual household. It was treated as a significant variable that affects the housing demand. The age variable was recorded for the age of the household head in years. The marital status of the household head indicates weather the individual was married, unmarried, divorced, widowed or legally married but not yet living with the spouse. Marital status was recorded as 1 if married and 0 otherwise. The highest education level of the household was divided into 23 categories in PSLM/HIES data but for simplicity it was recorded into two groups: 1 for literate and 0 for illiterate. Employment status of household head variable was measured, weather he/she was employed or unemployed. If the household head was employed then, we wanted to learn his/her job status, weather he/she was an employer and employed less than 10 persons or more than 10 persons. Was he self-employed, paid employed, unpaid family worker, own cultivator, share cropper, contract cultivator or he was earning through livestock. Dummy variable for each employment category was generated and used in the analysis. The variable, namely, occupation indicates the profession of the household head and the data was recorded into sub categories such as: Legislators, Senior Officials and Managers;

Professionals Technicians & Associate Professionals; Clerk, Service, Shop and Market Sales Workers; Skilled Agriculture and Fishery Workers; Craft and Related Trade Workers; Plant/Machine Operators and Assemblers; Elementary Occupations and Armed Forces. The exclusive category of occupation was transformed into a dichotomous dummy variable.

Related information to housing unit: rented or own house, house price, standardized housing unit, water, gas, electricity, kitchen, toilet, material of roof and wall. Each household was asked about the house occupancy as well as if it was a rented unit or the owner-occupied unit. Rent refers to the payments made by the tenants to the owner for using housing service over a specific period of time. Variable related to house price (capital value of the unit) was also available. It was generated through hedonic price model. Standardized housing unit was another important variable that refers to the unit of stock available in market and it was used to determine the housing demand. Data on house stock was not available in PSLM/HIES survey results, so it was measured by dividing owner-occupied house value to house price per unit. Data of owner-occupied house value was also missing, but because of its relevance it was not removed and the missing values were carefully predicted. Dummy variable for the house related service such as availability of water, gas, electricity and toilet were also generated. Two variables that relate to the structure of the house were also included. The type of material used in making roof (RCC/RBC, wood/bamboo, steel/cement sheet, other) and the type of walls (burnt bricks/blocks, mud bricks/blocks, wood/bamboo, stones, other) were considered to determine the rent equation.

Income and expenditures: (total income, total expense, rent expense, house or property tax, remittances) Income of the household head refers to the sum of wage, bonus and pension. Nonetheless, the total income was calculated by adding the permanent income[2]and transitory income. Remittances were e another form of income and they were calculated by adding the foreign and domestic remittances received. Major expense that an individual household has to accept was the housing expense (rent), which motivated the individual to save and buy its own housing unit. Total housing expense (5400) was the sum of House rent (5401), Subsidized house rent (5402), Rent free accommodation (5403), Owner occupied accommodation (5404), summer cottage rent (5405), Minor repairs/maintenance & redecoration/addition/alteration (5406), House and property tax (5407) and other expenses (5408)(all these code numbers are related to expenses given in the questionnaire).Other major household expense includes expense on gas and electricity, which was also observed in the construction of data set. List of variables and their description was given in table 4.4.

The housing demand model introduced by the neo-classical used several assumptions about the housing market, consumer behavior and nature of housing commodity. Thus, the consumer decision regarding housing choice depends on the observable factors such as housing quality, location, size, as well as unobservable factors such as housing services available. For regressing housing demand model standardized housing unit was taken as the independent variable, which represented the number of housing units available in housing market. Standardized housing units were calculated using the relationship in equation 4.14. Thus, an increase (decrease) in housing demand

[2] See equation 4.17 for the estimation of permanent income and transitory income.

was indicated by the increase (decrease) in the number of standardized housing units demanded.

Economic status of house depends on the monthly income of household, number of earners and income from remittances, if any. As only one income was reported in the survey, this study estimated the permanent and transitory income using the model discussed in equation 4.17.Incomewas regressed on the factors such as age of household head, number of earners, education of household head, household size, gender, marital status, remittances, employment status and occupational status.

According to Bourassa (1994) type of income was positively related to the probability of ownership of the house. The ownership decision also depends, therefore, on the number of earners because of the increase in number of earners; the investment in the housing market also increases. Income from a single earner makes it likely to decide on buying house. In the presence of several earners, it becomes highly unlikely to agree on buying a house with consensus. Remittances represent the total of remittance represent from foreign and domestic resources, which were considered as a source of income. Moreover, market value of a house represents the value of housing in rupees.

Affordability was used as a proxy for rent to income ratio. It was estimated by using real rent of the housing unit and total income from all sources. Thus, affordability represents the purchasing power of an individual household head and highly likely to affect the housing demand.

Among the demographic factors, the age of the household head may affect the tenure choice. Normally, age represents the status of household head in its lifecycle and it

indicates whether he is ready to settle down or not. The tenure choice model discloses a positive relationship of age on house ownership but it takes time to acquire the resources for acquiring a house. Nevertheless, once the ownership was ensured the cost of living declines as compared to the cost of rental payments. In case of Pakistan, it is very unlikely to own a house before the middle-age except for the cases of inherited wealth. Education of household head may also affect the ownership decision, and ultimately the housing demand. Education as a variable was taken as an indicator of earning potential of the household head. Furthermore, it also presented the status of the head in social sphere as well as a strong indicator of his ability to make important decisions of consumption or investment. Thus, education level was likely to represent the household head's ability to affect the tenure choice.

Factors such as gender of the household head were likely to affect the demand in a conservative society such as Pakistan. Generally, males and females have different attitudes towards decision making. Male household head turn out to be in a better position to make house ownership decisions based on their financial strength. Thus, female household head was unlikely to make a big investment decision such as house ownership.

One of the independent variable was the marital status of the household head. If the household head was married, it was more likely highlight the need for the ownership of a house. Moreover, according to Bourassa (1995), the tenure choice of widows was similar to the decision of married household head because a widow may continue to live in the house purchased by the spouse when alive.

Occupation, employment status and industry represent the earning potential of the household head. Thus, it indirectly affects the status of the household head. It was, therefore, taken as an independent variable related to housing demand regression.

The ownership of a house also depends on the family size. The attitude of a head determines whether he or she wants to spend on the ownership of a house or alternately on children's education, health or on business related activities to fulfill the need of a big family. Moreover, the family size also affects the saving level of an individual household, eventually effecting demand. The family size was an indicator towards the need for a new house i.e. ensuring adequate number of rooms for a large and growing family. Increase in the number of family members also represents a need for a bigger housing unit.

Table 4.4: List of Explanatory Variables

Variables	Description
Standardized housing unit	Dependent variable
Permanent Income	Monthly income, remittances or wealth effect
Transitory Income	Unexpected income, bonus
Remittances	Total remittance was the sum of domestic and foreign remittance
Market Value of House	Price of owner occupied housing unit
Low-income Group	Low income group (as identified under PSU)
Middle-income Group	Middle income group (as identified under PSU)
High-income Group	High income group (as identified under PSU)
Affordability	Affordability was defined as Rent to Income Ratio
Household Head's Age	Age of household head in year
Household Head's Education	Education of household head in year
Gender	= 1 if Male; = 0 if female
Marital Status	= 1 if married; = 0 otherwise
Occupation	Post currently working on
Employment Status	= 1 if employed; = 0 otherwise
Industry	Industry in which households head was working
Number of Earners	Number of earners in a house hold
Family Size	Number of members in a house hold
Household size	Number of Rooms
Owner Occupied House	= 1 if owner occupied, = 1 otherwise
Housing Expenditure (rent)	Rent in rupees
Imputed rent	imputed rent was used for the missing values of house rent
Type of roof	It refers to the material used in roof
Type of walls	It refers to the material used in making walls
Water Facility	water availability in house, piped, motor water or other
City	urban cities are chosen for analysis

Source: Author's own work

4.7 Descriptive Statistics

Descriptive statistics indicating means and standard deviations of all the variables were represented in table 4.5 and table 4.6 for survey data of 2004-2005 and 2010-2011, respectively. The purpose was to investigate the nature of the data set and to observe the changes with the change in the income group across two data sets. Standardized housing unit ownership was observed to 1 on average for all income group level for both sample periods. The average house ownership for middle-income group also represents the ownership average on the national level. The standard deviation, nonetheless, of 0.07 for high-income group was higher than the low-income group and middle-income group, indicating the tendency of owning more than one house on the average as higher. Permanent income level was observed to increase as we moved from low-income group to high-income group. Additionally, a noticeable increase in permanent income was also observed across two data sets from an average of 11.92 to 12.37on the national level. Whereas, an increase in permanent income do not guarantee an increased purchasing power as the housing price also increases over the period. The transitory income was observed to be zero on average with a standard deviation of 0.45, 0.50 and 0.67 for low-income group, middle-income group and high-income group, respectively for 2004-2005.Approximately, similar pattern was observed for transitory income in 2010-2011.

Surprisingly, an increase of 68.12 % and 120% on average house value for low and middle-income groups respectively was observed across two data sets. Market value of house was observed to be highest for high-income groupi.e.464 % and 480% than the housing unit in low-income group for 2004-2005 and 2010-2011, respectively. At the

national level, the average house value was observed to be higher in 2010-2011i.e. 2637309 Rs. as compared to1386344 Rs.in 2004-2005.

The descriptive analysis brings out the affordability increase on average from low-income group to high-income group i.e. from 0.83 to 0.87 for 2004-2005 and from 0.27 to 033 for 2010-2011.But, because of high rents and low-income, the affordability on the average decreased from 0.85 to 0.29 at national level, across the two data sets.

Household head age was observed to be mid 40's on the average for the ownership, which approximately remains same for all income groups. The household head with higher level of education was observed to be the part of high-income group. It clearly discovers that education was the source of high potential earning and positively impacted the housing demand. Moreover, the number of educated households' head on average increased from 9.84 to 10.63 at the national level, across two data sets. On the average, 93% of the household heads were observed to be male and 89 % were married as well.

The average number of earners decreased from 1.72 to 1.70 over the period at the national level. A similar pattern was also observed at different income groups' level. Furthermore, the number of family members was observed to be high for low-income group and low for high-income group. The average household size decreased from 6.49 to 6.14 over the period.

Overall, the house ownership also decreased for the two sample periods from a level of 71% household head owning their house to 68% ownership. The increase in ownership trend, nonetheless, was observed for low-income group, where 69% households owned their house initially and the level increased to 79% in 2010-2011.

Table 4.5: Means of Variables (2004-05)

Variables	National	Low-Income	Middle-Income	High-Income
Standardized housing unit	1.00	1.00	1.00	1.00
Permanent Income	11.92	11.56	11.88	12.58
Transitory Income	0.00	0.00	0.00	0.00
Remittances	11026	5089	8808	26069
Market Value of House	1386344	661429	922390	3735204
Affordability	0.85	0.83	0.85	0.87
Household Head's Age	46.24	44.71	45.93	49.43
Household Head's Education	9.84	8.65	9.60	11.63
Gender	0.93	0.95	0.94	0.90
Marital Status	0.89	0.91	0.89	0.87
Number of Earners	1.72	1.84	1.68	1.63
Household size	6.49	6.89	6.48	5.91
Owner Occupied House	0.71	0.69	0.70	0.74
Observation	2752	820	1402	430

Source: Author's own Calculations.

Table 4.6: Means of Variables (2010-11)

Variables	National	Low-Income	Middle-Income	High-Income
Standardized housing unit	1.00	1.00	1.00	1.00
Permanent Income	12.37	12.08	12.32	12.93
Transitory Income	0.00	0.00	0.00	0.00
Remittances	15712	8320	15381	27683
Market Value of House	2637309	1112030	2033660	6454766
Affordability	0.29	0.27	0.28	0.33
Household Head's Age	47.18	46.04	46.89	49.58
Household Head's Education	10.63	8.72	10.39	13.15
Gender	0.93	0.93	0.93	0.92
Marital Status	0.89	0.89	0.88	0.89
Number of Earners	1.70	1.78	1.73	1.51
Household size	6.14	6.36	6.14	5.83
Owner Occupied House	0.68	0.70	0.68	0.66
Observation	3053	944	1485	624

Source: Author's own Calculations.

4.8. Conclusion

In this chapter, we have developed a theoretical framework for the analysis of the determinants of housing demand in Pakistan. For this purpose, we have followed the model provided by Goodman (1998), Zabel (2004) and Fontenla and Gonzalez (2009). Secondly, in this chapter, we have described our empirical models based on theoretical framework for empirical analysis. We have applied these models in chapter 5 to quantify the determinants of housing demand in Pakistan. We have also discussed the characteristics of the variables used in empirical analysis. The next chapter is devoted to empirical analysis.

CHAPTER 5

EMPRICAL RESULTS AND DISCUSSION

5.1. Introduction

The theoretical framework described in previous chapter argues that housing demand was determined by various socio-economic factors such as income, location, affordability and demographic factors. The objective of this chapter was to empirically explore the relationship among housing demand and socio-economic determinants. To obtain determinants of housing demand, we needed house price and rent. For this, we have used hedonic models. This chapter also discusses in detail the income regression model to calculate the permanent and transitory income. We have estimated housing demand models at the national level using 2004-05 and 2010-11 data sets separately. Moreover, we have estimated housing demand at disaggregate level such as income group-wise i.e. low-income, medium-income, and high-income group, province-wise and across cities for 2004-05 and 2010-11.

The rest of the chapter is structured as follows: section 5.2 presents the results of Hedonic analysis for house price and imputed rent. Section 5.3 discusses the income regression model to calculate the permanent and transitory income. Tenure choice model at national level and across income groups is presented in section 5.4. Moreover, section 5.5 presents the housing demand model and section 5.6 discusses the effect of remittance on housing demand. Lastly, this chapter ends with conclusion.

5.2. Hedonic Analysis

5.2.1 Hedonic Price Model

Given the model specification in equation (4.18 and 4.19), two hedonic models were estimated. We have analyzed the hedonic model in log-linear form using OLS estimation technique. First, model is the hedonic price model, which was estimated by considering the house price attributes (see. Table 5.1).Second model is the hedonic rent regression model, which is estimated using the rent attributes for the two selected data sets (see Table 5.2).

Hedonic price model estimates the expected market value of the house, which is the predicted price based on the housing attributes. The housing attributes related to house structure considered the number of rooms and house property tax. While the service related attributes were taken as the source of availability of water and the availability of gas. The location related attributes included are time required to reach a grocery shop, public transport, primary school, middle school, high school and hospital for the year 2004-2005 and 2010-2011. Hedonic price model also considered income level groups, especially the low-income group as a base for comparison. The results in table (5.1) show that the number of rooms positively and significantly affects the house price. Estimations established that with an increase of one room in a housing unit increased 21% price of the house in 2004-2005. Taxpaying housing units increased the house price by 42%, high tax was also an indication of bigger housing unit so the price was also high. Additionally, the availability of gas was an important factor in determining

house price but it was insignificant for the data test of 2004-2005. The sign of coefficient was, nonetheless, positive as expected. Results brought into light that the price of housing unit also depends on the income group. The presence of individual household head in middle-income group, positively and significantly affect price by 34%. The coefficient of high-income group suggests that the house price was increased by 75%, which was more relative to middle-income group. Various locations related attributes were considered; nevertheless, only the estimated results for time required reaching the hospital was significant. A housing unit closer to hospital negatively affects the house price by 0.3%.

The results of survey 2010-2011 established that the size and service attributes are significant and they positively affect the housing price. One unit increase in room available in house cause price to increase by 20%, which is lower as compared to the change in 2004-2005.Tax paying house unit also increased the price by 39 %. Similarly, the gas availability caused the price to increase 17%, which was positive and significant. Moreover, the results proved that the price of housing unit was 36% more than the price of a housing unit fora low-income group. Similarly, the presence of household in a high-income group increased price by 69%, which is 1.9 times more as compared to the house price in middle-income group. In case of location attributes, house price significantly increases if it is near a high school by 1.1%. The house price, on the other hand, is negatively affected by the availability of hospital in the vicinity of the house.

Table 5.1: Hedonic Price Regression Model (dependent variable log house price)

Variable	2004-05	2010-11
Number of rooms	0.2180	0.2080
	(0.01)***	(0.01)***
House/property tax	0.4290	0.3940
	(0.05)***	(0.06)***
Gas availability	0.0730	0.1770
	(0.0500)	(0.06)***
Middle-income group	0.3450	0.3650
	(0.04)***	(0.04)***
High-income group	1.0990	1.0570
	(0.05)***	(0.05)***
Time required to groceries shop	0.0070	0.0150
	(0.0100)	(0.0100)
Time required to public transport	0.0000	-0.0060
	(0.0020)	(0.0100)
Time required to primary school	0.0050	-0.0010
	(0.0020)	(0.0100)
Time required to middle school	-0.0020	0.0040
	(0.0020)	0.0000
Time required to high school	0.0000	(0.0110)
	(0.0020)	(0.00)**
Time required to hospital	-0.0030	-0.0060
	(0.00)**	(0.00)**
Intercept	12.4320	13.2980
	(0.08)***	(0.09)***
City Dummies	Yes	Yes
Number ofObservations	2752	3041
R-squared	0.4520	0.3800

Note: *** p<0.01, ** p<0.05, * p<0.1, Figures in parenthesis are robust standard errors

Thus similar variables were found significant for the price change in housing unit for both data sets except for the availability of gas and high school in locality, which were insignificant during 2004-2005. It exposed, therefore, that with the change in consumer behavior, the price over the time depends on more attributes, which was previously dependent on the basic limited facilities. Studies in Pakistan such as Pasha and Ghaus (1990) and Nazli and Malik (2003) show similar results for different income levels and housing locality attributes. The results are similar to the findings in

Zaki(1981), Goodman (1989), Cheshire and Sheppard (1998), Loannides and Zabel (2002), Zabel (2004), Herath, and Maier (2010). The basic objective, when estimating a hedonic pricing model, was to generate a precise predictive model. Thus, the fitted price model was saved as hedonic price of individual household.

5.2.2 Hedonic Rent Model

Using similar technique on imputed rent for the housing unit was predicted using the Hedonic rent regression model. However, the imputed rent of house cannot be observed directly. Thus, different influencing factors were introduced in the hedonic rent model to achieve the primary objective of estimating an accurate predictive rent model. The hedonic rent model in this study considered a variety of characteristics based on the material used in the construction of building such as roof and wall; availability of electricity, toilet facility and availability of water for middle and high-income groups. The model was estimated using dummy variables for all the cities, considering Lahore as a base.

The results in table 5.2 indicate that the rent was significantly increased by 43% and 44% if the roof of house was made of RCC/RBC for 2004-2005 and 2010-2011, respectively. Rent was also considered on the bases of wall type: a wall made of burnt bricks or block and mud brick also unveiled significance for both data sets. Another variable i.e., walls made of stones revealed positive and significant increase of 44% on rent for the year 2010-2011, but the same variable was insignificant for the year 2004-2005. As expected, the availability of electricity in the house, caused an increase in rent by 22% in 2004-2005 and 36% in 2010-2011.

Table 5.2: Hedonic Rent Regression Model (dependent variable was log rent)

Variables	2004-05	2010-11
Roof made of RCC/RBC	0.439	0.449
	(0.04)***	(0.05)***
Burnt bricks/blocks wall	1.256	1.474
	(0.39)***	(0.32)***
Mud bricks/mud wall	1.201	1.454
	(0.40)***	(0.32)***
Wood/bamboo wall	0.608	1.524
	(0.47)	(0.44)***
Stones wall	0.904	1.743
	(0.67)	(0.80)**
Electricity availability	0.227	0.361
	(0.10)**	(0.05)***
Outdoor toilet	0.752	0.46
	(0.23)***	(0.38)
Flush toilet	0.964	0.507
	(0.22)***	(0.37)
Pit/latrine toilet	0.536	0.375
	(0.24)**	(0.39)
Piped water	-0.02	0.088
	(0.04)	(0.03)**
Middle-income group	0.36	0.139
	(0.03)***	(0.03)***
High-income group	1.173	0.832
	(0.05)***	(0.04)***
Intercept	7.188	8.002
	(0.43)***	(0.48)***
City dummies	yes	Yes
Number of Observations	2748	3,053
R-squared	0.377	0.336

Note: *** p<0.01, ** p<0.05, * p<0.1, Figures in parenthesis are robust standard errors

The availability of toilet facility presents a significant increase in rent for the year 2004-2005. The availability of outdoor toilet, flush toilet and latrine caused the rent to raise by 76%, 96% and 53%, respectively. The sanitary service, nonetheless, was complementary with the housing unit and was commonly available everywhere in urban areas, so in case of 2010-2011, these variables were found insignificant. Water

availability through pipes did not cause the rent increase in 2004-2005, nonetheless, rent increased by 8% because of pipe water facility in 2010-2011.

Analysis based on the income group level establishes that the percentage increase in the rent, if a house was in middle-income group, was 36% in 2004-2005 and decreased to 13% in 2010-2011. Similar decline was visible for a house in high-income group, 117% increase in rent was reported in 2004-2005, which later decreased to 83%. Yet again, in case of Pakistan, the results of 2010-2011 data set uncovered the determinants that affect house rent via increase over time.

5.3. Permanent and Transitory Income

Income level of household head determines the housing decision based on the permanent and transitory income. The literature suggests that a set of variables combined together can explain the variations in the household income. Therefore, income regression model was regressed using log-linear OLS technique. The purpose was to estimate an appropriate model that can predict the permanent income level, therefore different attributes related to household head such as age, education, gender; marital status and employment status are included in income regression model. Additionally, attributes related to household such as number of earners, household size and occupancy were also introduced. Results for the income regression model for the years 2004-2005 and 2010-2011 are presented in table (5.3) for all the cities' dummies relevant to Lahore.

For the year 2004-2005, income model was positively and significantly affected by the age of household head. An increase in age and education around one year

increases the income by 0.6% and 44%, respectively, which was reported to be 0.8% and 44% in 2010-2011. The coefficient of number of earners implies that with the increase in earners, the income of household will also increase by 9.2% (2004-2005) and 8.8% (2010-2011). Gender of household effect demonstrates insignificance for the year 2004-2005, whereas it significantly causes a decline in the income of household by 11% in 2010-2011. The literature discussed earlier brings up mixed results for the demographic factors. Estimation results revealed that if the household head was male and married then it will cause the income to increase by 6.6% (2004-2005) and 9.2% (2010-2011). This increase in the income shows that the married heads struggle for earning more, in order to meet the increasing expenses. Moreover, an addition from foreign or domestic remittance positively and significantly increases the total income.

According to Loannides and Zabel (2002), Zabel (2004), Herath, and Maier (2010) if the household head owns the housing unit then he will not make the housing expense and it can be considered as the saving that will ultimately increase the total income. Similar results are found by this study, where increase in income was 32% in 2004-2005 and it was reported 36% in 2010-2011. The analysis across income groups, especially of middle-income group to high-income group, the percentage increase changes from 22% to 90% and 17% to 70% for both data sets, respectively.

The effect of age on income increased over the time. For the two data sets, the impact of education level remained the same and with an additional earner, the increase in income declined. In case of Pakistan, if the household head owns its housing unit, then he will be better off with the passage of time.

Table 5.3: Income Regression Model to Calculate Permanent and Transitory Income (dependent variable was blog income)

Variable	2004-05	2010-11
Age	0.0060	0.0080
	(0.00)***	(0.00)***
Number of Earners	0.0920	0.0880
	(0.01)***	(0.01)***
Head's Education	0.4460	0.4410
	(0.02)***	(0.02)***
Household Size	0.0350	0.0530
	(0.00)***	(0.00)***
Gender	-0.0280	-0.1190
	(0.0500)	(0.04)***
Marital Status	0.0660	0.0920
	(0.04)*	(0.03)***
Remittances	0.0200	0.0110
	(0.00)***	(0.00)***
Owner occupied house	0.3200	0.3600
	(0.05)***	(0.04)***
Rented house	0.2300	0.4240
	(0.05)***	(0.05)***
Subsidized rented house	0.1330	0.3450
	(0.07)*	(0.06)***
Self-employed	-0.1210	0.0320
	(0.02)***	(0.0400)
Middle-income group	0.2230	0.1740
	(0.02)***	(0.02)***
High-income group	0.9030	0.7060
	(0.03)***	(0.03)***
Intercept	10.4090	10.7260
	(0.08)***	(0.07)***
City dummies	Yes	Yes
Number of Observations	2752	3052
R-squared	0.4840	0.4600

Note: *** p<0.01, ** p<0.05, * p<0.1, Figures in parenthesis are robust standard errors

5.4. Tenure Choice Analysis

The commonly available tenure choice for housing was for the rented and owner occupied units in Pakistan. For the analysis of tenure choice, all the attributes that can affect the ownership decision were found to be highly significant. The income variables were the major contributor when considering the house ownership decision, further ownership decision was effected more by the permanent income rather than the transitory income (Ahmad, 1994). Results at national level discovered that an increase in permanent income increases the house ownership probability by 243%, whereas the ownership decision decreases by 8.4% if the household head considers the transitory income (2004-2005). Similar result was observed for the year 2010-2011 where an increase in permanent income, increases the ownership decision by 56% (see. Table5.4). The coefficient of transitory income was negatively significant, where decrease in transitory income increases the house ownership only by 9% (2010-2011). These findings are in line with the findings of Ahmad (1994), Pasha and Ghaus (1990) and Nazli and Malik (2003) in case of Pakistan.

The marginal effect of house price for both the data sets was positively significant (see. Table 5.4).The results clearly uncovered that with the increase in house price, the ownership increases and the probability of ownership in 2010-2011 was 49% which was more than the reported increase of 30.7% in 2004-2005. As the house price was continuously increasing over time, the positive relation between ownership and house

prices was an indicator that the household head should make a prompt decision to own a housing unit, if he wanted to avoid further increase in the housing price.

Another important variable that directly affects ownership was affordability. As the affordability of household head increases the ownership probability by98% in 2004-2005 and 23% in 2010-2011. These findings are in line with the results of Tiwari and Parikh (1998), indicating that with an increase in income the rent remains same yet affordability increases. Moreover, it indicates that the rent expenses are inelastic and ownership increases with increase in affordability to a certain extent.

With an increase of one additional year in terms of age, there was a negative impact on the ownership decision by 1.5% in 2004-2005. There was a positive increase in the probability of ownership in 2010-2011(Goodman, 1988; Goodman, 1990; Dusansky and Koc, 2007). Results uncovered that with an additional earner in family, the probability to own a house decreased by 21.4% and 8.4%, respectively. Furthermore, an additional year of education seemed to reduce the probability of ownership by 56.8% (2004-2005) and 28.4% (2010-2011), respectively.

Increase in family size (addition of a member in family) decreased the probability of house ownership by 8.8% and 2.2% in 2004-2005 and 2010-2011, respectively. This indicates that the consumption expenses of a family with more members are high, so the probability of saving was low that ultimately decreased the probability of house ownership. Moreover, if the household head was male, he was more likely to make an ownership decision for both data sets. A married household heads in low and high-income group also negatively and significantly decreased the probability of owning a house for both data sets. The results, therefore, disclosed mixed findings for all the

selected set of variables with high significance. Except for age of household, similar ownership pattern was observed for both survey data.

Table 5.4: Tenure choice regression (National Level)

Variables	2004-05		2010-11	
	Coefficient	Margin effect	Coefficient	Margin effect
Permanent income	8.421	2.439	1.678	0.563
	(0.38)***	(0.12)***	(0.27)***	(0.09)***
Transitory income	-0.289	-0.084	-0.270	-0.090
	(0.07)***	(0.02)***	(0.06)***	(0.02)***
House Price	1.061	0.307	1.472	0.494
	(0.13)***	(0.04)***	(0.11)***	(0.04)***
Affordability	3.408	0.987	0.711	0.238
	(0.71)***	(0.21)***	(0.14)***	(0.05)***
Age	-0.051	-0.015	-0.000	-0.000
	(0.00)***	(0.00)***	(0.00)	(0.00)
Number of Earners	-0.740	-0.214	-0.251	-0.084
	(0.05)***	(0.01)***	(0.04)***	(0.01)***
Head's Education	-3.877	-0.568	-1.023	-0.284
	(0.18)***	(0.02)***	(0.14)***	(0.03)***
Household Size	-0.305	-0.088	-0.064	-0.022
	(0.02)***	(0.01)***	(0.02)***	(0.01)***
Gender	0.845	0.299	0.459	0.168
	(0.16)***	(0.06)***	(0.13)***	(0.05)***
Marital Status	-0.434	-0.108	-0.406	-0.122
	(0.13)***	(0.03)***	(0.11)***	(0.03)***
Low-income Group	-2.604	-0.667	-1.013	-0.333
	(0.13)***	(0.02)***	(0.09)***	(0.03)***
High-income Group	-9.464	-0.996	-3.435	-0.886
	(0.40)***	(0.00)***	(0.25)***	(0.02)***
Intercept	-106.062		-39.171	
	(4.26)***		(3.20)***	
City dummies	Yes	Yes	yes	Yes
No. of Observations	2752	2752	3,052	3,052

Note: *** p<0.01, ** p<0.05, * p<0.1, Figures in parenthesis are robust standard errors

Table 5.6 and 5.7 presented the margins for the tenure choice regression for 2004-2005 and 2010-2011. The margins were generated using the Probit model as first step of the two step Heckman procedure. The income group-wise tenure choice regression also

revealed the similar results that were discussed at the national level. The results highlighted that the low-income group depended more on the permanent income for house ownership decision in 2004-2005. Whereas, over the time change in pattern was observed and high-income group revealed more dependence on permanent income for a house ownership. Transitory income presented negative significance for all the income levels. Change in the transitory income decreased the probability of ownership by 3.7%, 7.1% and 6.2% for low-income group, middle-income group and high-income group, respectively (2004-2005). For the year 2010-2011, the change in transitory income decreased the probability of ownership of low-income group by 12.7%, which was twice more than the middle and high-income group.

Increase in housing price significantly and positively caused the ownership probability to increase across all income groups. The high probability of 40% and 68% was reported for the ownership owing to the change in housing price for both data sets. Over the time, the pattern of house ownership increased in high-income group.

The results established that the ownership decision was directly dependent on the affordability of the household, low-income group (128%) and middle-income group (119%) depended more on their income for housing ownership, whereas only high-income group depended less on affordability ratio for housing ownership during 2004-2005. Whereas, the results in table 5.7 indicate that the middle-income group depended more on the affordability (48%) for ownership decision.

With an increase in age by one year, the ownership was less likely to increase during 2004-2005. Similar result was reported for high-income group in 2010-2011.

Whoever, low-income and middle-income groups increased the probability of housing ownership with an increase of one more year in age. With an additional earner in a household, the probability of ownership decreased by 29%, 20% and 14% and 10%, 7.9% and 7.5%, respectively during 2004-2005 (PSLM). During 2010-2011 (PSLM), an additional earner decreased the ownership by 6.3% (low-income group), 8.5% (middle-income group) and 15.3% (high-income group). It was an indication that high-income group depended more on its earning. An addition member also decreased the probability of house ownership by 2.5%, 0.5%, and 4.4%across all income groups. It indicted that an additional member in family caused the expenses to increase and a decrease in the probability of owning a housing unit.

Marginal effect of an additional year of education decreased significantly the housing demand probability for all income groups, but the highest decrease in ownership was observed by 89% (low-income group) during 2004-2005 and 34% (high-income group) during 2010-2011. Moreover, a male household head positively and significantly impacts the house procurement decision and if household head was married then it negatively affects the house ownership decision.

Thus, the results clearly indicated that because of the change in the margins of all the selected variables, low-income group's decision regarding owning a house or to get a rented one was effected the most for two data sets.

Table 5.5: Tenure Choice Regression 2004-2005 (Income Group Wise)

Variables	Low-income		Middle-income		High-income	
	Coefficient	Margin effect	Coefficient	Margin effect	Coefficient	Margin effect
Permanent income	13.030	3.246	8.211	2.405	6.450	1.659
	(1.01)***	(0.30)***	(0.53)***	(0.17)***	(0.77)***	(0.22)***
Transitory income	-0.150	-0.037	-0.244	-0.071	-0.241	-0.062
	(0.18)	(0.05)	(0.10)**	(0.03)**	(0.14)*	(0.04)*
House Price	0.823	0.205	0.962	0.282	1.571	0.404
	(0.33)**	(0.08)**	(0.19)***	(0.05)***	(0.27)***	(0.06)***
Affordability	5.162	1.286	4.087	1.197	2.162	0.556
	(1.53)***	(0.39)***	(1.10)***	(0.32)***	(1.55)	(0.40)
Age	-0.089	-0.022	-0.048	-0.014	-0.034	-0.009
	(0.01)***	(0.00)***	(0.01)***	(0.00)***	(0.01)***	(0.00)***
Number of Earners	-1.180	-0.294	-0.708	-0.207	-0.569	-0.146
	(0.11)***	(0.03)***	(0.06)***	(0.02)***	(0.11)***	(0.03)***
Head's Education	-5.826	-0.893	-3.709	-0.541	-2.993	-0.243
	(0.46)***	(0.03)***	(0.26)***	(0.03)***	(0.46)***	(0.03)***
Household Size	-0.436	-0.109	-0.271	-0.079	-0.293	-0.075
	(0.04)***	(0.01)***	(0.03)***	(0.01)***	(0.05)***	(0.01)***
Gender	1.340	0.468	0.730	0.257	0.832	0.273
	(0.39)***	(0.15)***	(0.22)***	(0.09)***	(0.37)**	(0.14)*
Marital Status	-1.113	-0.168	-0.064	-0.018	-0.702	-0.137
	(0.33)***	(0.03)***	(0.16)	(0.05)	(0.36)**	(0.05)***
Intercept	-152.635		-106.222		-99.540	
	(11.49)***		(6.16)***		(9.58)***	
City dummies	Yes	Yes	Yes	yes		
No. of Observations	784	784	1,402	1,402	485	485

Note: *** p<0.01, ** p<0.05, * p<0.1, Figures in parenthesis are robust standard errors

Table 5.6: Tenure Choice Regression 2010-2011 (Income Group Wise)

Variables	Low-income		Middle-income		High-income	
	Coefficient	Margin effect	Coefficient	Margin effect	Coefficient	Margin effect
Permanent income	1.264	0.405	1.391	0.465	3.546	1.142
	(0.47)***	(0.15)***	(0.41)***	(0.14)***	(0.71)***	(0.24)***
Transitory income	-0.396	-0.127	-0.176	-0.059	-0.206	-0.066
	(0.13)***	(0.04)***	(0.09)**	(0.03)**	(0.12)*	(0.04)*
House Price	1.781	0.570	1.175	0.393	2.113	0.681
	(0.25)***	(0.08)***	(0.17)***	(0.06)***	(0.24)***	(0.07)***
Affordability	0.638	0.204	1.435	0.480	0.730	0.235
	(0.32)**	(0.10)**	(0.28)***	(0.09)***	(0.21)***	(0.07)***
Age	-0.001	-0.000	0.003	0.001	-0.008	-0.002
	(0.01)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)
Number of Earners	-0.196	-0.063	-0.253	-0.085	-0.475	-0.153
	(0.07)***	(0.02)***	(0.05)***	(0.02)***	(0.10)***	(0.03)***
Head's Education	-0.717	-0.213	-0.888	-0.251	-2.362	-0.340
	(0.24)***	(0.07)***	(0.21)***	(0.05)***	(0.41)***	(0.03)***
Household Size	-0.079	-0.025	-0.016	-0.005	-0.137	-0.044
	(0.03)**	(0.01)**	(0.03)	(0.01)	(0.05)***	(0.02)***
Gender	0.784	0.290	0.474	0.174	0.361	0.126
	(0.26)***	(0.10)***	(0.19)**	(0.07)**	(0.30)	(0.11)
Marital Status	-0.632	-0.166	-0.337	-0.103	-0.415	-0.118
	(0.22)***	(0.05)***	(0.15)**	(0.04)**	(0.27)	(0.07)*
Intercept	-38.854		-33.092		-74.003	
	(5.81)***		(4.85)***		(9.19)***	
City dummies	Yes	Yes	Yes	yes	Yes	yes
No. ofObservations	944	944	1,484	1,484	624	624

Note: *** p<0.01, ** p<0.05, * p<0.1, Figures in parenthesis are robust standard errors

5.5. Housing Demand Analysis

After estimating a number of alternate regression models with different sets of explanatory variables, the model that accurately estimated the housing demand at the national level is presented as table (5.5). The housing demand was estimated using 2-step Heckman model. We have employed OLS estimation technique.

The housing demand during 2004-2005 indicates that coefficients of permanent income are insignificant, whereas during 2010-2011 the permanent income elasticity of 0.04, negatively yet significantly affected the housing demand. Whereas, the transitory income elasticity 0.033 (2004-2005) and 0.039(2010-2011) was found to be positive and significant. It was found to be relatively smaller as compared to the income elasticity range i.e. 0.6 to 0.8 found in literature for developing countries (Mayo, 1981). The results are in line with the findings of Malpezzi and Mayo (1987), Lodhi and Pasha (1991) and Garabato and Ramada (2011) and they indicate that additional factors are needed to improve the housing demand. The results in table 5.5, nonetheless, present a static relation between transitory income and housing demand.

The difference in the results of income elasticity may have stemmed from different income measures (Mayo, 1981). Ahmad (1994) used the permanent income, predicted from the income regression. Shefer (1990) and Ballesteros (2001) used monthly household expenditures as an indicator for permanent income. Arimah (1992) and Tiwari and Parikh (1998) used total annual income as a proxy for permanent income. Moreover, because of the difference in the data sample, the results uncovered variations.

The fitted house price was statistically significant and it highlighted a negative relationship between house price and demand for both data sets. It indicated that with an increase in house price, keeping other factors constant, the overall demand in housing market will decrease. The reported price elasticity ranges 0.027and 0.042 for 2004-2005 and 2010-2011, respectively. Results suggest that the demand for house price was inelastic. The range of price elasticity observed in literature was from -0.1 to -0.9. The less elastic demand, nonetheless, could be caused by limited supply of houses in markets. Consequently, the household head was bound to pay the asking price of housing. Results imply a downward sloping demand for housing service with no gain in housing demand market.

Rent to income ratio used as proxy for affordability derived positive and significant results for the housing demand. With an increase in affordability, which may have beentriggered by the increase in income or decrease in rent, the house demand had increased by 18.5% and 0.8% in 2004-2005 and 2010-2011, respectively. It implies that household head was willing to buy a housing unit in order to avoid the large housing expense.

All the demographic factors are found insignificant for 2004-2005, whereas except gender all the demographic factors are statistically significant. Household head's age implies that the need for housing increases with the increase in age. With an additional year in the age of household head, increases the housing demand by 0.1%, nonetheless, after a certain age, as the children move out, the demand for housing decreases (2010-2011). It also implies that with an increase in house demand because of

age, there appears a change in the taste of the individual (Goodman, 1988; Fontenla *et al.*, 2009).

The coefficients for number of earners in a household were also positive and significant. The value of earners' coefficient indicates that with an addition of one earning member, the housing demand increased by 0.2% (2010-2011). Similar results were also reported by studies in Pakistan such as Pasha and Ghaus (1990) and Nazli and Malik (2003). It shows that a single earner (household head) cannot save enough because of high consumption expenses, therefore, with an increase in number of earning members, the saving level increases, which ultimately increases the demand for housing.

Highly significant results are reported for the effect of education on housing demand. With an additional year in education, the housing demand increased by 4.5%, which discovered that the income of the household was in control. Such household could demand a new housing unit with the change in its taste (2010-2011).Additionally, with an increase of one member in family, the demand for housing increased as the number of room were already assigned to existing members of the household. Thus, with an addition member, 0.3% increase was recorded. For a household that belonged to middle-income group, the demand increase was recorded as 2.4% and for a high-income group, an increase of 8.4% in demand was reported (2010-2011). Mixed results were reported in the previous literature regarding the effect of demographic factors on housing demand.

The LAMBDA coefficient indicates that the choice for housing was made by considering the housing units' consumption. The LAMBDA coefficient was positive and

significant for only 2010-2011.In case of Pakistan, this study established that a major increase in housing demand was caused by the education factor.

Table 5.7: Housing Demand at National Level (dependent variable housing units)

Variable	2004-05	2010-11
Permanent income	0.0190	-0.0430
	(0.0200)	(0.01)***
Transitory income	0.0330	0.0390
	(0.00)***	(0.00)***
House Price	-0.0270	-0.0420
	(0.00)***	(0.01)***
Affordability	0.1850	0.0080
	(0.02)***	(0.00)***
Age	0.0000	0.0010
	0.0000	(0.00)***
Number of Earners	-0.0010	0.0020
	0.0000	(0.00)***
Head's Education	0.0080	0.0450
	(0.0100)	(0.01)***
Household Size	-0.0010	0.0030
	0.0000	(0.00)***
Gender	-0.0070	-0.0070
	(0.0100)	(0.01)
Marital Status	0.0000	0.0060
	0.0000	(0.00)***
Middle-income Group	0.0030	0.0240
	(0.0100)	(0.01)***
High-income Group	0.0110	0.0840
	(0.0200)	(0.02)***
Lambda	-0.0020	-0.0180
	0.0000	(0.01)*
Intercept	0.9820	2.0370
	(0.23)***	(0.23)***
City Dummies	Yes	Yes
Number of Observations	2752	3,040
R-squared	0.107	0.119

Note:*** p<0.01, ** p<0.05, * p<0.1, Figures in parenthesis are robust standard errors

5.5.1 Housing Demand Analysis at Disaggregated Level

This study estimated the housing demand based on income groups for owned housing and is reported in table (5.6). The permanent income elasticity was found positive and significant for low-income group and high-income group, whereas the elasticity for middle-income group was found inelastic (2004-2005). The elasticity of 0.06 (low-income group) and 0.07 (high-income group) reported were higher than the results at the national level but it still indicated that the housing demand was inelastic. During 2010-2011, permanent income elasticity (0.04) was negatively significant only for middle-income group. Transitory income represents a positive and significant effect on the housing demand across all income levels and for both data sets. With the increase in income level, the housing demand became less elastic, as high-income group represented an elasticity of 0.02.

Increase in house price negatively affect the housing demand for all income groups. These results are highly significant for low-income groups and the credibility decreases as we move from low-income group to high-income group for both data sets. An increase of 36% was observed in housing demand with the increase in affordability in low-income group (2004-2005). As we moved from low to high-income group, affordability ratio decreased because of high-income and fixed rent cost and, therefore, housing demand was effected less by the affordability (2004-2005, 2010-2011). Moreover, during 2010-2011 attribute of affordability was insignificant for housing demand.

The coefficient of age of household head was found to be insignificant during 2004-2005, across all income groups. The age factor caused housing demand to change

slightly by 0.1% for income groups (2010-2011). As seen in the results at the national level, age, number or earners, household size (family members), education, gender and marital status are statistically insignificant during 2004-2005, except the household size related tohigh-income group, which negatively and significantly causes house demand to decrease by 0.5%.

Increase in the earning members of a household positively affected the house demand by 0.1% (low-income group) and 0.4% (middle-income group), nevertheless, for a high-income group, the housing demand decreases by 0.2% (2010-2011). For middle-income group, the increase in housing demand because of an additional year of education was reported as 5.1%, higher as compared to other groups. No significant impact of education, nonetheless, for high-income group was found on the housing demand. For most of the time families living in Low-income Group and middle-income groups view housing as an indicator for Social, Economic and Personal Security.

A logical increase in house demand was recorded with the increase in family size for all income groups. Household head being male negatively affect the housing demand in low-income group, whereas its affect was statistically insignificant for other income levels. For a married household, the house demand increased by 1.5% for a low-income groups, while results are insignificant for middle and high-income groups.

The results demonstrated a change in the attributes of housing demand across income groups over the year. The housing attributes for low-income groups highlighted that demand was more sensitive to the change. Therefore, high proportion of income was spent on the improvement and consolidation of housing units in low-income group.

Table 5.8: Housing Demand by Income Group(dependent variable housing unit)

Variables	2004=2005			2010-2011		
	Low-income	**Middle-income**	**High-income**	**Low-income**	**Middle-income**	**High-income**
Permanent income	0.0600	0.0240	0.0780	(0.0240)	-0.049	-0.009
	(0.04)*	(0.0300)	(0.04)*	(0.0200)	(0.02)***	(0.04)
Transitory income	0.0360	0.0270	0.0280	0.0320	0.042	0.02
	(0.01)***	(0.00)***	(0.01)***	(0.00)***	(0.00)***	(0.00)***
House Price	-0.0450	-0.0270	-0.0100	-0.0410	-0.054	-0.019
	(0.01)***	(0.01)***	(0.0100)	(0.01)***	(0.01)***	(0.01)*
Affordability	0.3620	0.1510	0.2410	0.0040	0.004	0.01
	(0.04)***	(0.04)***	(0.06)***	(0.00)***	(0.00)***	(0.01)
Age	0.0000	0.0000	0.0000	0.0010	0.000	0.001
	(0.000)	(0.000)	(0.000)	(0.00)***	(0.00)***	(0.00)***
Number of Earners	-0.0060	-0.0030	0.0010	0.0010	0.004	-0.002
	(0.000)	(0.000)	(0.000)	(0.00)***	(0.00)***	(0.00)***
Head's Education	(0.0090)	0.0050	(0.0200)	0.0310	0.051	0.028
	(0.0200)	(0.0100)	(0.0200)	(0.01)***	(0.01)***	(0.02)
Household Size	-0.0010	0.0000	-0.0050	0.0010	0.002	0.002
	0.0000	0.0000	(0.00)**	(0.00)***	(0.00)**	(0.00)***
Gender	(0.0110)	0.0070	(0.0110)	-0.0210	-0.002	-0.012
	(0.0100)	(0.0100)	(0.0100)	(0.01)**	(0.01)	(0.01)
Marital Status	(0.0040)	(0.0020)	(0.0080)	0.0150	0.002	0.011
	(0.0100)	(0.0100)	(0.0100)	(0.01)*	(0.01)	(0.01)
Lambda	0.0050	(0.0040)	0.0310	(0.0250)	-0.045	0.028
	(0.0100)	(0.0100)	(0.01)**	(0.01)*	(0.01)***	(0.01)**
Intercept	0.6310	0.9640	0.0240	1.8210	2.333	1.307
	(0.4100)	(0.32)***	(0.5800)	(0.32)***	(0.25)***	(0.57)**
City	yes	Yes	yes	yes	Yes	yes
No. of Observations	784	1402	485	944.0000	1,484	612
R-squared	0.2390	0.0980	0.2640	0.2030	0.16	0.297

Note:*** p<0.01, ** p<0.05, * p<0.1, Figures in parenthesis are robust standard errors

In an attempt to explain the differences of regional housing demand, this study used the log-linear regression model for a province-wise analysis of houses in urban Pakistan. The results are presented in table (5.7). The empirical results suggest that household income was the significant factor causing housing demand to vary among province. The permanent income elasticity of 0.03 (2004-2005) and 0.04 (2010-2011) was highly significant and positive for Sindh. Similarly, positive statistically significance permanent income elasticity was also reported for Punjab (2004-2005) and Baluchistan (2010-2011) on housing demand. Whereas, in case of KPK (2004-2005) and Baluchistan (2004-2005), the housing demand was negatively related to change in permanent income, but the results are insignificant for Baluchistan (2004-2005). The results indicate that the demand for housing was inelastic for all provinces.

Transitory income elasticity is positive and statistically significant for four provinces for both data sets, except for KPK (2010-2011). Moreover, the coefficient of transitory income presented inelastic demand for housing across all regions.

House price negative and significantly cause the demand for housing to decrease for all regions except for KPK (2004-2005) and Baluchistan (2004-2005). The result implies that the housing demand was inelastic and relatively small for all regions. The housing price was elastic for Baluchistan (2010-2011) and was reported to be 0.8. It indicates that the sectorial and regional difference should also be considered using aggregate parameters, while estimating housing demands. These differences are not reflected in the housing demand at national level.

Interesting results were reported regarding the affordability of a household head across regions. Results indicated that households in Punjab, Sindh and Baluchistan depend on affordability (rent to income ratio) for housing demand but, for KPK results were found insignificant. With an increase in affordability ratio, the housing demand increased by 15% and 4% for Punjab; 19% and 0.4% for Sindh and 12% and 14% for Baluchistan for both data sets, respectively. It indicates that individuals depend less on affordability for housing demand. A decrease, therefore, in housing demand was observed over the period for Punjab and Sindh. The dependence of income, nevertheless, for house demand increased over the period for Baluchistan.

As discussed in the previous literature, the demographic factors uncovered mixed results. With an increase in age, a significant change in demand was recorded to the extent of Punjab (2010-2011) and Baluchistan (2004-2005). An increase in number of earners negatively and significantly caused the decrease in demand by 0.9% for Sindh (2010-2011) and insignificant for all the other regions. With an increase in education, the demand for housing increased by 0.9% and 0.1% in Punjab; 1.1% in Sindh (2010-2011) and 5.8% for Baluchistan (2004-2005). Household size negatively affected the demand by 0.3% for Sindh (2010-2011) and its impact was insignificant for other regions. Similarly, gender and marital status were found irrelevant as a result of regional demand analysis.

Table 5.9: Housing demand: A Provincial Comparison (dependent variable housing unit)

Variables	Punjab		Sindh		KPK		Baluchistan	
	2004-05	2010-11	2004-05	2010-11	2004-05	2010-11	2004-05	2010-11
Permanent income	0.014	0.000	0.038	0.044	-0.047	0.023	-0.035	0.074
	(0.01)*	(0.01)	(0.01)***	(0.01)***	(0.02)**	(0.02)	(0.03)	(0.03)**
Transitory income	0.025	0.031	0.045	0.047	0.017	0.008	0.033	0.063
	(0.00)***	(0.00)***	(0.00)***	(0.00)***	(0.01)**	(0.01)	(0.01)***	(0.01)***
House Price	-0.021	-0.017	-0.017	-0.011	0.002	-0.030	-0.014	-0.087
	(0.00)***	(0.00)***	(0.01)***	(0.00)**	(0.01)	(0.01)**	(0.02)	(0.01)***
Affordability	0.152	0.044	0.199	0.004	0.071	-0.005	0.124	0.144
	(0.03)***	(0.01)***	(0.05)***	(0.00)*	(0.10)	(0.01)	(0.07)*	(0.04)***
Age	0.000	0.000	-0.000	0.000	0.000	0.000	0.001	0.000
	(0.00)	(0.00)*	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)**	(0.00)
No. of Earners	0.000	-0.000	-0.002	-0.009	-0.001	-0.005	0.003	-0.008
	(0.00)	(0.00)	(0.00)	(0.00)***	(0.00)	(0.00)	(0.01)	(0.01)
Head's Education	0.009	0.014	0.004	0.011	0.023	-0.008	0.058	0.017
	(0.00)*	(0.00)***	(0.01)	(0.01)*	(0.01)	(0.01)	(0.01)***	(0.02)
Household Size	-0.000	0.001	-0.001	-0.003	0.001	0.001	-0.001	-0.001
	(0.00)	(0.00)	(0.00)	(0.00)***	(0.00)	(0.00)	(0.00)	(0.00)
Gender	-0.009	0.001	-0.003	-0.005	-0.011	0.022	0.034	0.061
	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.03)	(0.05)
Marital Status	0.003	-0.001	-0.004	0.001	0.016	-0.019	-0.016	-0.016
	(0.01)	(0.00)	(0.01)	(0.01)	(0.02)	(0.01)	(0.02)	(0.02)
Intercept	0.988	1.200	0.614	0.636	1.451	1.127	1.394	1.218
	(0.05)***	(0.05)***	(0.07)***	(0.07)***	(0.15)***	(0.18)***	(0.21)***	(0.27)***
No.ofObservations	1,385	1,542	971	1,089	234	231	162	178
R-squared	0.066	0.106	0.144	0.247	0.126	0.078	0.263	0.391

Note: *** p<0.01, ** p<0.05, * p<0.1 level of significance and standard errors are highlighted in parentheses

The city-based results of demand analysis are reported in table (5.8). It was seen that amongst all 14 cities, only five cities i.e. Gujranwala, Lahore, Sukkur, Karachi and Peshawar emerged as dependent on permanent income as far the housing demand was concerned. In case of Peshawar and Gujranwala, a decrease in housing demand was observed because of the change in permanent income during 2004-2005 and 2010-2011, respectively. Similarly, a change in demand pattern was observed amongst cities and dependence on permanent income for Lahore, Sukkur and Peshawar was found insignificant concerning housing demand during 2010-2011, which was previously significant. The city-wise analysis indicated that most of the cities' purchasing power related to housing depends on the transitory income except for Bahawalpur during (2004-2005), while Gujranwala and Peshawar during (2010-2011). Results indicate that transitory income was less elastic in cities because of high consumption expense. The housing demand depends on unexpected source of income such as bonus or inherited income.

House price was found to be less elastic and negatively significant for Rawalpindi, Faisalabad, Lahore and Karachi during 2004-2005. While the housing demand was elastic owing to the change in housing prices in Sargodha, Gujranwala, Sialkot and Sukkur. During 2010-2011, the housing price elasticity negatively affected the housing demand for most of the cities except for Gujranwala. Housing demand was elastic in Quetta, Multan and Sargodha. It was reported less elastic for other cities in 2010-2011. It implies that the house demand was less elastic in cities with more population. Moreover, in capital cities housing prices do not depend on the price elasticity.

Affordability was an important factor for housing demand in cities. Results establish that the affordability changed over the time. Housing demand was insignificant in terms of change in affordability to the extent of Islamabad, Rawalpindi, Gujranwala, Multan, Bahawalpur, Hyderabad and Peshawar (2004-2005). Affordability decreased over the time in Sargodha from 24% to 8.7%; in Faisalabad from 15.9 to 14.3%; in Lahore form 42% to 6% and in Sukkur from 29% to 5.9%. For Quetta, affordability positively and significantly increased the house demand by 2%, representing capital gain for 2 data sets. Results also indicate a high housing expense and less/no increase in income. Consequently, affordability decreased over time.

Table 5.10: Housing Demand: City-Wise Analysis (dependent variable housing unit)

City	2004-05			
	YP	**YT**	**Price**	**Affordability**
Islamabad	0.031	0.033***	-0.024	-0.134
Rawalpindi	0.041	0.023*	-0.035**	-0.083
Sargodha	0.035	0.034***	-0.061***	0.244**
Faisalabad	-0.005	0.029***	-0.046***	0.159*
Gujranwala	0.081**	0.052***	-0.054***	0.014
Sialkot	0.012	0.031**	-0.059**	0.320*
Lahore	0.069***	0.019**	-0.034***	0.427***
Multan	-0.028	0.018**	-0.010	0.139
Bahawalpur	0.035	0.001	0.000	-0.024
Sukkur	0.171**	0.043*	-0.086**	0.293*
Hyderabad	0.022	0.042***	-0.016	-0.036
Karachi	0.048***	0.044***	-0.015**	0.274***
Peshawar	-0.047**	0.017**	0.002	0.071
Quetta	-0.035	0.033***	-0.014	0.124*
	2010-11			
Islamabad	0.004	0.045***	0.004	0.052
Rawalpindi	0.035	0.031***	-0.033**	0.116***
Sargodha	0.054**	0.033***	-0.041***	0.087***
Faisalabad	-0.028	0.032***	-0.021	0.143***
Gujranwala	-0.080***	-0.005	0.035**	0.064**
Sialkot	-0.024	0.036***	-0.036**	0.019
Lahore	0.017	0.028***	-0.021**	0.060***
Multan	0.103***	0.056***	-0.048***	0.051
Bahawalpur	-0.023	0.026***	-0.019**	0.014
Sukkur	-0.049	0.061***	0.007	0.059*
Hyderabad	0.022	0.031***	-0.016*	0.050***
Karachi	0.080***	0.047***	-0.017***	0.004
Peshawar	0.023	0.008	-0.030**	-0.005
Quetta	0.074**	0.063***	-0.087***	0.144***

Note: *** p<0.01, ** p<0.05, * p<0.1 level of significance.

5.6. Role of Remittances

We have examined the impact of remittances on housing demand using total remittances as an explanatory variable in the housing demand model. The results are presented in table 5.9.We have found that remittances have a positive and significant impact on housing demand. The table above indicates that remittances have a positive impact on housing units in both

periods (2004-05 and 2010-11). This table also shows migration either domestic or international and establishes the fact that migration causes significant increase in demand for new houses. The remittances sent by emigrants/immigrants increase the purchasing power of the households. With more resources, households increase spending on housing. Gilani *et al* (1981) demonstrated that 22 percent of total remittances were invested in the housing sector. Arif (2009) argues that migration exerts a considerable influence on housing ownership and the quality of housing. The estimated impact was higher in 2004-05 (0.0013) as compared to 2010-11 (0.0008). The obvious reason emerges the crunch in housing market because of the global financial crisis. These results indicate that rapidly rising domestic as well as internal migration has huge implications for housing sector. Rural-urban migration significantly increases the demand for new houses, especially in big cities. Similarly, enormous inflows of remittances from the Middle East and Europe put a huge pressure on the housing market. New housing units are required to accommodate the population migrating to big cities.

Table 5.11: Impact of remittances on housing demand (dependent variable housing unit)

Variables	2004-05	2010-11
Permanent income	-0.0355	-0.0529
	(0.03)	(0.01)***
Transitory income	0.0342	0.0398
	(0.00)***	(0.00)***
House Price	-0.0296	-0.0437
	(0.00)***	(0.01)***
Affordability	0.1735	0.0076
	(0.02)***	(0.00)**
Age	0.0005	0.0007
	(0.00)**	(0.00)***
Number of Earners	0.0044	0.0033
	(0.00)*	(0.00)*
Head's Education	0.0327	0.0495
	(0.01)***	(0.01)***
Household Size	0.0014	0.0033
	(0.00)	(0.00)***
Gender	-0.0097	-0.0051
	(0.01)*	(0.01)
Marital Status	0.0035	0.0070
	(0.00)	(0.00)
Remittances (PKR)	0.0013	0.0008
	(0.00)**	(0.00)**
Intercept	1.5921	2.1687
	(0.32)***	(0.24)***
Income Group	Yes	Yes
LAMBDA	Yes	Yes
City dummies	Yes	Yes
Number of Observations	2,752	3,040
R-squared	0.090	0.121

Note:*** p<0.01, ** p<0.05, * p<0.1, Figures in parenthesis are robust standard errors

5.7 Conclusion

This chapter was aimed at examining the determinants of housing demand using two data sets. We have used nationally representative household data sets PSLM-HIES covering 2004-05 and 2010-11 for empirical analysis. The empirical analysis has been restricted to 14 big cities of Pakistan. Moreover, we estimated the impact of various socio-economic factors on the housing demand at disaggregated level i.e. income-group-wise, province-wise and city-wise. The aggregate analysis exhibited that income, house price, affordability, demographic factors such as age of the head of the household, education and the household size as well as the number of earners and marital status are the key factors in determining the housing demand in Pakistan.

CHAPTER 6

CONCLUSION

Housing is one of the most basic human needs. Millions of people all over the world are struggling to have a roof over their heads. For the past several years, Pakistan has been faced with housing issues both in qualitative and quantitative terms. The problems concerning housing are more serious in the urbanized Pakistan. Multiplication of urban population through rural to urban movement for varied opportunities and a better standard of living has been the major source of the problem. A plethora of literature on housing has evolved setting up theoretical foundations encompassing the housing demand and supply, empirical analysis as well as the evaluation of government policies pertaining to housing aspects. Moreover, developments in the housing sector are now seen to benefit from extensive and rigorous research which has matured on the basis of housing demand and supply and has also attempted to measure both the micro and macro implications. A very few studies have ventured into determining the housing demand in Pakistan. This dissertation particularly analyzed the housing demand in urban areas i.e., large cities of Pakistan. More specifically, this dissertation has estimated the housing function for big cities of Pakistan on the basis of household data while investigated the factors that drive housing price and housing demand. It also examined the price differentials among the housing units and investigated the impact of remittances on housing demand in Pakistan.

For empirical analysis, Pakistan Social and Living Standards Measurement Survey/Household Integrated Economic national Survey (PSLM/HIES) data for the years 2004-2005 and 2010-2011are used. We have used data of 14 large cities as a sample to achieve the

above stated objectives. Sample size is 2752 households for 2004-2005 and 3053 for 2010-2011. Following the conventional housing studies, we determined house price by employing the hedonic price model. Unlike most studies on developing countries, we quantified the relationship between housing demand and its covariates by using an econometric framework augmented by Heckman's two-step selection procedure that controls for selectivity bias between tenure choice and quantity of housing services demanded. Margins for probability of house ownership are calculated by using the Probit model. Permanent and Transitory income is also estimated based on the permanent income hypothesis. Another aspect, not commonly addressed in studies related to developing countries including Pakistan, was to determine the separate effect of permanent and transitory incomes on housing demand. Log-linear model was estimated using OLS technique.

The study found that two variables housing price and income (temporary and permanent) play an important role in the determination of the housing units' demand. Although it can be observed that an increase in houses' prices will cause decrease in demand for the housing units. The housing demand increases when the permanent income increases. On the face of change or increase in the transitory income, the demand for housing units remain static since people do not desire to make long-term decisions based on the volatile income.

In findings, we analyzed the hedonic rent and hedonic price in order to estimate that how roof structure and other building material play an important role in the construction, especially their impact on the overall house price. We also found out that people prefer to have the house whose walls contain more steel and made of concrete. Such walls are looked as precious since the coefficient of steel wall is 1.74 for the year 2010-2011, which is statistically significant. People prefer to live in those houses where all the basic amenities are available in the vicinity of

the house. On the other hand, the demand for houses that lack essential needs of the household members either within or outside of the house, such as market, school, milk-shop, barber-shop, mechanics, shoe makers etc. are in less demand. The result also proved that middle and higher income people have significant and positive impact on the hedonic rent and hedonic price.

It was found out that the transitory income has positive effect on the housing demand among all three groups, but its impact was relatively stronger in case of middle-income as its coefficient is 0.04 for low, 0.03 for middle and0.02 for high-income group. Escalation of price was negatively related to demand as the housing demand decreases with the increase in the prices of housing units. The affordability has same effect on low and middle-income groups, but for high-income group it was positive yet reflects a lesser value in terms of its coefficient. Its coefficient is 0.04 for both low and middle and0.01 for high-income group in case of 2010-11. In 2004-05 it had caused an increase in the housing demand through an increase in the transitory income. It had, then, affected affordability as well, which comes forth through the coefficient values: 0.036 for low, 0.15 for middle and 0.24 for high-income group. The demand for housing at the national level has positively impacted on permanent income as people with more permanent income caused an increase in demand for houses. The scenario changed in 2010-11 when people with more permanent income had a negative impact on the demand for housing. This result is significant. In case of transitory income, there was a 3.3 % effect in 2004-05 and 3.9 % effect in 2010-11 and both of these results are significant. As income and demand have emerged negative, this turns out as a standard proof that with the increase in housing units' prices, the demand for housing decreases. In 2004-05, affordability had a positive impact on the housing demand as the increase in number of people who could have afforded to buy a house had caused the increase in housing demand. The trend changed during 2010-11 when there were

more people who could have afforded to buy houses yet the demand for housing remained low as compared to 2004-05.

Policy Implications

To achieve the proposed objectives to overcome the problem of housing development on a large scale, the focus should be shifted towards the housing sector development through capacity building of both formal and informal sectors. In order to facilitate the process of manifold housing development, the availability of affordable and suitable land with an effective land delivery mechanism is crucial. For creating an enabling environment for households from all income levels to avail the opportunity of owning a good piece of land for building their own houses needs to be ensured on the government level.

There is also a rapidly growing need for encouraging research and development activities for supporting housing activity particularly for low-income segments of the society. Issues and challenges are always present as stumbling blocks in the way of construction of the desired number of houses and fulfilling peoples' demands and addressing their wishes. There are provisions available to address mismanagements, apathy, inefficiencies and institutional weaknesses yet for the lack of good governance those provisions are not working in the interest of people from all income groups. On the other hand, effective and timely resource mobilization through the government initiative is highly recommended. Incentives and measures such as tax rationalization, reduction in property tax and registration, simplification of procedure and enforcement of effective foreclosure laws need to be introduced to the masses of Pakistan. High costs and exaggerated prices always create a big question mark in the minds of potential buyers. In order for developing cost effective strategies for the housing sector, government can play a key role in improving the housing market of Pakistan. The housing policy needs to gear towards

emphasizing on the mobilization of resources, suitable and affordable land availability, incentives for ownership, incentives for developers and constructors, and the promotion of research and development activities for low cost and high quality housing. Any effective housing policy must be attractive, well designed and properly articulated yet without its implementation it would be meaningless to have great features about the policy. The government failed to implement the proposed strategy with a few exceptions such as measures for housing finance by the State Bank.

To meet the rising demand for housing, various formal financial institutions are catering the finance needs. In Pakistan, House Building Finance Corporation (HBFC) – a specialized housing bank, one DFI, two microfinance banks and 27 commercial banks are serving the financing needs of housing. HBFC is the only specialized housing bank in the country which has been providing housing finance since 1952. The commercial banks started housing finance during 2003, but they are contributing a very small share in the total housing finance system because of their stringent regulations.

It has been found that the housing studies across the board recommend arrangements and research-oriented plans for a cautious yet realistic understanding of the conduct of the urban housing markets. A gap frequently identified in strategies envisaged while creating nations – whereby Pakistan in no way an exception. This study is an attempt to throw light on the potential association between housing research and strategies that might be created and evolved towards the endeavors to encourage more stratified and point by point dissection on housing markets in Pakistan.

The middle-income group was experiencing increasing problems in acquiring land and constructing its homes. The stumbling block stems from its constantly decreasing

paying capacity owing to inflation and escalated costs of land and materials. Thus an increasing number of households of this group are developing informal settlements to meet their housing requirements. The government of Pakistan should provide loans to the middle-income group for the purchase of land to construct a house on it. The housing problem cannot be addressed effectively unless the government shuns the prevalent apathy and develops mechanisms for addressing the critical housing needs of the middle-income group. Speculation and haplessness can end through the effective intervention of the government with the help of strategic plans for catering the growing needs of housing for middle and lower middle class populations. Easy loans for house-building should be increased and procedures should be developed to abolish the red tape on obtaining them.

The way forward

There are various avenues on which future research can be conducted to further explore the housing demand in Pakistan. Few possible areas include:

- First, in this study the importance of high rise building is ignored due to data limitation. Research on housing demand can be extended by analyzing the role of high rise building in managing rising housing needs. For this purpose a specific survey can be conducted

especially in mega cities such as Karachi, Lahore and Islamabad where there is rising trend in building apartments to make residence affordable.

- Second, this study ignores the role of travelling time to reach at work destination due to data limitation. This dimension can also be added in future research.

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