Reinvestment Behaviour and Policies in Housing
The Case of Turkey

By

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ABSTRACT

Reinvestment decisions in housing are made by independent households in the free market, rather than by some authority. Although a micro level activity, households' decisions in reinvestments often have broader implications at the macro level. Some of these implications can be observed directly in the built environment, whereas others are to be traced in the overall economy. Developing an understanding of households' reinvestment behaviour and providing information on this issue could contribute to the monitoring of the economic system, as well as to urban decision-makers and planners in designing finer policies and tools of intervention in relation to problems of the housing stock and neighbourhood environments. The study aims to identify problems in reinvestment issues, factors in household reinvestment decisions, adjustment strategies of households, scale and types of reinvestment work, and motivation underlying the investments so as to explore macro implications of reinvestment behaviour. Current levels of investments in urban areas have increased to such significant magnitudes in Turkey that its implications for the overall economy have to be taken into account. Despite four decades of research and practice history in the world, reinvestment issues have been ignored in Turkey.

The findings of this study reveal that although substantial capital and resources are engaged in reinvestment activities in Turkey, there are households who are unable or unwilling to reinvest to their dwellings, or conversely there are dwellings that are unlikely to receive reinvestments. These are the lowest income households, the rental stock, or dwellings located in the neighbourhoods of poor environmental quality, and flats in apartment blocks where common areas are not maintained. With another point of view, reinvestment decisions have implications in the depreciation of the housing stock. The findings display that in the Turkish case reinvestments in existing housing stock are significant components of housing investments, households' reinvestment expenditures have implications in the construction sector and thereby in the overall economy, and households' reinvestments help to adjust housing consumption with regard to the current needs and trends, and act as supply adjustment mechanisms in existing housing stock and neighbourhoods. The findings indicate a possible set of policy issues in the more efficient operation of the housing markets.

PREFACE AND ACKNOWLEDGEMENTS

For the past ten years, reinvestment decisions and expenditures in the existing housing stock have been the focal subject of my research interest. My awareness of this current urban economic trend in Turkey arose during my graduate studies at the Middle East Technical University (METU) in Ankara. It was Prof. Murat Balamir, coordinator of the City Planning Master Studio in 2000-2001 academic year, who encouraged me to study this subject which still remains almost unnoticed by researchers and policy makers. I am indebted to him for his support and guidance from the initial stages of my academic life to the present day.

My Ph.D. journey started in January 2003 at the Department of City and Regional Planning (CRP), METU. In 2004, I was awarded Erasmus Scholarship for the status of an exchange student for an academic year at the Technical University of Dortmund (TU Dortmund), Germany. During my Erasmus period, I received continual support from members of the CRP Department at METU. In particular, I would like to thank Prof. Ali Türel, Chairman of the Department at that period, and Assoc. Prof. Ela Babalık-Sutcliffe, Erasmus Coordinator of the Department. I also wish to express my gratitude to Dr. Sebastian Müller, the Erasmus Coordinator of the Faculty of Spatial Planning, TU Dortmund, and all of the members and students of the SPRING Dortmund in 2004-2005 academic year. During my study at TU Dortmund, I had the opportunity to discuss my research project with Prof. Ruth Becker. She kindly allowed me to conduct my study under her supervision at the Faculty of Spatial Planning Ph.D. Programme. I am grateful to Prof. Ruth Becker for her invaluable comments and suggestions throughout this study.

The thesis defence took place at TU Dortmund, December 14th 2010. I owe my deepest gratitude to the members of the examination committee for the time they sacrificed for reading this dissertation and their constructive comments on the study: my supervisors Prof. Ruth Becker and Prof. Murat Balamir, and Head of the Committee of the Doctorate Prof. Sabine Baumgart. I would also like to mention the concerned support of a friend and colleague, Mehmet Saner, during my last visit to Dortmund in the completion of the final stage of this dissertation.

Again, without the support of colleagues and friends, it would have been impossible to complete this dissertation. First of all, I am heartily thankful to Assoc. Prof. Nil Uzun whose support throughout the process was invaluable. I am also grateful to Prof. Melih Ersoy, Chairman of the CRP Department, for his continual encouragement during the study. My colleagues and friends Özgehan Özen, Banu Aksel Gürün, and Cansu Canaran also deserve a special note of thanks for their help in carrying out the survey in Ankara. I would also like to mention the help of my friend and colleague Pelin Sarıoğlu Erdoğdu, who was always with me while dealing with the difficult task of preparing questionnaires, developing sampling methods, and carrying out surveys. I would also like to thank Suna Yaşar Özdemir for her encouragement and friendship throughout the entire process. Other friends also deserve a word of thanks: Meltem Şenol Balaban and Arzu Taylan shared different stages of this experience with me, even though they were not near me physically they were always available on the other side of the line. My officemates in Room 305 at METU; Yasemin Sarıkaya Levent, Tolga Levent, Sinan Burat, Ayşegül Keleş Eriçok, and Burak Büyükcivelek, we shared together not only the good experiences but also the intolerable ones during our Ph.D. studies and professional lives.

Last but not least, I want to acknowledge the role of my family. Without their support, encouragement, and love this dissertation would not have come about. I owe my deepest gratitude to my mother Gönül Özdemir and my husband Fatih Sarı for their multifaceted support all through these years. Special thanks also go to my becoming daughter who shared the stresses of the thesis-defence procedures with me during my 18th week of pregnancy. We are expecting her with excitement, curiosity, and love. I am also grateful to my brother and my parents-in-law, whose support and understanding helped me to face the difficulties throughout the process. Lastly, I offer my regards to all of those who supported me in any respect during the completion of this project.

This study is dedicated to the memory of my father.

Ö. Burcu Özdemir Sarı
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LIST OF ABBREVIATIONS

BRSA: Banking Regulation and Supervision Agency

DIY: Do It Yourself

FO: Flat Ownership

GDP: Gross Domestic Product

GNAT: Grand National Assembly of Turkey

GNP: Gross National Product

HBS: Household Budget Survey

HDA: State Housing Development Administration

Hh: Household

METU: Middle East Technical University

OLS: Ordinary Least Squares Regression

PMHU: Prime Ministry Housing Undersecratariat

REF: Reference Category

RM: Repairs and Maintenance

RME: Repairs and Maintenance Expenditures

SMSA: Standard Metropolitan Statistical Area

SPSS: Statistical Package for Social Scientists

TURKSTAT: Turkish Statistical Institute

VAT: Value Added Tax

CHAPTER 1

REINVESTMENTS IN EXISTING HOUSING STOCK

1.1. Investigating Households' Reinvestment Behaviour: Subject and Aim

Housing stock is a major economic resource for countries, besides its influential role in social life. Efficient use of this resource is an indispensable objective of housing policies. This objective can be fulfilled by reinvestments in existing housing stock. Reinvestments here refer to repairs and maintenance (RM) activities, as well as rehabilitation investments undertaken with the purpose of improving existing housing assets and standard of life (Figure 1.1). RM activities could cover minor repairs (e.g., regular RM, painting, replacement of door-window frames), major repairs (e.g., replacement of kitchen-bath systems, installations like plumbing or electrical systems), and structural repairs (e.g., covering external surfaces and roof, foundation consolidation or retrofitting against seismic and other hazards). Whereas, rehabilitation comprises conversions, extensions, upgrading, joining / subdividing operations, and changes in layout plan of dwelling units.

Figure 1.1: Reinvestments in Existing Housing Stock

With reinvestments;

- prevention of losses from existing inventory,
- extension of economic life of the housing stock,
- preservation of asset values and securing value increases,
- improvements in the standards of housing services and living environments,

- adaptation of the stock with regard to the current needs and trends can be achieved.

Such efforts are believed to improve housing and living conditions for households (Hhs), and resource efficiency for overall economy. In this respect, reinvestment decisions could comprise both a major **social policy** area and a significant subject of research and implementations in **urban studies** and **planning**.

Reinvestments in existing housing areas have attracted attention for more than three decades in the scientific literature. By the end of 1960s, major problem for many European countries was the intolerable living conditions faced in aged housing stock. Economic burden of redeveloping those properties and social objections stemming from earlier massive clearance experiences compelled administrations to search for alternative methods of improving poor housing conditions. On the other hand, in the US, large-scale redevelopment projects operated in the deprived and declining urban areas resulted in the displacement of many poor urban Hhs, worsening their housing conditions rather than improving it. This was one of the reasons of the urban riots experienced in the 1960s. As a result, both in European countries and in the US, interest in the means of improvement and rehabilitation in existing housing stock increased, and brought Hhs to the centre of policy-making as the main actors of reinvestment decisions.

In most economies, reinvestment decisions are made by independent Hhs in the free market, rather than collectively or by some external / superior authority. ***Although reinvestment decision is a micro level activity, Hhs' decisions often have broader implications at the macro level beyond Hhs' individual well-being.*** Some of these implications can be observed directly in the built environment, for instance, in the depreciation of the housing stock, the quality of housing and neighbourhood services, housing supply, etc. Further implications can be traced in the overall economy, in terms of total volume of capital engaged in reinvestment in comparison to new construction, volume of production activity for materials employed in reinvestment operations, and jobs created (usually for qualified labour) through this type of construction activity, etc.[1]. Consequently, developing an understanding of Hhs' reinvestment behaviour and providing information on this issue could contribute to urban decision-makers

[1] Macro implications of Hhs' reinvestment behaviour are discussed in detail in Section 2.3.

and planners in designing finer policies and tools of interventions to tackle problems in existing housing stock and neighbourhoods.

Contrary to the US and European examples, the problem of housing has been considered as a quantitative deficiency problem for many decades in Turkey; therefore the focus of housing policies and urban planning has been confined to 'urban growth', and 'new stock production'. Although the contexts are dissimilar to the US and EU examples, comprehensive redevelopment has become a most frequented intervention method in Turkey in the absence of policies and tools for intervening in the existing urban environment and building stock. Yet, there are reasons to consider reinvestments as a current issue, and a requirement for monitoring the existing housing stock in Turkey. Certainly the most striking reason is the need and rising demand for the achievement of safer and higher standard urban environments in a country where floods and earthquakes frequently cause losses in the inventory. Many other reasons for emphasizing reinvestments in existing housing stock could be advanced in the Turkish case[2].

Turkish Hhs, dominantly owner-occupiers as in most countries, are the main decision-makers of reinvestments in housing. However, unlike other countries, there are no policies to consider reinvestment processes in existing housing stock, and no tool or mechanism exists to encourage or supervise Hhs' reinvestments. Though, the magnitude of Hhs' reinvestment expenditures is not negligible in Turkey:

- Reinvestment expenditures of urban Hhs in housing were nearly 787 million Euros in 2004 (Turkish Statistical Institute: TURKSTAT, 2004b)[3]. More than four fifth of these expenditures were realized by owner-occupiers. Of these expenditures, 48 per cent were payments for professional services whereas 52 per cent were for material purchases.
- In 2004, annual value of private residential investments for new construction was approximately 6.71 billion Euros in urban areas[4]. This means that, volume of Hhs'

[2] A detailed discussion of these reasons is presented in Section 3.4.
[3] This volume is estimated by TURKSTAT based on Household Budget Survey (HBS) data. It is actually an underestimate of the total volume of Hhs' reinvestment expenditures in urban Turkey for a number of reasons. These reasons are underlined in Chapter 5 of this study.
[4] Based on 'construction permits statistics' of TURKSTAT (www.tuik.gov.tr). Urban areas here refer to settlements with 20,001 and more inhabitants.

reinvestment spending was roughly 12 per cent of the value of new housing construction by private sector in 2004.

- Furthermore, volume of property taxes collected was nearly 994 million Euros in 2004. In other words, in urban areas Hhs' expenditures for reinvestments were as much as 80 per cent of the property taxes collected in the same year[5].

Considering the fact that Hhs' are the main decision makers of reinvestments in housing and given the magnitude of their reinvestment expenditures, Hhs' reinvestment decisions are expected to play a crucial role in the trajectory of nation's housing stock and neighbourhoods, and in overall economy. Understanding how individual reinvestment decisions are determined would contribute to identify aggregate outcomes of the individual behaviour and accordingly devise policies for the encouragement or abatement of the tendencies of reinvestments. Therefore, this study is fundamentally concerned with identifying the factors affecting Hh reinvestment decision. The major line of argument is that Hh reinvestment decision is a function of;

- Hh characteristics (i.e. mode of tenure, financial capacity, life stage),
- qualifications of dwelling unit (i.e. size, age, value),
- neighbourhood features (i.e. quality of neighbourhood services and environment, locational advantages),
- market attributes (i.e. availability of credits, construction materials, and skilled labour).

A number of these attributes can be directly influenced by policies intended to improve standards of living and quality in existing housing stock and neighbourhoods. This study also investigates adjustment strategies adopted by Hhs, scale and types of reinvestment work, and the motivation underlying these investments to explore macro implications of Hh reinvestment behaviour.

Recent discussions in Turkey on 'urban transformation' provide additional justifications for investigating Hhs' reinvestment decisions in existing housing stock[6]. Several legislation drafts have been introduced since 2004 on the transformation of urban areas. Current 'urban transformation' proposals follow the conventional trends aiming solely physical

[5] Based on 'tax statistics' of Revenue Administration of Ministry of Finance (www.gib.gov.tr).
[6] A detailed discussion of current legislative proposals on 'urban transformation' is presented in Section 3.3.

redevelopment of urban areas and consider large-scale and expensive public operations only, without taking into account social issues or the alternative policies of triggering reinvestment capacities of Hhs. Attempts to improve housing and living conditions in existing housing stock and neighbourhoods cannot be considered independent of local constraints / potentials, and resident participation. Within this context, investigating Hhs' reinvestment behaviour finds additional justifications.

1.2. Reinvestment Behaviour of Urban Households: Scope of the Study

Hhs' reinvestment behaviour have attracted almost no attention in Turkey due to lack of interest in the means of improvement within existing housing stock. Yet, there are reasons to believe that reinvestment decisions could be a major factor affecting quality changes in the housing stock and urban environments especially in the Turkish case. This argument originates from the fact that almost all of the housing stock (both owner-occupied and rented) is privately owned, and that all types of reinvestments are totally dependent on Hhs' decisions in the free market.

Privately owned housing stock in Turkey constitutes 99 per cent of the stock, leaving almost no share for public housing. This stock is dominated by apartment blocks produced under 'Flat Ownership' (FO) relations (Balamir, 1975, 1992). 67 per cent of urban Hhs were estimated to live in flats by year 2006 (TURKSTAT, 2002-06). This ratio is expected to increase in the near future since most of the new dwelling units, 80 per cent in 1990-2003 period, are contained in apartment buildings (TURKSTAT, 2003b). This type of stock is regulated through 'Flat Ownership Law' (1965)[7]. According to the article 19 of the Law, flat owners are compelled to maintain and preserve the architectural, aesthetic as well as structural qualities of the property. Therefore, the main decision-makers of reinvestments in housing (both owner-occupied and rented) are individual flat owners rather than some external authority. As mentioned above, no specific policy exists to consider reinvestment processes in the existing housing stock, and there is no tool or mechanism to encourage or supervise Hhs' reinvestments.

[7] Flat Ownership Law was revised in 1969, 1983, 1985, 1991, 1992, 2005, and 2007.

In the FO system, decision-making power on buildings is unconditionally fragmented, minimizing the probability of producing joint decisions, neglecting the comprehensive or building level redevelopment needs in urban areas at future stages of urban lifecycle (Balamir, 1975, 1992, and 1996a). This ownership structure provides individual owners with rights to freely enjoy the control of investments in their own dwelling units. Thus, it has led to greater prospects for individual investments. It may be argued that incidence and type of reinvestment work and volume of reinvestment expenditures are significant as threats or potentials, to be discouraged or encouraged in a planned manner. Every reason exists to justify the focus of this study on reinvestment decisions taking place in privately owned flats in multi-unit structures[8].

In the literature, researchers usually study either owner-occupiers' reinvestment behaviour in single family housing, or landlords' (tenants' in rare cases) reinvestment decisions in tenements. Yet, in the Turkish case, flat owners can rent their dwelling units. Therefore apartment blocks could accommodate both owner-occupiers and tenant Hhs. Tenancy rates among urban Hhs living in apartment blocks were estimated to be 30 per cent, whereas owner-occupancy was 64 per cent by year 2004 (TURKSTAT, 2004b). The two modes of tenure almost always exist together in apartment blocks. Moreover, tenant Hhs are also able to undertake reinvestments in the dwelling unit they occupy depending on their agreement with the flat owners[9]. Thus, ***the study investigates reinvestment behaviour of urban Hhs who live in the privately owned owner-occupied and rented flats which is the dominant form of housing in Turkey.***

The purpose of understanding how individual reinvestment decisions are determined, and to identify aggregate outcomes of these decisions for the housing stock and living environments requires investigating not only the decision to reinvest or not, but also the decision regarding the size of reinvestment expenditure. Throughout this study, these two decisions are considered separate but interdependent decisions taking place sequentially. In other words, Hh has to decide first 'whether to undertake reinvestment or not'; then, conditional upon reinvestment decision 'the size of reinvestment expenditure' is determined. This is what

[8] Reinvestment decisions of Hhs living in single family houses are also considered whenever the information is available.
[9] Rights and liabilities of Turkish Hhs regarding reinvestments in housing are presented in Section 4.2.

Mendelsohn (1977) calls **'the sequential model'**. This model provides the opportunity to examine factors affecting the likelihood and the size of reinvestment expenditures separately, which are not necessarily the same. In other words, sequential model allows investigating different levels of reinvestment expenditures, rather than lumping all expenditures into a nonzero expenditure category. And thereby, it helps in exploration of reinvestments which cover a broad range of activities from 'minor repairs' to 'rehabilitation' with different cost items. It could be argued that minor repairs, particularly regular RM, are different from other types of reinvestments since they are ongoing costs, and they constitute relatively smaller amounts of expenditure. As Montgomery (1992) underlines, it is conventional in literature to separate regular maintenance from major improvement, though the basis for this separation is somewhat arbitrary. Her findings, however, display that including maintenance expenditures in empirical models increases the explanatory power of the models in illuminating Hhs' improvement investments. Although different in nature and size, regular RM are vital components of reinvestment decisions, the lack of which could give rise to higher costs in the future, and relatively poor housing conditions for Hhs. Thus, all types of reinvestment efforts are considered significant for the purpose of this study.

This study employs the view that reinvestment decision is not solely reserved for Hhs who stay in-situ. Hhs may also undertake reinvestments following a mobility decision. Therefore, investigating a mixed sample of mover and non-mover Hhs better suits the needs of this study to obtain a realistic picture of reinvestment behaviour[10]. Yet, this study focuses on the 'reinvestment decision' itself rather than 'move / stay decision'. This is due to the fact that there are many reasons of mobility apart from adjustments (i.e. change in employment, eviction) which are beyond the scope of this study.

As mentioned earlier, this study argues that Hh reinvestment decision is underpinned by a mix set of factors related to; characteristics of Hh itself, qualifications of dwelling unit occupied by Hh, features of neighbourhood where dwelling is located, and general market conditions. Hh characteristics are indicators of demands and preferences as well as financial and physical investment capacity of Hh. Whereas qualifications of dwelling unit determine the actual service level provided by dwelling, and the structural constraints imposed by dwelling on

[10] Annual mobility rate in urban Turkey was estimated to be nearly 11 per cent in 2003 and 2004 (TURKSTAT; 2003d, 2004b).

reinvestment works. Neighbourhood features, on the other hand, display existing motivations or disincentives for reinvestments based on the services and amenities provided by the neighbourhood, locational attributes, and land-use. Market attributes (e.g. availability of credits, or provision of grants for reinvestment works, availability of skilled labour, and variety of construction materials) usually affect the demand for reinvestments, and type, scale, and quality of works undertaken. These set of factors are evaluated by their effects on Hhs' investment and consumption considerations, since they are assumed to be the basic motives underlying Hhs' decisions related to their dwellings at any point in time. Previous studies in other countries usually investigate the effects of Hh and dwelling characteristics on reinvestment decisions. Factors related to neighbourhood features and market attributes are the least employed ones, especially in empirical studies. This is often due to the constraints imposed by available data. Throughout this study all sets of factors are assumed to have significant effects on reinvestment decisions[11]. However, as in previous studies, empirical part of this study is fundamentally dependent to available data sources as discussed in the next section.

1.3. Methodology and Data Sources

This study employs a number of methods to explore factors influencing the likelihood of Hh's reinvestment decisions and the level of reinvestment expenditures, as well as to identify macro implications of such individual behaviour in the Turkish case. First, an international survey of existing studies is conducted to examine previously identified determinants and macro implications of Hhs' reinvestment decisions, details of the databases employed, their methods of investigation, and findings. Therefore, existing theoretical and empirical studies in the field are the primary references guiding this research, though verification of the research arguments is based on real life observations. Scientific references throughout this study are fundamentally dominated by research in US Hhs and housing stock. Studies considering other countries are rare, and they are used whenever accessible and available in English. Framework of analysis in this study is basically built up on information provided by previous research work in the field. However, survey of literature is not the only source referred when investigating Hhs' reinvestment behaviour throughout the study. It is also necessary to take

[11] Each factor set and their expected effects on reinvestment decisions are discussed in Section 4.4.

account of the country's own dynamics and conditions rather than mechanistically testing the hypotheses provided by theory. Therefore, current reinvestment trends and requirements specific to Turkey, as well as rights and responsibilities of Turkish Hhs pertaining to reinvestment decisions are integrated to the framework of analysis.

In order to explore determinants of Hh's reinvestment decisions empirically, this research adopts two basic data sources. First one is the raw data of Household Budget Survey (HBS) 2004, which was compiled by TURKSTAT, representing urban and rural areas of Turkey. This data was made available for public use in 2008. The second data source is a survey sample obtained through the 'Household Mobility in Housing Stock (2000-2008)' project, a Scientific Research Project funded by the Middle East Technical University (METU)[12]. Geographic coverage of the survey is the metropolitan districts of Ankara, the capital city. Although these two data sources differ in terms of their geographic coverage and content, they both serve to investigate the determinants of Hhs' reinvestment decisions.

HBS was not conducted specifically for housing research, yet it provides crucial variables on the basis of Hhs (RM expenditures, Hh income, mode of tenure, type and age of dwelling etc.), and sufficient number of observations (almost 8600 cases nearly 70 per cent of which is urban) to investigate Hhs' reinvestment decisions for urban Turkey. Reinvestments are represented in HBS by 'RM expenditures' of Hhs. HBS results are also available partially as an interactive database on TURKSTAT's website for years 2002-2006[13]. This database is employed to provide additional information on Hhs' reinvestments for a five year period where needed.

Although HBS provides opportunities to explore Hh's reinvestment decisions, it has a number of shortcomings. Previous studies in the field almost always mention the lack of crucial variables in the available data sources for analysing the factors affecting Hh's reinvestment behaviour, and the need to employ a bulk of proxies which make the interpretation of results

[12] The author of the present research also took part as project staff in different stages of the referred project. The data is employed in this study with the permission of Prof. Balamir, initiator and coordinator of the project. 'Household Mobility in Housing Stock' was partially a follow-up of a previous study undertaken by Prof. Balamir in 1984. The aim was to repeat the same study after 20 years time interval with those units previously visited and new units of an extended sample covering apartment blocks that were constructed after 1984.
[13] Refer to www.tuik.gov.tr for interactive database of HBSs.

difficult[14]. The analyses conducted with HBS data are no exceptions, since HBS was not designed specifically as a housing survey. With this data source it is only possible to investigate the effects of *Hh and dwelling characteristics* on the likelihood of reinvestment work and the size of reinvestment expenditures. Unfortunately, the data does not provide information on location, even at province level, which makes it impossible to integrate data from other sources to proxy *neighbourhood or market variables*. A second shortcoming is the lack of crucial information on the type of reinvestment expenditures which were collected by the HBS but not processed during the data entry and lost totally. Last but probably the most significant deficiency of HBS data is the reinvestment expenditure itself which is reported only for the survey month. HBS (2004) was conducted through January 1st – December 31st, for a full year, each month with 720 sample Hhs. Hhs were asked to record their consumption expenditures on a daily basis during the survey month. Therefore, reinvestment expenditures provided by HBS solely represent the reinvestment works undertaken during the survey month. This means HBS provides only a monthly picture of 8640 Hhs' reinvestments. However, reinvestment expenditures for Hhs may not take place in every month as other types of consumption expenditures (i.e. expenditures for food). Hhs may employ various reinvestment strategies in different seasons or under different Hh conditions through a year, often extending several months. Therefore, in HBS data, it is not surprising to observe a reinvestment pattern where many of the Hhs having no expenditure, and Hhs with nonzero expenditures displaying low investment levels.

The second data source employed in this study is an attempt to overcome the above mentioned limitations. It is a survey designed specifically for investigating housing processes and it covers a special section related to Hhs' reinvestments[15]. The survey designed under 'Household Mobility in Housing Stock' project is referred as 'the Ankara Survey' hereafter. The sample of the Ankara Survey was selected from the records of apartment blocks which were registered to FO books in the Deeds Offices in Ankara. These records cover information related to buildings and individual flats in the central districts of Ankara metropolitan area namely; Çankaya, Yenimahalle, Keçiören, Altındağ, Mamak. The records were obtained from the local Deeds Offices of those districts and converted to a combined list ordered with

[14] For instance, 'age of the Hh head' is usually employed as a proxy for Hh's mobility expectation whereas 'age of the dwelling' is utilized due to lack of information on dwelling condition.
[15] The section on Hhs' reinvestments of this research was developed by the author in line with the relevant literature, under the supervision of the project coordinator.

respect to date of registration for a systematic sampling. Every 20th record was selected (5 per cent sampling) in order to implement a Hh questionnaire[16]. Therefore, in principle the distribution of the sample is unbiased in time and space. Every Hh in the surveyed buildings (regardless of mode of tenure) was encouraged to participate in the multiple-choice questionnaire, yet the final distribution of the sample was dependent upon the low response rates of the Hhs. Hhs were not interviewed face-to-face, rather the questionnaire forms were distributed to the Hhs and after a convenient time period a surveyor collected the questionnaires. More than 8000 Hhs in approximately 950 buildings were visited. The response rate however remained approximately 25 per cent. Yet, no significant bias for the purposes of analyses in this study is generated due to low response rates[17].

The Ankara Survey contributes to the empirical part of this research especially by providing a number of crucial variables which are significant in exploring the individual reinvestment decisions. These are;

- detailed information on Hh's reinvestments (volume and type of reinvestment expenditures, purpose of the work done, etc.) reported for the year immediately preceding the survey,
- reinvestments undertaken in commonly-owned parts of the apartments in the last 12 months,
- Hh's perceptions of dwelling and neighbourhood, and
- Hh's expectation of mobility in the foreseeable future.

In addition to these, Ankara Survey provides information on the exact location of each building which makes it possible to integrate an external variable ***'land values per square meter'*** for each case[18]. As a result, effects of *Hh characteristics*, *qualifications of dwelling, and neighbourhood attributes* on reinvestment decisions can be explored through the Ankara Survey. However, investigating the effects of market attributes is not possible in the case of Ankara either. A number of market attributes (i.e. availability of credits for reinvestments,

[16] The method which was employed in the 1984 Survey designed and implemented by Prof. Balamir is also followed here.
[17] Refer to Appendix F for comparison of distributions in Ankara Survey with the general distributions.
[18] Land values in Ankara with respect to district and street names are obtained from the Revenue Administration of the Ministry of Finance. 'Minimum Land Values per Square Meter in Turkey' (Revenue Administration, 2006) can be accessed from www.gib.gov.tr. These are the minimum land values assessed by Tax Assessment Committees to establish property tax. Tax Assessment Committees are composed of members from related municipality, deeds office, chamber of commerce, and headman (muhtar) of the district.

costs of construction materials) are identical for all districts, and there is no data associated with the remaining factors which might vary with respect to the districts (i.e. availability of skilled labour, cost of labour, etc.).

Data analysis in this research is undertaken with the Statistical Package for Social Scientists (SPSS) version 11.5. Figure 1.2 displays the structure of the empirical part covering the analysis with HBS data (Chapter 5) and the Ankara Survey data (Chapter 6). Both bivariate and multivariate analyses are employed in order to identify the factors affecting Hhs' reinvestment decisions. The likelihood of a Hh to undertake a nonzero reinvestment expenditure given the Hh, dwelling, and neighbourhood attributes is investigated through **'binary logistic regression'** method. This is the same method applied by similar studies in the field which investigate the probability of reinvestment decisions with dichotomous dependent variables (having done reinvestment or not). Factors affecting the size of reinvestment expenditures are explored through **'ordinal logistic regression'** method[19]. This method permits to investigate multiple outcome categories (i.e. expenditure categories) and is preferred when order of the dependent variable's categories are significant for the research (i.e. lowest to highest expenditures).

Reinvestment in the existing housing stock is a current urban economic trend in Turkey which still remains almost unnoticed by researchers and policy makers. Hhs' reinvestments for RM and rehabilitation in the existing housing stock have been so extensively practiced recently, that it almost denotes a new stage in economic, physical, and social development of urban areas. Hhs' reinvestment processes need to be scientifically explored, and their macro level outcomes and social implications need to be traced for the development of specific response and guidance policies. With this purpose and in line with the above mentioned methodological considerations, this study is organized in seven parts, including this introductory chapter. In order to examine previously identified determinants and macro implications of Hhs' reinvestment decisions, a survey of existing theoretical and empirical studies is conducted in Chapter 2. Basics of Turkish housing stock, current reinvestment

[19] 'Ordinal logistic regression' method is preferred in this study since this method does not require distributional assumptions (i.e. normality, linearity, no outliers) as 'multiple regression' method does. Initial analysis of HBS and the Ankara Survey data displayed that distributional assumptions are not met in these data sources.

trends and requirements in Turkey are discussed in Chapter 3 to display that reinvestment policies and interventions in the Turkish housing system is an imperative.

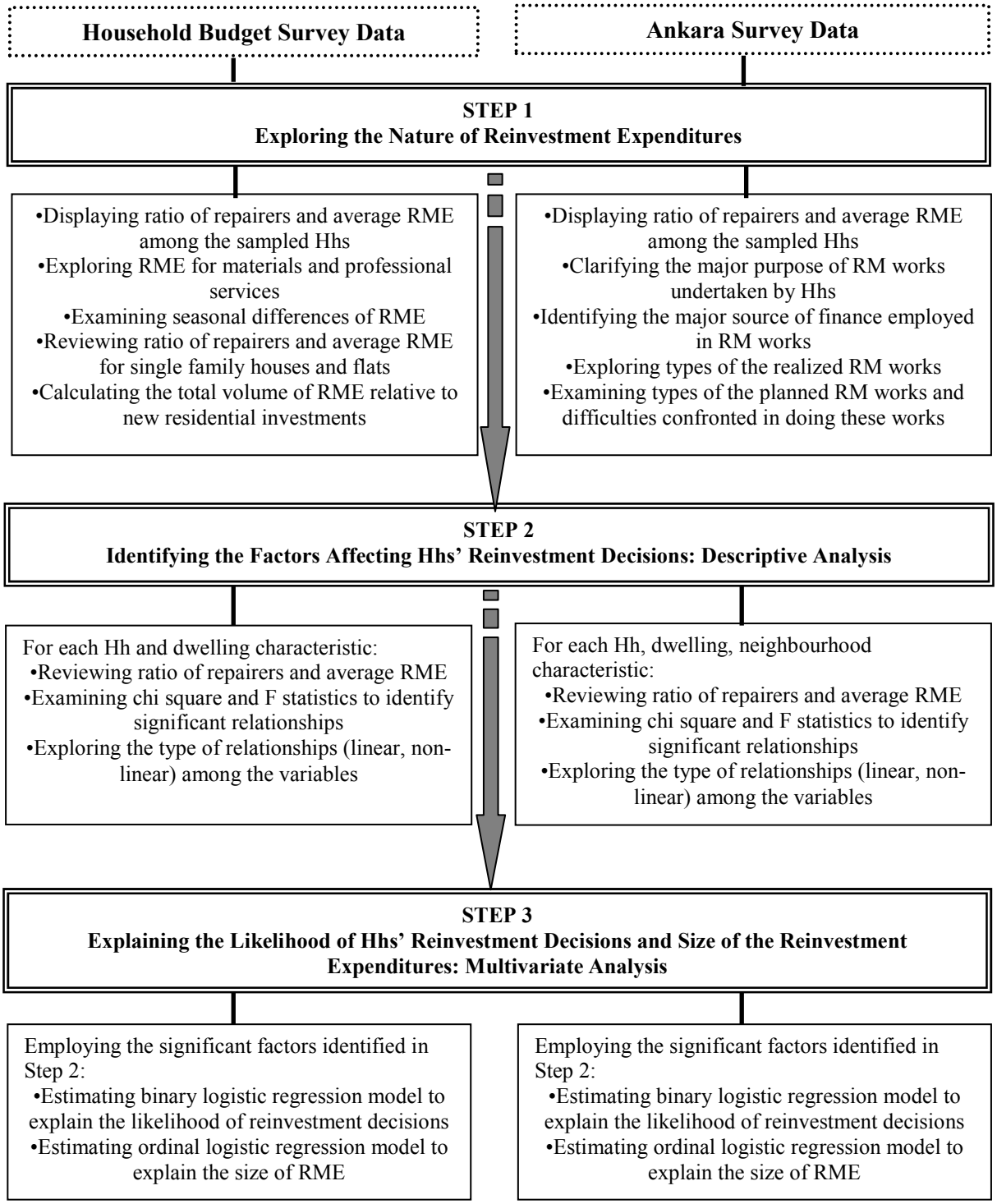


Figure 1.2: Flowchart Indicating the Structure of Analyses

In Chapter 4, the framework of empirical analysis is built up based on the previous research in the field as well as Turkey's own social, economic, and political dynamics. The factors

affecting the likelihood of Hhs' reinvestments and size of the reinvestment expenditures are investigated empirically for the Turkish case in Chapter 5 and Chapter 6. Additional information on the major purpose of reinvestments for Hhs, major source of finance employed in these activities, type of works undertaken, and the difficulties Hhs confronted in doing these works are presented in Chapter 6. The final chapter discusses the determinants and macro implications of Turkish Hhs' reinvestment behaviour, and the scope for reinvestment policies in Turkey.

CHAPTER 2

REINVESTMENT PROCESSES AND POLICIES IN HOUSING: A SURVEY OF THEORETICAL AND EMPIRICAL APPROACHES

2.1. Nature of Housing

The necessity to reinvest in existing housing stock stems basically from the nature of housing itself[20]. Housing has a number of peculiar characteristics which have direct implications on reinvestment processes. It is first convenient to embark on **durability**. Housing is a durable consumption good with a lengthy, though limited, economic life when compared to other consumption goods[21]. Due to this durable characteristic of housing, new construction always remains a small portion compared to existing stock, thus the quality of nations' housing is largely determined by the existing stock. However, during its lifecycle, housing is subject to deterioration and processes of obsolescence. 'Deterioration' is defined as the physical decay of building components due to ageing and Hhs' use. In other words, with the passage of time the services provided by housing units are lost to some extent due to ageing. 'Obsolescence', on the other hand, is usually defined as relative degree of uselessness or disutility as evaluated by different actors of the housing sector such as Hh, landlord or planner (Nutt et al., 1976). Both deterioration and obsolescence processes may result in the decline of house values, namely depreciation[22]. Yet, it is possible to retard or even reverse the effects of ageing by reinvesting for RM, and rehabilitation of the existing housing stock. However, this does not

[20] 'Housing' not only refers to a physical entity (dwelling unit) but also has social, economic, and psychological dimensions. Throughout this study, 'housing' refers to one or more of these dimensions depending on the context.

[21] 'Economic life of housing' can be defined as the useful life during which it serves occupiers.

[22] Though, in some cases aged housing stock may be more attractive for Hhs compared to the relatively new stock. For instance, in many European countries houses constructed before the 2nd World War have better qualifications (e.g. more living space, higher ceilings, higher architectural value, better design) compared to ones rapidly constructed in the post-war period in order to eliminate housing shortage.

preclude the fact that at the end of economic life the need for redevelopment becomes inevitable[23].

Housing is a more durable commodity than its user Hhs' life cycle, and discrepancies between the two frequently give rise to the need for revisions and therefore reinvestments. As Hhs progress through the life cycle, changes in Hh size and income result in different housing needs and preferences and changes in mode of life. Sabagh et.al. (1969) define Hh life-cycle stages from formation to dissolution as; (1) marriage (family formation), (2) pre-child (constant size), (3) child-bearing (increasing size), (4) child-rearing (constant size), (5) child-launching (decreasing size), (6) post-child (constant size), and (7) widowhood (family dissolution)[24]. For instance, in child-bearing stage increasing Hh size may trigger demand for more housing space, whereas in child-launching stage the need for housing space is decreased. Hh income, on the other hand, generally follows an inverted u-shape as Hh moves through the life cycle. This in turn affects housing consumption of Hhs in different life cycle stages. At a particular point in time a gap may exists between the Hh's desired level of housing consumption and the actual one provided by the existing standards of housing. Hhs have several options when such a need for adjustments arises[25]. Reinvesting in the existing housing is one of the options since it is a way of social and physical adjustment for Hhs. Another option may be a decision for moving elsewhere. When one Hh vacates a dwelling unit another Hh moves in. This underlines the fact that during their life cycle, housing units are transferred between Hhs whose characteristics and preferences differ. This indicates to existence of various reinvestment decisions and strategies.

Another distinguishing characteristic of housing is its **immobility**, in other words its being place-fixed. First conclusion to derive from this attribute is in physical terms. Housing has the qualities and constraints of land such as location and linkages with surroundings. During the development of a housing area existing social, political, economic and technological context is taken into account. With the passage of time, these circumstances change and new developments and land-use decisions take place in cities. Consequently, spatial pattern of

[23] Decision to redevelop or reinvest depends on several factors and in some occasions redevelopment becomes feasible (or preferrable) before the building reaches to the end of its economic life. Details of this discussion are given in Section 2.2.
[24] Some stages of this categorization do not apply to childless couples, and most are irrelevant to single persons. A review of alternative Hh life cycle models can be found in Schaninger and Danko (1993).
[25] A detailed discussion of Hhs' adjustment options exists in Section 2.3.3.

cities change, altering the distribution of employment, services, amenities, and new residential areas. This alteration works in favour of some neighbourhoods whereas affecting others adversely (such as locational obsolescence). Moreover, as Lichfield (1988) emphasise, changes in human, social, economic or natural environment make buildings less suitable for the needs they serve and they become environmentally unsuitable (environmental obsolescence). In a changing housing market, the signs of locational and environmental obsolescence are observed in existing housing areas. These two types of obsolescence are exogenous to Hhs and can not be retarded by individual reinvestments. Therefore, existence of locational and environmental obsolescence is expected to trigger Hhs' mobility decisions. Even in such cases, reinvestments may be promising for efficient use of existing resources, especially in the form of conversion of uses.

Second interpretation of immobility is in social terms. Housing as attached to a neighbourhood, is subject to negative and positive changes that occur in its surrounding area, namely, neighbourhood effects. Due to its immobile nature, housing is not only perceived with its own physical features but also with the characteristics of its context. Characteristics of the surrounding area affect the desirability of the residence. Housing is seen as a 'package' which also includes the physical appearance of the neighbourhood and the social character of people living in it (Smith, 1970). Neighbourhood effects in this context are not restricted to neighbouring land-uses, physical condition of the neighbourhood, social characteristics of the neighbours (race, ethnicity, income, etc.), but also include behaviour of neighbouring actors. Thus, reinvestment decisions in housing are not solely realized with regard to the physical and structural characteristics of housing unit, but also with regard to the neighbourhood characteristics, reinvestment behaviour of neighbouring actors, and Hhs' predictions about the future of neighbourhood.

In addition to its durability and immobility, housing is also **structurally inflexible**. Housing units are developed with a specific construction technology and set of materials, with regard to Hh demand and mode / style of their time of production. Thus, flexibility of housing is limited by its technological, material and architectural attributes. Consequently, the configuration of a house when it was originally constructed affects the alternatives into which it can be transformed in the future (Galster, 1987). When possible outputs of reinvestments are not sufficient for occupier Hhs to meet their expectations then housing units are

transferred to Hhs whose housing preferences are more modest. These individual transactions affect neighbourhoods in aggregate resulting in the changing social composition and therefore changing reinvestment behaviour. Moreover, structural inflexibility is sometimes a reason for preferring redevelopment alternative to reinvestment when demanded alterations are not possible to apply in existing dwelling units.

These peculiar characteristics of housing provide insights about the reinvestment processes and Hh reinvestment behaviour in housing. In the following sections of this chapter first, reinvestment decisions are examined as economic decisions to underline comparative advantages of reinvestment and redevelopment. Secondly, previous studies in the field are reviewed to understand Hhs' role as major actors of reinvestments and to identify macro implications of Hhs' reinvestment behaviour. Then, a brief presentation of existing policy approaches to reinvestment processes is made to explore the policy alternatives in different contexts. This is followed by a review of previous theoretical and empirical studies in order to penetrate reinvestment processes and Hhs' behaviour. In the final section of this chapter contributions of theoretical and empirical studies on this research are presented.

2.2. Reinvestment as an Economic Decision

Reinvestment processes in housing have captured attention of researchers since the late 1960s due to changing housing policies by the end of that decade. Housing shortages have been the major public problem in many countries after the Second World War, and quantity of housing remained as a problem until the end of 1960s. Public policy and allocation of resources aimed at new construction in order to increase housing supply, and minor attention paid to improvements in the existing housing stock (Skifter Andersen, 1999). In the late 1960s, elimination of housing shortage to some extent and social objections stemming from the earlier massive clearance experiences resulted in a policy shift highlighting qualitative aspects of housing. Moreover, problems faced in aged housing stock, and high costs accruing in the redevelopment of such properties raised the question whether redevelopment or rehabilitation was more feasible at unit property and at an aggregate level (Needleman, 1965, 1968, 1969; Sigsworth & Wilkinson, 1967; Schaaf, 1969). Consequently, an economic debate was launched on the comparative economics of redevelopment and rehabilitation in improving the quality of housing stock basically by means of public resources.

One of the pioneering studies in the field discussing the decision to redevelop or rehabilitate is Needleman's book 'The Economics of Housing – 1965'. Comparative advantages of rehabilitation and redevelopment are briefly discussed in his study, and a feasibility analysis for these alternatives in improving the quality of housing stock is presented. Needleman perceives rehabilitation as a less time consuming method to apply, and less dependent to weather conditions compared to redevelopment, avoiding fluctuations in the construction industry. However, the standards of the rehabilitated property are likely to be lower and its useful life shorter when compared to a newly built property. As the budgetary constraints are considered, clearly less capital is engaged in rehabilitation. From the local authorities' point of view, given a specific budget, this means more housing units to be improved by rehabilitation when compared to rebuilding. Moreover, rehabilitation produces less social disturbance than redevelopment. Yet, rehabilitation is practicable only when the building is structurally sound but lacks facilities for modern living. This has also limitations since buildings are structurally inflexible and deficiencies of design or fittings may sometimes be impracticable or too expensive to alter. In contrast, redevelopment schemes can avoid this problem.

'From the purely economic view', the redevelopment versus rehabilitation question is often resolved on the basis of least-cost approach (Schaaf, 1969). Needleman (1969) claims that two kinds of decision criteria are applicable for social investment problems of this type. First one is choosing the project which maximises the present value of benefits less costs, subject to budget constraints. However, measuring the benefits is usually extremely difficult. An alternative approach is choosing the method which minimize the costs for providing accommodation in a given quality standard. Needleman applies cost minimization approach first to decide between rehabilitation and rebuilding of a single dwelling, and then considers improving the quality of a housing area. In this method, investment for rehabilitation is a postponement of redevelopment to some future point in time. In other words, this method compares rebuilding now and rebuilding in the future. Basically, the comparative cost of rebuilding or rehabilitation depends on (i) the rate of interest, (ii) the future length of life of

the renovated property, and (iii) the difference in annual running costs and rents of the modernized property and the rebuilt one[26].

Following Needleman, Schaaf (1969) also examines the economic feasibility of housing rehabilitation as compared to redevelopment. His contributions in the field can be identified in three points. First, he proposes to consider the annual depreciation rate of the new structure since what is built is to depreciate through time, and any investment analysis is limited to a period equal to the length of life of the new building. Second, he refers to a major shortcoming of the Needleman's formulation that in reality there is no single renewal standard, and different standards for rehabilitation and new construction are possible. He then takes different levels of renewal standards into account such as 'code compliance', 'structural repair', 'modernization', 'prestige rehabilitation', and 'new construction'. And finally he points out that a new structure may provide a higher level of shelter amenities than a rehabilitated one, thus, he employs the annual rent differences between a new structure and a rehabilitated one to reflect the level of shelter amenities[27].

Needleman's arguments are criticized by Sigsworth and Wilkinson (1967) on the basis of being biased in favour of rehabilitation and simplifying a complex decision making process solely to economic analysis. Rather they underline that both rehabilitation and redevelopment are required, but the emphasis needs to be on redevelopment, and social factors in addition to organisational and administrative factors must accompany economic factors in such a decision making process. Merrett (1979) also criticises Needleman approach, in the context of British urban renewal policies. He informs that state's renewal policies since 1950s stimulate rehabilitation within the private sector while discouraging local housing authorities from municipalisation and the consequential work of rehabilitation. Similarly, redevelopment

[26] For Needleman (1969, p. 198) the decision rule is rehabilitate if:

$$b > M + b\,(1+i)^{-\square} + \frac{r+p}{i}\,[1-(1+i)^{-\square}]$$

where b = the cost of demolition and rebuilding,
M = the cost of adequate modernisation or rehabilitation,
i = the rate of interest expressed as a proportion,
$\square$ = the useful life of the rehabilitated property, in years,
r = the difference in annual repair costs,
p = the difference in rent per dwelling on rehabilitated and newly built property.

[27] Schaaf's article is based on Needleman's book (1965), there Needleman does not consider the difference in rents of the modernized property and the rebuilt one, an issue which he later takes into account in an article in 1969.

activity is basically reserved for the authorities rather than private enterprises. Consequently Merrett argues that Needleman, ignoring the **question of agency**, presents an 'illusory choice' between rehabilitation and redevelopment. Needleman analyzes the issue from local authorities' point of view (as does Schaaf), however, Merrett emphasises that if cost comparisons prove that rehabilitation is a superior alternative then it takes place only if owner-occupiers and private landlords choose to do it. In fact, Needleman is not totally ignoring the question of agency. Rather, he argues that private enterprises are unable to maintain the housing stock in good condition; therefore State by default has the task to modernize or replace the dilapidated housing stock. Moreover, he underlines that complete acquisition of the dilapidated stock by State is indispensible in this process.

Although criticised in several aspects, Needleman approach (or the cost comparison approach) to redevelopment versus rehabilitation question is still a powerful tool for administrations which provides the basic inputs for housing policies in terms of stimulating new building or reinvestments. In the late 1960s, economic burden of redevelopment accompanied with shrinking public budgets and expenditure cuts compelled administrations to favour least-cost approaches in their policies. Reinvestment was such an approach to improve the quality of existing housing stock, and the major actor of reinvestments was the private sector, particularly Hhs in owner-occupied housing. Increasing interest in the improvement and rehabilitation of existing housing stock brought Hhs to the centre of policy-making as the main actors of reinvestments. In the UK, for example, from the late 1960s, housing policy shifted from 'comprehensive redevelopment' to 'housing and neighbourhood rehabilitation', and over four million private dwellings have been improved with the aid of government subsidies to individual homeowners since the early 1970s (Gibson, 2003).

2.3. Review of Macro Implications of Households' Reinvestment Behaviour

Privately or publicly owned, owner-occupied or occupied by tenants, in existing housing stock reinvestment decision is still a relevant social policy area. Owing to the Hhs' central position in reinvestment decisions, Hh reinvestment behaviour has extensively been investigated by numerous research efforts in the world scientific literature. Although reinvestment decision is a micro level activity, Hhs' decisions often have broader implications at the macro level beyond improvements in Hhs' individual well-being. Macro level

implications have been less emphasized however, only partial aspects of the issues like depreciation of housing, or volume of improvement expenditures studied. Based on such research, macro implications of Hhs' reinvestment behaviour can be reviewed under a number of subtitles:

2.3.1. Reinvestment Behaviour and Depreciation of Housing

In the housing literature, depreciation is broadly defined as the decline in house values due to ageing. This definition is broad enough to cover both physical deterioration and other processes of obsolescence (Lichfield, 1956). Central in the field of maintenance theory is the relationship between Hhs' maintenance expenditures and depreciation rates of housing (Sweeney, 1974; Chinloy, 1980; Arnott *et al.*, 1983; Shilling *et al.*, 1991; Knight & Sirmans, 1996; Harding *et al.*, 2007; Wilhelmsson, 2008). Hhs' reinvestments for maintenance are argued to slow or even reverse the effects of depreciation on the value of housing services. Findings of a recent empirical study indicate that in the absence of maintenance, housing depreciates at approximately 2.5 per cent per year, while maintenance lowers the depreciation rate to roughly 2 per cent per year (Harding *et al.,* 2007). In another study, poorly maintained houses are displayed to depreciate at a much faster rate, by almost 1 per cent per year, than do houses with average maintenance, and that well-maintained houses has had the effects of age retarded by 0.17 per cent per year (Knight & Sirmans, 1996).

In this context, the relationship between 'mode of tenure' and 'tendency to maintain' has also been attended. It is argued that owner-occupied housing units tend to be better maintained than rental units (Grigsby, 1963; Sweeney, 1974; Shilling *et al*., 1991). Empirical evidence supports this argument displaying that tenant-occupied dwellings depreciate faster than owner-occupied ones approximately by 0.5 per cent per year (Shilling *et al*., 1991). Moreover, owner-occupant landlords in proximity to their rented property are displayed to have higher likelihood of rehabilitation investment tendencies than landlords residing elsewhere (Mayer, 1981). Consequently, Hhs' reinvestments help effective use of housing by preserving or even improving the standards of both physical structure of the housing unit and the services provided by it. In the absence of Hhs' reinvestments, declining asset values and losses from the existing housing inventory is unavoidable.

2.3.2. Reinvestment Behaviour and Neighbourhood Quality

Hhs' reinvestment behaviour is not only seen as a determinant of housing quality but also of the quality of nations' housing stock and neighbourhoods (Winger, 1973; Dildine & Massey, 1974; Galster, 1987; Littlewood & Munro, 1996). Accordingly, understanding the behaviour of individual agents, contributing to the aggregate dynamics is considered a precondition to understand neighbourhood dynamics (Galster, 1987). Studies in this context analyse Hhs' reinvestment behaviour in order to elaborate an understanding of neighbourhood change. Depending on the high share of privately-owned dwellings in US cities, it is argued that basically the current reinvestment decisions of private owners (decisions to repair, modernize, or expand existing houses) determine the changes in housing quality in many neighbourhoods, rather than new construction or direct governmental action (Dildine & Massey, 1974). A similar argument is maintained also for the UK where owner-occupation has been the dominant tenure since the 1970s. Accordingly, the majority of British Hhs have a role both in the production, and in the consumption of housing services, being responsible for the maintenance of the greater part of the housing stock; therefore, the problem of disrepair in housing can be explained by examining why owner-occupier Hhs refrain in reinvestments (Littlewood & Munro, 1996). These imply that Hhs' reinvestment behaviour is a key for maintaining and improving the quality and the standards of housing services and living environments in cities.

2.3.3. Reinvestment Behaviour and Household Moves as Correlates

In the context of housing consumption adjustments, Hhs' reinvestment and mobility decisions are believed to be correlated (Seek, 1983; Shear, 1983; Boehm & Ihlanfeldt, 1986; Potepan, 1989; Montgomery, 1992; Littlewood & Munro, 1997; Baum & Hassan, 1999; Mandič, 2001; Sinai, 2001). The need for adjustments arises when Hhs are faced with a discrepancy between the desired or optimal level of housing consumption and the actual one. For some researchers, Hhs' adjustment options are limited to a simultaneous decision between the discrete alternatives of moving or improving (Shear, 1983; Boehm & Ihlanfeldt, 1986; Potepan, 1989; Montgomery, 1992; Sinai, 2001). For others, moving and improving decisions can be integrated, providing a viable alternative adjustment option to Hhs (Seek, 1983; Littlewood & Munro, 1997; Baum & Hassan, 1999; Mandič, 2001). This implies that Hhs may not intend to

reach desired level of housing at the time of moving, rather they can deliberately choose a relatively lower amount of housing services with the intention of improving it through time (Littlewood & Munro, 1997). Then, it is possible to observe the move and improve strategy through reinvestment behaviour and expenditures of recent mover Hhs. Moreover, recent movers are displayed to undertake more consumption oriented investments, whereas Hhs with mobility plans in the near future are often engaged in investments aimed towards selling if at all (Littlewood & Munro, 1997). These two different motives have differing implications on the quality and on the value of existing housing stock. Consequently, Hhs' reinvestment decisions must be considered as an integral part of mobility decisions in order to develop a better understanding of housing adjustments.

2.3.4. Reinvestment Behaviour and Residential Investments

In many countries, reinvestment processes have become a focal tool of housing policies, and measures have been developed to encourage Hhs' reinvestments. These are usually partial financial supports to reinvestment expenditure, and they are conditional upon Hh and dwelling attributes[28]. By the aid of these supports, volumes of reinvestment expenditures realized by Hhs have grown in time, and have become almost as significant as investments in new construction. For instance, it was estimated for US cities that, volume of reinvestment expenditures in housing was approximately 59 per cent of the value of new housing construction in year 2000, and 68 per cent of the reinvestment expenditures were realized by homeowners[29]. Also in France, where some subsidies are available both for new construction and for reinvestment works, nearly 60 per cent of total residential investments were composed of reinvestments in 1993 (Donner, 2000). This ratio remained approximately 50 per cent during 2000-2002, despite declining state aid to reinvestments (Ball, 2005). Consequently, the attention reinvestment expenditures capture in the residential investment debates has increased, and understanding the nature of reinvestments (determinants, incidence, timing, etc.) is argued to be a precondition for a thorough understanding of residential investments

[28] There are also other measures such as investments of local authorities for green and open spaces, infrastructure, etc. which are directed especially to declining neighbourhoods to attract Hh demand to these areas and to encourage resident Hhs' reinvestments in these neighbourhoods. A detailed discussion of existing policy approaches to reinvestment processes are presented in Section 2.4.

[29] Data related to 'expenditures for residential improvements and repairs', and 'value of new construction put in place' are obtained from U.S. Census Bureau, Current Construction Reports, C50/01-Q1 and C30/01-1, www.census.gov.

(Mendelsohn, 1977; Boehm & Ihlanfeldt, 1986; Galster, 1987; Potepan, 1989; Montgomery, 1992; Bogdon, 1992; Reschovsky, 1992; Holmans, 2004). It is usually assumed that demand for investment in housing is dominantly for new construction. Yet, there is the possibility of investing by improving the existing housing stock (reinvestments) and without an understanding of reinvestments; an understanding of housing investments remains incomplete (Montgomery, 1992).

One may also assume that although new investments are affected by numerous factors and fluctuations in the national and even global economy, reinvestment activities are relatively immune to volatile impacts of such changes. It may be interesting to explore the differential effects of the current global financial crisis. While new investments were dramatically reduced, it is probable that the reinvestment trends remained relatively constant. During the current economic crisis, reinvestment activities are perceived as a way to stimulate production activity in the construction sector, and to maintain demand for labour. 'European Economic Recovery Plan' (COM, 2008) declared by the Commission, for instance, encourages investments for measures improving energy efficiency in existing building stock as a way to create jobs and save energy.

2.3.5. Reinvestment Behaviour and Housing Supply

Improvement of the existing housing stock and Hhs' reinvestment decisions are also relevant in the context of housing supply. Several studies indicate that in forecasting future housing supply, adjustments to the existing housing inventory must be taken into account as an alternative mechanism to the production of new housing (Merrett, 1982; Boehm & Ihlanfeldt, 1986; Potepan, 1989; Dipasquale, 1999). Since housing is a durable good, not only new housing production decisions but also reinvestment decisions in existing housing stock are the determiners of housing supply[30]. Conversions of uses, extensions, upgrading, joining and subdividing decisions in existing housing stock are among reinvestments that can affect housing inventory. However, very little is known about the scale of these investment initiatives and about their contribution to the housing inventory. A better understanding of

[30] It must be noted that population trends play a significant role in forecasting future housing supply. The demand for new housing investments is expected to be low in urban areas with shrinking population. It is probable that reinvestment activities are intensified in those areas.

home improvement decisions could lead to more effective housing policies, since these improvements are primary supply adjustment mechanisms in existing neighbourhoods (Mendelsohn, 1977).

It is possible to extend the list of macro implications of Hhs' reinvestment behaviour[31]. A number of conclusions can be derived from the literature reviewed above. Accordingly Hhs' reinvestments for RM, and rehabilitation:

- prevent unnecessary losses from existing inventory,
- extend economic life of the housing stock,
- preserve asset values and secure value increases,
- improve the standards of housing services and living environments,
- help to adjust housing consumption with regard to the current needs and trends,
- act as a supply adjustment mechanism.

Thus, it is not only individual Hhs but also overall economy that is affected by reinvestment decisions (e.g. upgrading, joining / subdividing operations, replacing structural components of dwelling). In this respect, reinvestment decisions comprise both a major social policy area and a significant topic of research and implementations in urban planning. Therefore, developing an understanding of Hhs' reinvestment behaviour is a contribution to decision-makers and urban planners in designing finer policies and interventions for existing housing stock and neighbourhoods.

2.4. Existing Policy Approaches to Reinvestment Processes

In countries, where the role of Hhs' within reinvestment processes is well understood, policies and programmes have been developed to trigger and monitor Hhs' reinvestment tendencies. Measures and instruments for this purpose are basically provided as part of the planning legislation, building codes, tax legislation, rent acts or in some cases special legislation for reinvestment works are prepared. Policies are targeted especially to Hhs who are unable or

[31] For instance, Hh reinvestment decision may also be considered as an indicator for Hh saving capacity for purchases in new stock; yet none of the reviewed studies investigated the issue from this point of view.

unwilling to reinvest to their dwellings or dwelling units which are in urgent need of reinvestments.

In the UK and Sweden for instance, planning legislation provides local authorities with powers to compel owners to renovate or sell their properties. Yet, these types of direct measures are seldom used (Skifter Andersen, 1999). In some cases, regulation of tenure provides a number of useful instruments for housing rehabilitation. For example, in regulated buildings of Danish private rented housing, rents are determined with respect to expenditures which cover running costs (cleaning, taxes, insurances etc.), a fixed capital yield to the landlord, a certain amount per dwelling for administration as well as fixed transferences for maintenance (Skifter Andersen, 2008). Money collected for maintenance is allocated between a maintenance account for the property and a central fund which is employed for housing rehabilitation in private rented sector (Hansen & Skifter Andersen 1999). Regulation through the taxation of property is another instrument for building a capacity and triggering Hhs' reinvestment decisions. For instance in France, tax relief provides a significant incentive for improvements and repairs in owner-occupied housing of specified age. The tax reduction is basically 20 per cent of the total improvement costs with a certain ceiling, which increases with the number of children in the family (Oxley *et.al*, 1999).

In addition to these, provision of grants -usually from the general housing finance system through special schemes- is among the most frequently employed instruments. This is an indirect regulation to make reinvestments attractive. For instance, in the UK, grants for different tenure types are provided (subject to means-test) to improve the standards of housing services and living environments both at single property level upon individual application, and at renewal areas as declared by local authorities. Designation of renewal areas is another instrument for intervening in the existing housing stock and environments experiencing many problems. This instrument is usually provided by special programmes. It makes possible for local authorities to cope with the problems simultaneously by the concentration of public investment in the defined area, generating economies of scale, and greater degree of control over materials used and higher level of expertise which secure higher standards (Leather, 1999, 2000).

2.5. Review of Theoretical and Empirical Studies

The basic modelling approach in reinvestment literature posits rational and optimising Hhs in their reinvestment decisions in order to maximize their perceived well-being. Hhs' reinvestment behaviour has been examined by a number of researchers who have utilized various data sources and employed a variety of models. Winger (1973), Mendelsohn (1977), Mayer (1981), Shear (1983), Boehm and Ihlanfeldt (1986), Montgomery (1992), Littlewood and Munro (1996), Baum and Hassan (1999) can be given as examples. All of the studies, excluding Mayer's, investigate owner-occupants' reinvestments. Mayer's study (1981) is among the very few studies which examines the rehabilitation decisions of landlords in rental market. In Appendix A, summary of these studies with respect to their 'definition and actor of reinvestment', 'identified adjustment options', 'utilized data', 'dependent - independent variables', and 'methods of investigation' can be found. It must be noted that the scientific literature referred here is fundamentally dominated by research on the US Hhs and housing stock. Only the last two studies reviewed are examples from the UK and Australia. This review could be organized in many ways, for instance existing studies can be categorized with respect to the researchers' view regarding the benefits of reinvestments as consumption and / or investment. Yet, another grouping may be possible with respect to adjustment options considered by researchers i.e. improve, move, move and improve, etc. In this study, rather than categorizing the previous literature, the review is presented in a chronological way. Since most of the studies reviewed here have been built upon each other, chronological presentation helps to follow emerging views and their criticisms parallel to the evolution of the reinvestment research.

Winger's (1973) article, in search of the internal determinants of homeowners' upkeep spending, is among the earlier studies. For him, besides external factors (e.g. neighbours and neighbourhood effects), there are also a number of internal factors, such as certain Hh and dwelling characteristics, associated with the upkeep decisions of urban homeowners. He notes that the relation of these internal factors with upkeep investment must be considered simultaneously. However, his study is restricted with the available data, and the data sets he employs do not permit for such a simultaneous consideration. He examines a sample of homeowners with positive upkeep expenditures utilizing two different data sources. Data from the Federal Housing Administration, area summaries of estimates of the yearly

maintenance cost, is the first database. It provides dwelling characteristics and it is available for 1966-67 period. Second database is The Survey of Consumer Finances, which includes observations on Hh estimates of actual expenditures on improvement and repairs, and Hh characteristics for 1964-65 period.

For Winger, upkeep is an investment decision and upkeep expenditures are means by which homeowners alter their housing investment. Consequently, the profitability of upkeep investments need to be considered, and he evaluates it in terms of expected income streams, prices or costs, and the market rate of interest[32]. As he notes, the owner (as 'homo-economicus') chooses the upkeep level which maximizes the present value of his investment. His framework allows only two different strategies; to maintain the quality of existing structure by different levels of investments or to do nothing. He adopts a linear regression model to investigate the relations. He notes that four forms of the regressions were calculated: linear, semi-logarithmic, double-logarithmic and inverse semi-logarithmic. He reports linear relations since none of the transformations provide a better 'fit' to the data. His empirical findings display that larger homes require more expenditure to maintain normal depreciation than smaller ones, high family income results in high expenditure levels, and being middle aged is positively correlated with upkeep expenditures while being old or young vice versa.

Another pioneering study in the field belongs to Mendelsohn (1977). He attempts to provide evidence on the behaviour of owner-occupiers in their dual roles as consumers and investors in single-family housing. For him, the dwelling unit occupied by homeowners is both a consumption good which provides living quarters, and a significant component of Hh investment portfolios. He develops a housing improvement model, in which Hh utility function is based on housing, other consumption goods, assets, and leisure time, conditional upon the Hh discount rate. He denotes that utility maximization is subject to budget and time constraints. Similar to the Winger's work, Mendelsohn also considers two options for homeowners: to improve or not. However, unlike Winger's sample, Mendelsohn examines a mixed sample of homeowners composed of both improvers and non-improvers. He examines the probability and size of nonzero improvement expenditures by utilizing a national sample of 'Residential Alterations and Repairs' collected quarterly by the Census. This data covers

[32] Income from home ownership, in this context, refers to imputed rent, which is a function of the value of housing service received.

detailed descriptions of the type of repairs and alterations made, the amount of each expenditure, who did the work, whether money was borrowed, and how much money was spent on materials, value and age of the dwelling, and information about the owner for 1971-72 period. However, variables such as knowledge about the owner's skills, the time he invested in repairs, the size of the house, its condition, the neighbourhood, and the exact location of the house are not available.

He attempts to explain the pattern of maintenance expenditures where many observations are zero and concludes that the pattern could be a result of two interdependent but separate decisions: whether to make an improvement and how extensive the improvement should be. He employs this sequential model and presents the maximum likelihood estimates of the coefficients for the probability of nonzero expenditures estimated by the 'logit' model. Additionally he presents ordinary least squares (OLS) estimates of the coefficients for the size of nonzero expenditures, estimated by a linear model. He adopts dwelling and Hhs characteristics as independent variables. However, for him variations in neighbourhood quality and prices are also a significant part of the analysis. Yet, the data he employs does not provide necessary neighbourhood variables, forcing him to utilize several locational variables as proxies. His empirical findings indicate that, higher incomes increase the frequency of nonzero expenditures and their size significantly, and the probability of hiring outside help. Moreover, younger owners are reported to perform their own work more frequently than elderly Hhs and they spend less than middle-aged owners. Elderly Hhs, on the other hand, spend about as much as middle-aged owners although they invest less often. Blacks, with a lower probability of making expenditures, spend compensatingly larger amounts. Also, the likelihood of nonzero expenditures declines with the length of stay in the dwelling, yet size of expenditures are increased at the same time. Finally, outside help is more frequently employed with older and higher-valued homes, which may reflect the difficulty and desired quality, respectively, of the requested improvements.

Studies of Hhs' reinvestment behaviour generally consider homeowners as a focus of research. There are few studies which investigate reinvestment decisions in rental housing[33]. Mayer's study (1981), which presents an analysis of individual landlords' housing rehabilitation decisions, is among them. In his model, rehabilitation investment means capital stock adjustment by a profit maximizing landlord. If landlord invests in his property this is in order to increase the capital stock in his building from its initial level (during the period of observation) toward a profit maximizing level. In Mayer's model, a landlord's income is assumed to depend on the housing services he provides (thus it is related to the capital stock), and current maintenance investments. An optimal level of capital stock exists that maximizes his profits for given market conditions. The likelihood (I) that landlord undertakes some rehabilitation investment is taken in his analysis to be a function of the difference between optimal level of capital stock (K*) and the initial level (K_0)[34]. Large and positive differences indicate that potential additional profits are large for moving to the optimal capital level, providing incentive for the landlord to undertake investment.

Mayer's (1981) study of rehabilitation decisions by landlords based on two options, to rehabilitate or not, displaying no differences than studies focusing on homeowners. He utilizes a micro data that belongs to Berkley, California, which permits separate consideration of a broad range of investment determinants. It covers randomly selected structures within building size classes (5% of single-family, 10% of duplexes and triplexes, and 20% of larger buildings). The subset of those structures which contains one or more rental dwellings forms the sample of Mayer's study. His data, similar to Mendelsohn's, covers both investor and non-investor landlords for rehabilitation. He employs conditional logit analysis to estimate his model, with two possible outcomes for any building – some or no rehabilitation. He explains his reason for selecting a logit rather than OLS formulation with the dependent variable of his analysis taking discrete values within a narrow finite range. His empirical findings suggest that neighbourhood characteristics affect rehabilitation activity through their impacts on additional rents for better quality buildings. Building component conditions are also proved to

[33] Helbers and McDowell (1982) examine tenants' investment in repair and improvement, whereas Moorehouse (1972) examines landlords' maintenance behaviour. Also Sweeney (1974) develops a theoretical model for the assertion that 'owner occupied units tend to be better maintained than rental units'. However, he did not apply his model empirically. Moreover, Arnott et. al. (1983) investigate landlords' profit maximization problem in a theoretical study.

[34] $I=f(K^*-K_0)$ where I is the likelihood of some rehabilitation investment occur, K* is optimal level and K_0 is initial level of capital stock (Mayer, 1981, p.78).

affect rehabilitation activity. Poor conditions observed in appearance-oriented components increase likelihood of rehabilitation to occur. However, poor conditions observed in basic structure/service components results in decreasing likelihood of investment. For example, deteriorated building exterior, porches and stairs, and roofs leads to more rehabilitation; whereas poor conditions of electrical system, plumbing, heating, and foundation discourage it. Moreover, Mayer's analysis displays that greater building age results in more rehabilitation and is thus not an obstacle for rehabilitation when other conditions are favourable. Furthermore, owner-occupant landlords are found to have higher likelihood of rehabilitation investment than other landlords.

Another model of housing rehabilitation decisions is developed and applied by Shear (1983) for Hhs in owner-occupied housing units. This study is significant since it includes characteristics of Hh, dwelling unit, and neighbourhood all together as independent variables. Furthermore unlike the previously mentioned studies, Shear's study allows moving as an alternative option which can take place simultaneously with rehabilitation decisions. Shear argues that, rehabilitation decision by homeowners can not be adequately explained without relating it to the move decision. And he criticizes Mendelsohn (1977) for not considering the effects of neighbourhood or dwelling unit characteristics, changes over time in Hh and neighbourhood characteristics, and the Hh move decision as an alternative to home improvements. He examines determinants of the homeowners' rehabilitation investment decision in a two-period model. In the first period, basic decision for Hh is 'whether to undertake and bear the costs of rehabilitation in its initial housing unit' and 'whether to move out of its initial housing unit and bear the costs of moving'. In the second period, non-mover Hhs derives utility from the housing services supplied by their initial housing units. On the other side, mover Hhs realize the returns and costs of their initial housing units in the sale price. Additionally, movers also derive utility from the housing services supplied by their new housing units in the second time period and bear the associated cost of that unit.

Shear (1983) relies on data in the Annual Housing Survey (currently called as American Housing Survey) for 1974-1977 period. Observations represent single-family, detached, owner-occupied housing units, come from a group of fifty large Standard Metropolitan Statistical Areas (SMSAs). Central city or suburban status for the observations can be identified from the data. He uses this information in the construction of locational

characteristics that proxy the price of housing services. Rehabilitation is defined by data as alterations and replacements. The data indicates whether the rehabilitation was undertaken but not the monetary value of expenditure. He identifies different categories of Hhs among movers and non-movers with respect to their rehabilitation expenditures in different years. He employs multinomial logit analysis to explore qualitative choice behaviour and empirically estimate the simultaneous relationship between rehabilitation and moving behaviour. He applies separate multinomial logits for each rehabilitation activity (1) alterations and (2) replacements. Two major theoretical conclusions derived from Shear's study are strongly supported by the multinomial logit results. First one asserts that Hhs, who do not move, value their housing services differently in their rehabilitation decisions than Hhs who move and consequently face an external market price of housing services. Second conclusion claims that the ability of Hhs to adjust their level of housing services through rehabilitation undertakings affects their moving behaviour. Empirical results of Shear's analysis reveal that life cycle and other Hh characteristics are the best measured data and provide the clearest results. Younger Hhs, both non-movers and movers, display more rehabilitation investment. For older housing units, adjustments in the supply of housing services through alterations and replacements display to be easier and more common. The effects of neighbourhood change can be seen more obviously in the move decision. Hhs in declining neighbourhoods are most likely to face high levels of disequilibrium in their consumption of housing services since they are more likely to undertake no rehabilitation activities.

One of the most referred studies in the field belongs to Boehm and Ihlanfeldt (1986). Their study is significant in terms of their attempt to include variables measuring neighbourhood quality and option of expected mobility. In their study, homeowner is assumed to maximize the present value of the stream of net future benefits (including final sales revenue) produced by the house over the future time period the Hh expects to remain in the dwelling. In search of the determinants of home improvement expenditures, they note that due to the limitations of available databases previous studies focused primarily to internal determinants of the improvement decision. However, theory suggests that external factors such as the neighbourhood environment or the relative cost of improvement may also be significant. Consequently, their study focuses especially on the effects of external variables on the improvement decision.

Their model hypothesizes that improvement expenditures is a positive function of these expenditures' expected impact on resale value, the increase in housing services resulting from the additional expenditures, and the marginal valuation of housing services. Expenditures are expected to be negatively related to the effective property tax rate and the price of maintenance and improvement inputs. They utilize data from Neighbourhood Housing Services Project, covering a sample of homeowners reside in single-family detached housing units located in 20 neighbourhoods in different cities (1978-80). For each neighbourhood, first, interviews were carried with Hhs residing within a random sample of structures, and then same Hhs were reinterviewed in 1979 and 1980. Maintenance and improvement expenditures reported for the past year were taken from the 1979 and 1980 interviews and summed to form the dependent variable of the analysis. They present OLS estimations of magnitude of maintenance and improvement expenditures. They note that, experiments with a semi-log OLS equation, a Tobit model, and the two stage model (Mendelsohn model) were also done, however linear OLS estimates are reported since other models did not provide any better explanatory power. Empirical findings display that, eight variables; real income (+), crowding (-), house age (+), number of rooms (+), house condition (-), crime (-), the percent of neighbourhood properties with no exterior defects (+), and the construction cost index (-) are statistically significant and have consistent signs with the theoretical model. They argue that empirical evidence supports the hypothesis that factors external to the individual homeowner and his dwelling unit affect the magnitude of maintenance and improvement expenditure. With reference to Mayer's (1981) contribution on the effect of neighbourhood quality on housing improvement, they indicate that homeowners, like landlords, perceive the investment return to housing improvement to be greater in better neighbourhoods.

Montgomery (1992) also develops a theoretical model and investigates it in an empirical study in order to explain home improvements in the context of Hh investment in residential housing. She criticizes the model of Mendelsohn (1977), since he solely models homeowners that stays put and choose only between doing nothing and increasing housing stock by improving, excluding the possibility of homeowners to adjust their holdings of housing stock by moving. According to her, a model that includes solely the options of doing nothing or improving predicts that an increase in income leads to an increase in the probability of improving. Quite the opposite, a model that includes only the options of improving or moving up predicts that an increase in income leads to a decrease in the probability of improving. She

concludes that these models are only valid if the Hh's choices are nested. This means for Mendelsohn's model, the Hh must first choose to stay put and then choose between doing nothing and improving.

In Montgomery's theoretical model of improvement behaviour, homeowners simultaneously choose the level of housing stock to hold and the means by which they adjust their current holdings of housing stock in order to maximize utility. In her model, Hhs face a choice among four mutually exclusive options – move down, do nothing, improve, or move up. She employs American Housing Survey as the primary data source. This data covers information about the Hh, dwelling, and neighbourhood characteristics of the surveyed occupants of selected dwellings. The sample was recoded into four categories covering those who moved down in the last 12 months (the main reason for mobility is demand for a less expensive house), those who moved up (the main reason for the move is demand for larger unit or better quality dwelling unit, more expensive place, better investment, or improved conveniences), those who did not move and made zero expenditure on improvement, and those who did not move and made positive expenditure on improvement. All other movers giving a main reason than those listed above were dropped from the sample.

Montgomery (1992) includes most of the variables of previous studies in the analysis, which she finds significant such as Hh income, socio-demographic characteristics, dwelling characteristics, neighbourhood characteristics, and construction costs. Additionally, she attempts to capture the effects of variation in the relative price of housing with cross-sectional variation in house price and its appreciation rate. She presents estimated results for improvement expenditure equation, and the ordered probit models, one in which maintenance is included as improvement and the other in which it is not. Her findings display that the predicted impacts of changes in variables on the likelihood and level of improvement are generally consistent with previous studies; income (+), duration of stay (-), dwelling age (+), age of Hh (-), and minority status (-). She concludes that housing stock plays a significant role as wealth in influencing the level of expenditure on improvement, and variables affecting cost of improvement are also significant to study.

All of the above mentioned studies focus on reinvestment behaviour of Hhs in the context of US housing markets. Examples from other countries are very rare in the field. One of them is

provided by Littlewood and Munro (1996) in their attempt to explain the causes of disrepair by examining owner-occupiers' RM behaviour. They develop an analytical framework based on the dual nature of housing both as an investment and consumption good. They assume that basically rational individual decision making process determines improvement and maintenance behaviour, depending on owners' demands and preferences, subject to the costs and income constraints. They exclude move-stay decision from their model and reduce their analysis to the choice of whether to improve or not. Their reason for excluding mobility decisions lies in the fact that decisions to move is not only confined to disequilibrium in housing circumstances but also triggered by demographic, work or family related circumstances.

They estimate two different models based on The Scottish House Condition Survey. The first model is developed to explain the incidence of disrepair in Scottish housing whereas the second model explores the factors associated with the propensity of doing repair and improvement works. They employ logit modelling which enables a multivariate analysis of a discrete choice outcome. They also apply Multiple Classification Analysis in order to highlight the contribution of the different groups of exploratory variables to whether a Hh is experiencing disrepair and whether it has undertaken works. Their study reveals that Hh and dwelling characteristics as well as Hhs' perceptions of dwelling and neighbourhood are all contributing approximately equally to the probability of having undertaken some works. However, the current state of repair (or the probability of a house being in poor repair) is displayed to be related more strongly to the characteristics of the dwelling itself.

Empirical findings of their study on Hh income, age of the Hh head, length of residence, age and size of the dwelling are similar to the above mentioned studies. Moreover, their study reveals that older and larger dwellings are more likely to be in disrepair, yet they are also more likely to experience repair and improvement works in the previous year. These findings display that Hhs respond to the higher depreciation rates observed in larger and older properties however, their investments are either poorly directed or insufficient to offset the effects of depreciation. Additionally, flats are reported more likely to be in disrepair when compared to detached houses. Income and Hh savings are also reported to be significant in undertaking repair and improvement work but savings are reported to display stronger effects on the condition of house. Littlewood and Munro conclude that in general Hhs are not

ignorant about the physical state of their housing, rather Hhs' responses (especially who are older, have lived in the house longer, or are poorer) to poor conditions are rational. For them, a better understanding of owners' decision-making processes is vital to develop more properly targeted policy measures to improve the condition of the private housing stock.

Another significant study in the field concerning Australian homeowners is presented by Baum and Hassan (1999). Studies of residential mobility usually assume that changes within Hh's circumstances lead to residential dissatisfaction, which may inevitably lead to a decision to move. However, as Baum and Hassan emphasize, reinvesting in the existing housing may provide an alternative to moving, when faced with residential dissatisfaction. They investigate the residential mobility process by examining the decision to renovate rather than move. For them, once a Hh registers a given level of residential dissatisfaction, the available options may be (a) moving; (b) changing aspirations or preferences and staying; (c) renovating; or (d) some combination of a, b or c. They identify two separate groups of renovators; non-mover renovators and mover-renovators. They suggest that these groups may renovate for different reasons, and for non-mover Hhs, renovations may be considered as an alternative to moving when faced with residential dissatisfaction. They argue that there is a need to consider the residential decision process in much broader terms than simply moving or staying. For them renovating activity is an important part of the decision process.

They discuss the factors which may influence renovation activity of these two groups. With respect to the tenure type, their discussion of mobility and renovation is carried out for owner-occupants. For them, the ability to undertake substantial renovations is essentially reserved for owner Hhs and is considered as a tangible benefit of ownership. They employ data from the 1991 Housing and Location Preference Survey carried out in Adelaide, South Australia by the Australian Bureau of Statistics. The data were collected from a randomly selected sample of Hhs using a structured survey questionnaire which was administered face-to-face with the Hh head or the partner of the Hh head. It includes questions relating to Hhs' recent mobility decisions and the extent to which they had undertaken renovations and alterations (regarding the last five years prior to the survey). They adopt bivariate and multivariate analysis for the discussion of renovation decisions. They first present crosstabulations between renovations and various socio-economic variables. Then, results of the logistic regression analysis are presented in order to investigate the effects of the independent variables on renovation

behaviour. Utilisation of logistic regression in this study is due to the dichotomous dependent variable, taking the value of '1' if the Hh renovated, '0' if the Hh did not renovate. The data for renovations includes major structural renovations and extensions, as well as minor repairs. They define 'renovators' as Hhs undertaking major renovations or extensions, distinct from the investors for minor repairs.

Empirical findings of Baum and Hassan (1999) reveal that for the entire sample; dwelling age, length of residence, purchase price, Hh type, and Hh income are significantly related to the likelihood of renovating. The likelihood of renovation activity is greater for couples with or without children, for high income Hhs, for Hhs having 6-10 years length of stay in the dwelling, for dwellings with $30 001 - $50 000 purchase price, and where the age of the dwelling is between 21-50 years. For the 'non-mover' sub-sample dwelling age, length of residence, Hh type, and Hh income are all significant when regressed against the dichotomous renovation variable (all results for the entire sample are valid for non-mover sample excluding purchase price). For the mover sub-sample; the age of the dwelling, Hh type, length of residence, and metropolitan location are significant when regressed against the dichotomous renovation variable. Renovations are more likely for couples without children, for Hhs living in the dwelling for 3-5 years, for dwellings located in the inner metropolitan region, and where the age of the dwelling is between 21-50 years.

In this section, previous theoretical and empirical studies investigating Hhs' reinvestment decisions are reviewed in order to exhibit the state of the art and to understand how scientific approaches perceive and investigate the issue of reinvestment behaviour. There are also other studies in the field, yet the selected ones (from the US literature) are the most commonly referred ones. The review of previous studies provides a number of clues for the design of this research. An evaluation of this survey is presented in the following section.

2.6. Findings of the Review

There are a number of conclusions to derive from the review of previous work. First one is related to 'purpose and main investigations' of the reviewed studies. Each of the studies reviewed investigates Hh reinvestment behaviour in order to shed light on a broader issue such as depreciation in housing, urban decline, residential investments, etc. They all examine

the determinants of individual Hh's reinvestment decisions. Most of the studies realize that reinvestment decision contains two separate but interdependent decisions, and therefore explore (1) factors affecting the probability / likelihood of a Hh to undertake reinvestment work, as well as (2) factors influencing the volume of reinvestment expenditures. This study also considers reinvestment decision as composed of two stages where Hh first decides whether to undertake reinvestment or not, then conditional upon the reinvestment decision size of the reinvestment expenditure is determined. All of the studies reviewed highlight the complexity of the reinvestment decisions which are underpinned by a mix set of factors related to:

- Hh itself (income, duration of occupancy, life stage, etc.)
- dwelling occupied by Hh (physical condition, size, value, etc.)
- neighbourhood which the dwelling is located (quality of services and environment, etc.)
- factors related to general policy environment and market (availability of grants, land-use decisions, availability and cost of labour, construction costs, availability of materials, etc.).

The effects of these factors on reinvestment decisions are explored in the reviewed studies, yet all analyses are confined to the factors provided by the utilized data sources. Thus, the second conclusion is related to the 'data used in the analyses'. All of the studies reviewed here, and also most of the studies which are not mentioned here use survey data. Yet, in most cases these surveys are designed for other purposes, but they include a number of variables useful for investigating Hh reinvestment behaviour. However, not all of the necessary variables are covered in these surveys, restricting the hypotheses of studies, and compelling researchers to adopt a bulk of proxies in place of the missing variables. Consequently, results of empirical analysis become difficult to interpret. In the Turkish case, a data source is available from the TURKSTAT's 2004 HBS which permits to investigate Hhs' reinvestment behaviour in some respects. Above mentioned limitations are also valid for this data, since the survey was not designed specifically to examine reinvestments in housing. Yet, the survey provides relatively a large sample size (8640 Hhs) and has an extended geographical coverage (urban-rural Turkey) which can not be easily achieved by individual initiatives. Moreover, TURKSTAT also provides some part of the HBS data as an interactive database on its website for five consecutive years which permits comparisons. Therefore, analysis of this data may provide some insights to Hhs' reinvestment behaviour. Yet, for a thorough investigation

of the issue, and in order to obtain data about the variables not considered by HBS, a survey research was designed and a Hh questionnaire was developed and implemented in Ankara in 2007-2008. Details of these data sources and related analyses are presented in Chapter 5 and 6 of this study.

Third finding is related to 'definition of reinvestment'. Almost all of the studies employ a different definition of their own for reinvestment. The same words such as 'improvement' (Medelsohn, Boehm & Ihlanfeldt, and Montgomery) or 'rehabilitation' (Mayer, and Shear) are employed, though reinvestment works covered under those headings differ from one study to another. This fact complicates comparison of the findings of different studies. However, a number of studies carry more than one analysis in order to observe variations in results by examining sub-categories of reinvestment. For example, Shear (1983) investigates the determinants of rehabilitation investments by mover and non-mover Hhs for (1) alterations and (2) replacements separately. Montgomery (1992) also presents two different models of Hh improvement behaviour in an attempt to explain likelihood and level of improvements, one in which maintenance is included as improvement and one in which it is not. Consequently, it may be argued that any analysis of reinvestment issues should include a clear definition of what type of reinvestment activities are covered in the analysis.

Another finding of the review is about the 'actor of reinvestment' whose behaviour is the subject of the study. All of the reviewed studies, except Mayer (1981), investigate the behaviour of homeowners (which refer to owner-occupiers in these studies) as basic decision-makers of reinvestments. However, there are also studies which investigate reinvestment behaviour of landlords and tenants (refer to footnote 33). As Baum and Hassan (1999) emphasize, the ability to undertake substantial renovations is essentially reserved for owner Hhs and is considered as a tangible benefit of ownership. However, in the Turkish case the rate of tenancy in urban areas is 29 per cent in the (privately owned) stock by 2006 (TURKSTAT, 2002-06), and urban housing stock accommodates both owner-occupiers and tenant Hhs. Thus, investigating the reinvestment behaviour both in owner-occupied and rental stock may provide a more complete understanding of reinvestment decisions.

A final conclusion is about the 'framework of investigation and method of analyses' adopted in these studies. Usually researchers with a background in economics first present quantitative

economic models of Hh reinvestment behaviour based on the 'profit' or 'utility maximization'. They, then undertake empirical analyses to test the results of their models. On the other hand, researchers having roots in urban planning or urban sociology prefer to adopt conceptual or analytical frameworks rather than economic models. Both methods are considered equally promising and useful in guiding empirical analyses. Yet, throughout this research the second method is preferred since it has more powerful tools of abstraction which may be useful in understanding the complex phenomenon of behaviour in a cultural context rather than simply relying on homo-economicus. Moreover, these frameworks are more relevant for policy development and easier to understand for researchers from a variety of disciplines, either dealing with social policy or urban planning, who have an interest in understanding reinvestment decisions.

In terms of the statistical methods adopted in reviewed studies, clearly the multivariate nature of the issue under investigation (reinvestment behaviour) and measurement level of the dependent and independent variables are determiners. Nature of the Hhs' reinvestment behaviour requires simultaneous consideration of many factors. Such simultaneity can be achieved by employing multivariate statistics. Previous studies employed lineer regression models where the dependent variable(s) is continuous (ratio or interval), whereas logistic regressions were preferred for dichotomous (categorical) dependent variable(s)[35]. These considerations are also taken into account during the determination of the statistical method of this research. However, it must be noted that explanatory power of the multivariate models in the literature surveyed (R^2) is very low, explaining solely 7-20 per cent of the variation in reinvestment expenditures. Method of regression is a useful tool yet, it is believed that tabulations like simple frequency tables or multivariate crosstabulations can also provide in depth understanding of the relationships investigated in many cases. This study employs both types of tools in analysing Hhs' reinvestment behaviour.

In this chapter, major reasons to consider reinvestments in the existing housing stock are presented based on the previous scientific literature. In the Turkish case, there are also other reasons to emphasize reinvestments in the existing housing stock. These are examined in the next chapter.

[35] Refer to Appendix A for description of dependent variables in each of the reviewed studies.

CHAPTER 3

URBAN HOUSING STOCK IN TURKEY AND REINVESTMENT AS A CURRENT TREND AND REQUIREMENT

3.1. Introduction

For many decades the problem of housing has largely been considered in Turkey as an issue of production at 'sufficient' levels and therefore a quantitative problem. With this issue in mind, the focus of housing policies and urban planning was reduced to 'urban growth', and 'new stock formation'. This attitude could have been considered relevant and satisfactory at the earlier stages of urbanization. However, Turkey is experiencing a new phase of urbanization today characterized by a reduced pace of population increase, where already a surplus in housing stock exists. Moreover, with greater mobility and access to information, availability of credits and capital, removal of constraints on imports, expansion in construction materials, industrialized upgrading skills and packages etc. every condition prevails for extensive practice of reinvestments in existing stock. Moreover, the existing housing stock mostly produced within a short span of time has been ageing altogether and calls for the provision of 'reinvestment policies'.

Housing has an economic life that nevertheless terminates. Though limited, economic life of housing could also be extended, and reinvesting in maintenance and rehabilitation could ensure efficient and effective use of the existing housing stock. In the Turkish context, however, total redevelopment has currently become the most frequently favoured intervention method in the absence of policies and tools for intervening in the existing building stock. Recently, discussions on 'urban transformation' have dominated the agenda, with the introduction of several draft legal arrangements. Yet, current 'urban transformation' proposals are still following the conventional trends aiming solely at the physical redevelopment of urban areas. Although comprehensive redevelopment interventions to fulfil social objectives have priority in many occasions, there are several reasons which would accommodate

reinvestments in the existing housing stock and urban environments. For instance, as Balamir (2002) underlines;

- majority of the building stock is produced within a short span of time without adequate technical supervision,
- unauthorized stock is legalized on paper without real physical upgrading,
- over-production (surplus) in housing is a general condition for some decades,
- population growth rate and rate of urbanisation is declining,
- recently increased public investments in new infrastructure, transportation and public services upgrading have become unavoidable,
- there is pressing need to improve standards of safety in urban environments facing natural hazards, environmental pollution, fire, sabotage and terrorism, etc.

The primary aim of this chapter is to underline the reasons for emphasizing reinvestments in the existing housing stock as a priority in Turkey. Therefore, the conditions intrinsic to Turkish urbanization and urban housing stock formation are exposed as a first task. It is also useful to evaluate the recent 'urban transformation' proposals of the government and local authorities in office in order to underline the potentials provided by these efforts for intervening in the existing urban environment, as well as the deficient aspects of these proposals. The final section discusses reinvestment trends, and intends to establish reasons for the need of reinvestment policies in Turkey.

3.2. Formation of the Urban Housing Stock in Turkey

Urban housing stock in Turkey has been formed fundamentally through private investments despite the low levels of capital accumulation especially in the earlier stages of urbanization (Balamir, 1982). Public housing similar to European examples never existed in Turkey and public intervention in the housing sector has been negligible until the very recent years. Home ownership has always been encouraged by governments whereas rental sector has been almost totally ignored. Yet, as Balamir (1999) underlines a comprehensive and consistent model of social policy has not been developed even for the ownership model. Housing finance has been largely dependent upon the state-owned institutions though very small portion of the population benefited from the credit support provided. Commercial banks, due to the shortage of capital resources with respect to demand and high levels of inflation, did not provide any

finance for housing until 1990s (Türel, 1994). Yet, in such an environment the country has displayed significantly high levels of housing production (Figure 3.1)[36].

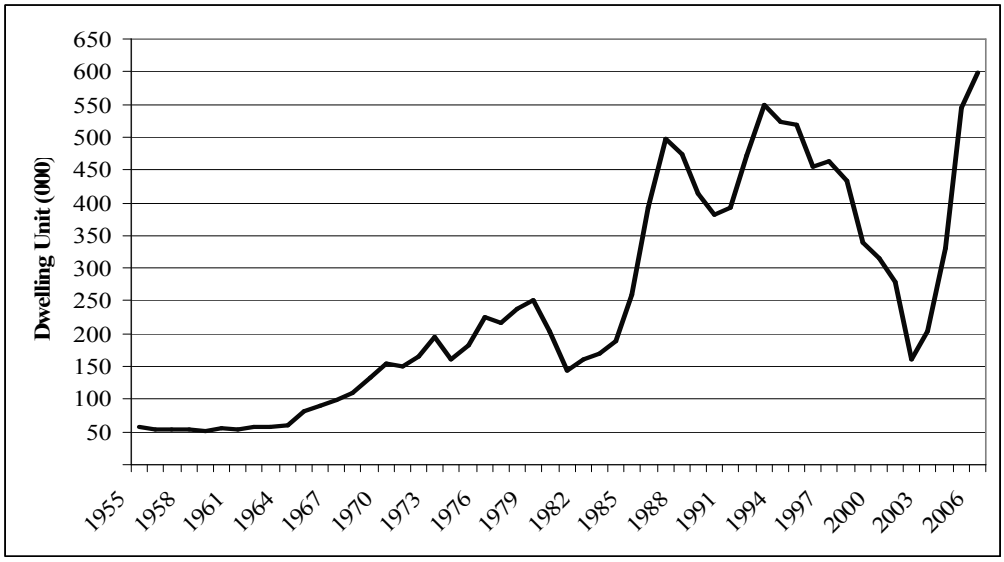


Figure 3.1: Annual Housing Production Starts in Urban Areas According to Construction Permits: 1955-2006

Source: After Balamir (1975, 1982); TURKSTAT, *Building Construction Statistics* (2003b), *and Building Permit Statistics* (2008a).

The first and foremost factor which contributed to the high performance displayed in housing production was the invention of 'Flat Ownership' (FO) relations beginnings of which are in 1940s-1950s that gave rise to the construction of multi-unit structures in urban sites (Balamir, 1975, 1992, 1996a, 1999). It may be useful to examine the conditions specific to Turkish urbanization in order to understand the emergence and evolution of FO relations and its role in the formation of the urban housing stock.

Republic of Turkey was founded in 1923. Early decades of the Republic era were devoted to the recovery from the First World War and War of Independence. Great Depression of 1929 and the Second World War had negative effects on the Turkish economy and development, although Turkey managed to keep out of the war. Limited resources of the country and

[36] Construction permit statistics are much more reliable indicators of housing production in Turkey compared to occupancy permits for a time-series analysis (Balamir, 1982). Many dwelling units are inhabited without obtaining an occupancy permit after the construction is completed. Therefore, construction permit statistics are employed as basic indicator of housing production starts throughout the study.

shortages in the necessary materials for construction gave rise to stagnation in housing production[37]. Until 1950s housing shortage was not a major problem since percentage of urban population in total population remained constant at 23-25 per cent in the first three decades of the Republic period. Rapid increase of urban population started after 1950s (Figure 3.2) and became a major determinant in the formation of the urban housing stock. The major factor underlying this increase in urban population was migration from rural areas. Population mobility increased the immediate housing demand in urban areas. Yet, administrative intervention in the market for the provision of infrastructure, land and housing was far from a sufficient level. Supply of urban sites was constrained which led to the high land values. In such an environment it was not possible to follow the common practice of undertaking individual construction activities on single urban plots. Consequently, two major processes emerged in the free market environment to meet the immediate housing demand: (1) construction of squatter houses; (2) construction of multi-unit and multi-owned physical structures.

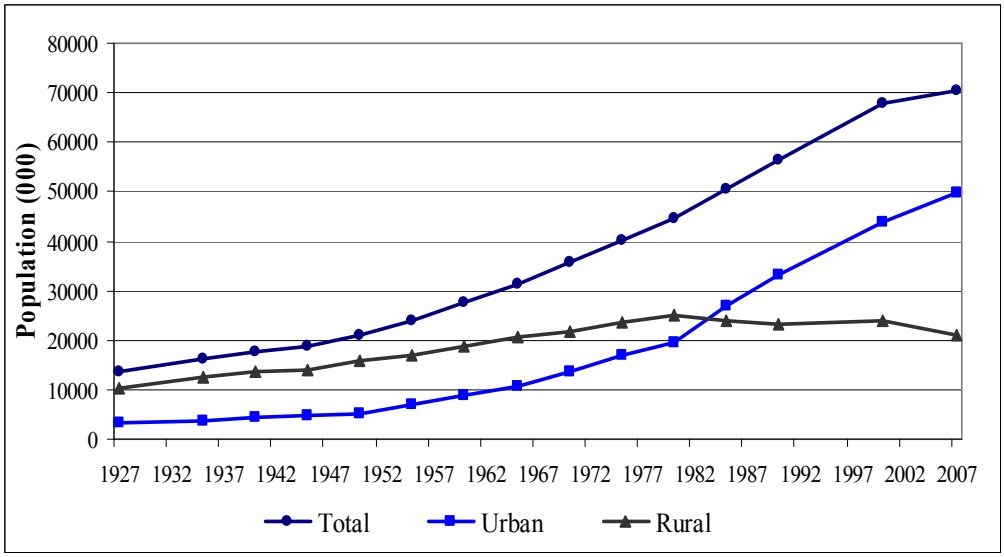


Figure 3.2: Urban and Rural Population 1927-2007[38]

Source: TURKSTAT, *Census of Population* (2003a), and *News Bulletin* (2008b)

[37] Cement production, for instance, was limited to 11 thousand tons in 1923, almost 0.02 per cent of the cement production in the country by 2006 (Batmaz *et.al,* 2006; Building Information Centre: YEM, 2007).

[38] Urban population comprise population living within the municipal boundaries of the provincial centres and sub-provincial towns (TURKSTAT, 2003a).

Squatter housing construction was a solution especially for migrants from rural areas. Akçura (1982) argues that the driving force of squatter housing construction was the lack of available housing stock in urban areas which could be filtered down to the migrants in addition to the high land values that made it impossible to have access to urban land. Tekeli (1996), on the other hand, claims that migrant population were workers in the marginal sectors, thus levels and fluctuations of income were an obstacle that could not generate real demands in a legitimate housing supply mechanism. Access to urban land or urban housing was impossible for migrants. Therefore they simply invaded the public or private lands constructing squatter houses. They located their squatters usually in areas of undesirable and difficult terrain. In 1955 there were nearly 50 thousand squatter houses; by 2002 this number was estimated to be two million, accommodating almost 27 per cent of the urban population (Keleş, 2002). Squatter housing was an entirely illegal undertaking at the time of their construction, but became a widespread mode of access to legitimate ownership of urban property through time with "laws for the condonation of unauthorised forms of development" (Balamir, 1996a)[39].

The second process to meet housing demand under high levels of land values emerged as the collaboration of individuals in the construction of high-density multi-unit physical structures on privately-owned land. Balamir (1975, 1992, 1996a, 1999) provides exhaustive investigation of these processes. Accordingly, in late 1940s and early 1950s, informal or semi-formal arrangements evolved between entrepreneurs, landowners, and investor Hhs collaborations. In this process small savings and capital came together and formed an investment capacity that can initiate development activities, large enough to meet high land values. Entrepreneur – developer, in this model, has a role of initiating the cooperation. He procures agreements and develops the land with the consent of the landowner. The developer does not need large-scale capital since he avoids the cost of access to land, and markets the 'independently usable parts' of the building before construction is completed (at times, even before it is started). Landowner, in return for his permission of development, gains access to ownership of a number of flats depending on his agreement with the entrepreneur, proportions determined by the value of land. Hhs' investments and participation in this process also results with their rights of access to flats. This process became predominant in the country in

[39] These laws are referred as 'Amnesty Laws' hereafter.

a short span of time leading to its formal recognition in 1965 with the 'Flat Ownership Law' (Law No: 634).

According to Balamir (1992, 1996a, 1999), the formation of urban housing stock in Turkey is based in three distinct processes of property ownership transformation. Much of these were of different shades of illegality at their inception. One by one, legal solutions were introduced, and the FO became the most widely exercised development process. Accordingly, scarcity of capital wealth compelled individuals to act collectively with respect to their means apart from the formation of squatters, and informal sharing and subdivisioning of peripheral land for development purposes has led to another type of property relations. FO is the most capital intensive process to be legalized earliest. The three processes were respectively named as 'appropriation', 'apportionment', and 'appurtenance' by Balamir (1992). Contributions of FO relations to the performance displayed in housing production can be observed from Figure 3.3[40].

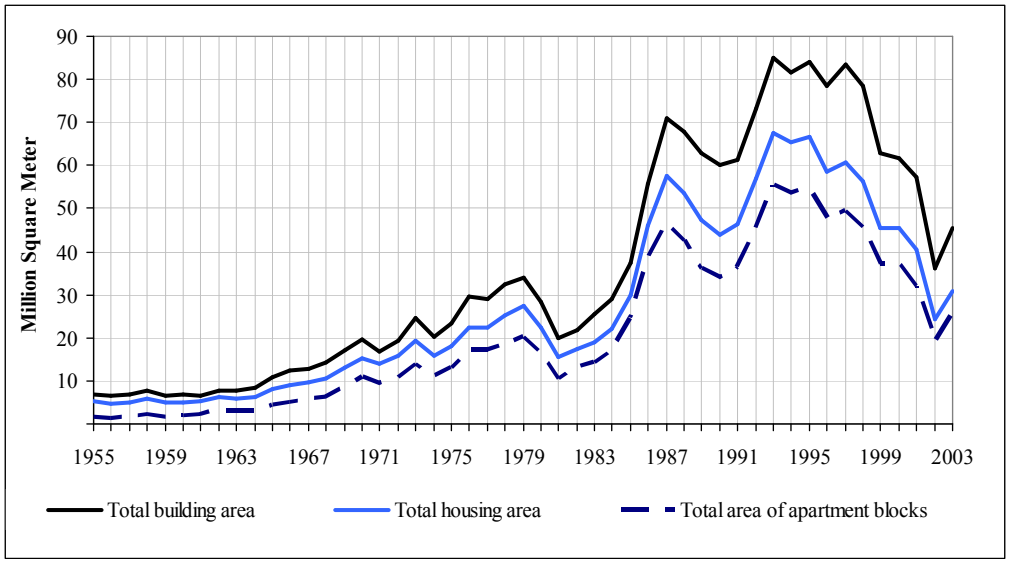


Figure 3.3: Annual Production of Buildings in Urban Areas According to Construction Permits: 1955-2003

Source: Updated from Balamir (2002); TURKSTAT, *Building Construction Statistics* (2003b).

[40] The information presented in Figure 3.3 on apartment blocks is not available anymore due to new data categorization system adopted by TURKSTAT in 2004. Current categorization is done with respect to number of dwelling units contained in buildings.

Fluctuations in annual housing production observed in Figure 3.1 and Figure 3.3 are also worth mentioning here. Basically, housing production volatility can be attributed to instability in the national economy of Turkey. It must be noted that a macro analysis of the dynamics and development of the housing production in Turkey is beyond the scope of this study. Yet, there are a number of points to highlight for a better understanding of urban housing stock formation.

Until 1979, housing production in Turkey displayed a consistent increase with the widening contribution of FO relations. In 1980, Turkey experienced a military coup after which several transformations in the economic, political and social system took place. Two significant issues regarding the housing sector in 1980s were (1) Amnesty Laws enacted during 1984-1987, (2) foundation of the State Housing Development Administration (HDA) in mid-1980s. Annual new housing construction went an upswing during 1982-1987 mainly due to these two processes. Amnesty Laws enacted in 1980s allowed transformation of squatter houses into multi-storey apartment blocks. It is known that 43 per cent of the housing starts during 1984-1987 were issued a construction permit with respect to two major Amnesty Laws (Law No: 2981 and 3290)[41].

On the other hand, with the foundation of HDA in 1984, subsidized credits were provided to both the supply and demand sides for new construction primarily to large-scale cooperatives (Balamir, 1999). Large-scale construction firms and cooperatives which were able to carry out mass production started to dominate the construction activities (Balaban, 2008). During 1984-1989 approximately 550,000 dwelling units received subsidized credits from the HDA. Moreover, HDA contributed to the construction sector as a producer as well. This contribution was very limited and remained at 43,145 dwelling units during 1984-2003 (HDA, 2009). By the end of 1980's diminishing resources of the HDA limited the number of dwelling units to be financed and credit ceilings could not be raised parallel to rises in construction costs (Türel, 1994).

1990s were the years of high inflation rates and instable national economy. Demand for housing increased in the initial years of the decade since housing was considered in general as

[41] Calculated from the available data provided by State Planning Organization (SPO, 2001).

a secure investment in an economic environment with several uncertainties. Rate of inflation reached to its highest level (149.6 per cent) in 1994, and high interest rates restricted the credit opportunities of the private sector hence private investments (Aydoğan, 2004). Economic crises of 1994, 1998, 2000 and 2001 were followed by the severe decline in housing production. Moreover, the effects of those crises were deepened by the two earthquakes experienced in the Marmara Region in 1999. The major point of discussions consequent to the huge losses in the earthquakes was the poor construction quality of the existing building stock. It may be argued that the demand for housing was negatively affected from that experience for a couple of years following the earthquakes. In 2001, 'Building Supervision Law' (Law No: 4708) was enacted with the purpose of sustaining safety in built environment through project and building supervision. It is probable that the new regulations and intensified controls following the earthquakes also contributed to the decline in the volume of housing production.

During 2002-2006 annual housing production had artificially increased at an accelerated rate never observed in the last 20 years of Turkish urbanization history. This increase was mainly a result of the deliberate policy of the government in office. Government, in their first term in office, initiated a program called 'Planned Urbanization and Housing Production' the target of which was declared as production of 500,000 dwelling units by means of HDA[42]. During 2003-2008, HDA constructed 337,500 dwelling units and provided credits to bring 56,000 further dwelling units for their completion (HDA, 2009). Annual new housing construction went an upswing, and from 162,000 units in 2002, peaked almost to 600,000 units in 2006[43]. The financial sector also contributed to this production expansion. During the same period, commercial banks have provided housing loans on the demand side with low interest rates. This was possible mainly due to low inflation rates compared to earlier periods[44]. Monthly interest rates for housing loans were 2.57 per cent in mid-2004 and declined to 0.99 per cent by the end of 2005 (Doğan, 2006). Recently in 2007, 'Law on Housing Finance System' was enacted after several years of discussion[45]. Yet, this was not an effort for developing a

[42] 'Government Program', official website of the ruling party (Justice and Development Party, JDP, 2008a), www.akparti.org.tr, accessed in January 2009.
[43] Latest available figures on construction permits are for 2006.
[44] During 2002-2006 highest level of inflation was 29.7 per cent in 2002 and lowest level was 7.7 per cent in 2005.
[45] The full name of the law is 'Law on Amendments to Several Laws Concerning the Housing Finance System' (Law no: 5582, 2007).

thorough housing finance system, rather the aim was to reorganize several related laws in order to prepare legal and institutional basis of a mortgage system which did not exist in Turkey. With this law, the companies approved by Banking Regulation and Supervision Agency (BRSA) are also allowed to provide housing loans for the demand side. The loans provided by the financial sector and by approved companies allow for transactions in the existing housing stock (regardless of age of the dwelling) as well as purchases from the new construction. Yet, it is a fact that the so-called mortgage system in Turkey is not sufficient for purchasing a house without savings.

It must be underlined that both the transformation of squatter houses under the Amnesty Laws and housing production supported by HDA have contributed to the prevalence of apartment blocks in Turkey. Existing urban housing stock is dominated by blocks of flats and 67 per cent of the urban population lived in this type of stock by 2006 (TURKSTAT, 2002-2006)[46]. In the last fifty years, Turkey has displayed significantly high levels of housing production. According to the latest Building Census of TURKSTAT (2001) 92 per cent of the existing residential buildings are constructed after 1950s. Therefore, it is an imperative to develop 'reinvestment policies' for the existing housing stock most of which have been produced within a short span of time and ageing altogether. However, current efforts on 'urban transformation' are far from developing thorough and consistent 'reinvestment policies'.

3.3. Current Debates on 'Urban Transformation'

Since 2004 discussions on 'urban transformation' have dominated the agenda with the introduction of several legislation drafts and legal arrangements[47]. A chronological list of these arrangements is presented in Table 3.1.

[46] It was estimated that in 1999 most of the urban Hhs in major cities such as İzmir (64.3 %), Ankara (69.8%), Samsun (75.7%), and İstanbul (82%) were living in flats (TURKSTAT, 2004a).
[47] The term 'urban transformation' is adopted here since recent legal documents and discussions in Turkey employ this terminology.

Table 3.1 Chronological List of Legislation Drafts and Legal Arrangements Concerning 'Urban Transformation' 2004-2006

Type	Name	Status
Legislation Draft	'Development and Urbanization Act' 'Urban Transformation Act'	2004 – Never sent to GNAT[48]
Law (No:5104)	'Law on an Urban Transformation Project Within Northern Periphery of Ankara'	12.03.2004 – Enacted
Law (No:5216)	'Metropolitan Municipalities Law'	23.07.2004 – Enacted
Legislation Draft	'A Draft Bill on Urban Transformation and Development'	2005 – Approved with slight changes as Law No: 5366
Law (No:5366)	'Law on Conservation by Renewing and Utilization by Rehabilitation of Decayed Historical and Cultural Heritage'	05.07.2005 – Enacted
Law (No:5393)	'Municipality Law'	13.07.2005 – Enacted
Legislation Draft	'A Draft Bill on Transformation Areas'	2006 – Sent to GNAT, has not been decided yet

Source: Balaban (2008), Uzun (2006), GNAT (www.tbmm.gov.tr).

Legal arrangements concerning 'urban transformation' were not intensified coincidentally during 2004-2006. The 'Action Plan' declared by the government, following the general elections of 2002, displayed the first signs of the planned transformations in urban areas. The social policy activities under the 'Urbanization and Settlement' heading of that plan were related to; (1) prevention of squatter housing construction, (2) initiation of an extensive housing construction program[49].

Explanation of these activities was clearly indicating that a new amnesty for squatter housing was on the way and housing construction was seen as a short-term solution to unemployment problem which, for the government, was the primary problem of Turkey. This action plan mentioned absolutely nothing about mitigation activities and retrofitting of buildings against seismic hazards, though in the following years these have become the so-called major concern underlying 'urban transformation' proposals and took their part in the action plan of the second term.

Following the declaration of the action plan, a series of legislation drafts were prepared, as legal framework for 'urban transformation' (refer to Table 3.1). However, these arrangements

[48] GNAT - Grand National Assembly of Turkey
[49] 'Action Plan of the 58th Government' (JDP, 2003), www.dpt.gov.tr, accessed in January 2009.

have been criticised by academia, NGOs and, by the different branches of Turkish Union of Chambers of Engineers and Architects basically on the following grounds:

- these efforts are rent or profit-oriented, and bypass current legislations,
- these define an urban transformation process independent from the existing planning and urban development system and legislation,
- these methods provide amnesties for illegal status of squatter houses and for various sorts of unauthorized development, and thereby give rise to blunt injustice,
- these provide arbitrary and discretionary powers to local authorities in determination of the urban transformation areas (Balaban, 2008), rather than provide options for citizens' initiatives (Balamir, 2006).

A detailed presentation of the above mentioned legislative efforts and arguments advanced against them is beyond the scope of this study, yet a number of points are to be highlighted as they relate to the issue of reinvestments in existing urban environments:

- Emergence of 'urban transformation' as part of the current urban investment policies can be considered as a progress since it indicates that government is somewhat aware of the changing nature of urban problems and puts some emphasis on the improvement of existing urban areas[50].
- Yet, current 'urban transformation' proposals are still following the conventional trends aiming solely physical redevelopment of urban areas ignoring the social, economic and local dimensions of interventions and opportunities of planned reinvestments.
- Moreover, these proposals relying on generating local rents consider large-scale and expensive public operations only, without taking it into account the alternative policies of triggering reinvestment capacities of Hhs.
- Consequently, 'urban transformation' is clearly reduced to transformation of squatter housing areas and decayed historical parts of the cities which are very attractive due to their locational advantages in cities.

[50] Numerous urban transformation projects emerged in almost every city after the year 2005. During 2005-2007 period, Greater Municipality of Ankara alone initiated 45 urban transformation projects covering an area of approximately 30,000 hectares, including the entire historical quarter of the city (www.ankara.bel.tr).

- As a result, improvement and redevelopment needs of the existing urban areas containing authorized housing stock are totally ignored.

The current action plan of the government declared on January 2008 redefines the issue as 'urban renewal and squatter housing transformation' and it is seen as part of the housing production process[51]. HDA is assigned to be in charge of these operations. 10.4 per cent (35,246 dwelling units) of HDA's housing production during 2003-2008 was realized in squatter transformation areas (HDA, 2009). Yet, transformation and improvement of urban areas can not be reduced solely to redevelopment interventions. This is also highlighted in the 'Settlement - Urbanization Ad-hoc Committee Report' of 9th Development Plan (2007-2013). Accordingly improvement, rehabilitation, and revitalization alternatives have to be major objectives of 'urban transformation' in Turkey rather than redevelopment operations (SPO, 2007).

3.4. Reinvestment as a Current Trend and Requirement in Turkey

In general, the need to employ available resources efficiently calls for the promotion of reinvestments in existing housing stock. Further justifications for reinvestment policies could also be advanced in the Turkish case. The most striking one is that of natural hazards, floods and earthquakes in particular. According to official records, over 18,000 lives were lost and more than 300,000 housing units were destroyed or damaged in the earthquakes experienced in the Marmara Region in 1999, together with other high social and economic costs. Achievement of resilient and safe urban environments often necessitates reinvestments in existing built up areas as a priority in Turkey.

Moreover, Turkey is experiencing a new phase of urbanization since 1990s. Declining annual population growth, slowing down of rural to urban migration, and formation of a significant excess stock in urban areas are the major attributes of this phase. Annual average population growth rate in Turkey has displayed a decrease from 24.9‰ to 18.3‰ in 1980-85 and 1990-2000 periods respectively (TURKSTAT, 2003a). Moreover, the share of the population living in urban areas has reached to 70 per cent of total population in year 2007 (TURKSTAT,

[51] 'Program of the 60th Government – Action Plan' (JDP, 2008b), www.dpt.gov.tr accessed in January 2009.

2008b). Therefore, it is not realistic to expect further population increases and high rates in urban growth, compared to the dramatic increases of 1950-60.

Furthermore, the total number of dwelling units is observed to exceed the number of Hhs in urban areas and a surplus housing to exist. Figure 3.4 displays the number of urban dwelling units compared to urban Hhs.

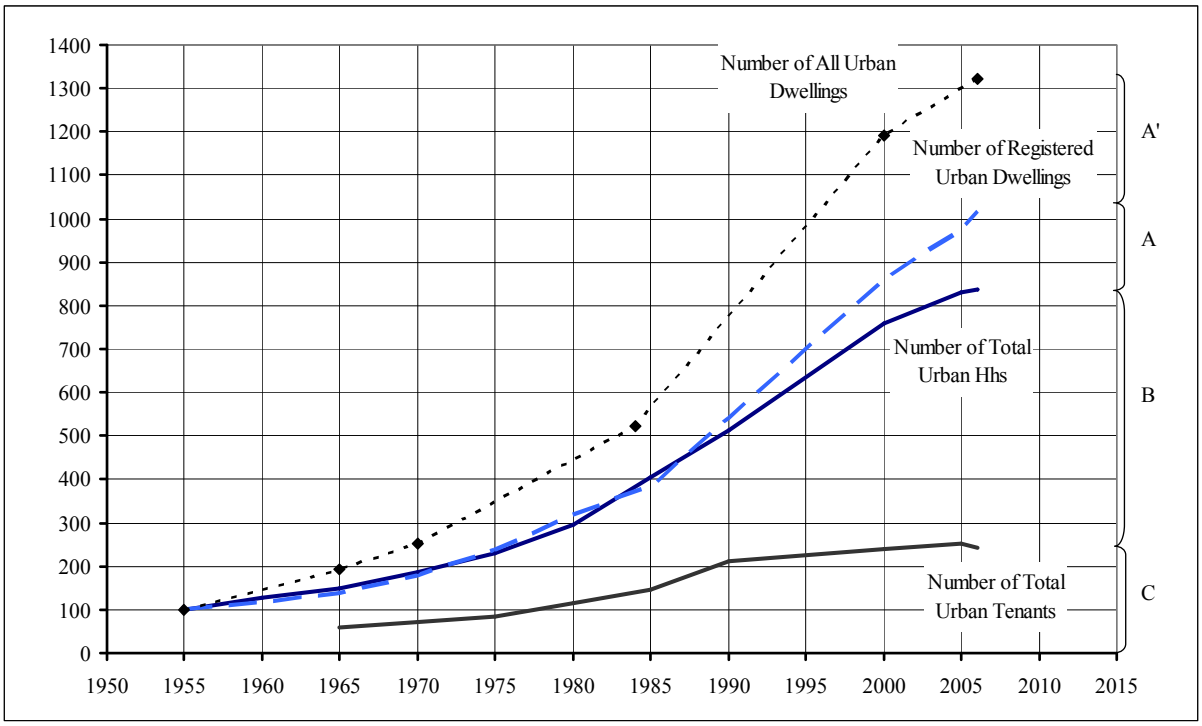


Figure 3.4: Number of Urban Dwelling Units and Urban Households: 1955-2006

Source: Updated from *Balamir (2002)*; Urban Dwelling Units: TURKSTAT, *Building Construction Statistics* (2003b), *Building Permit Statistics* (2008a), *Building Census 1965, 1970, 1984, 2000*, Urban Hhs: TURKSTAT, *Census of Population 1955-2000*, *Hh Consumption Expenditure Database* (2002-06), Urban Tenants: *Census of Population 1965-2000 (1980 Census has no related data)*, *Hh Consumption Expenditure Database* (2002-06).

It is crucial to underline that data regarding urban Hhs in Figure 3.4 contain population accommodated both in the authorised and unauthorised parts of the stock. Whereas, 'registered urban dwellings' cover only the authorised part of the housing stock, and losses from the stock due to ageing as well as due to 1999 earthquakes are considered in the

calculation to obtain a thorough picture of the existing housing stock[52]. 'All urban dwellings', on the other hand, include both the authorised and unauthorised stock. According to Figure 3.4, nearly 25 per cent of excess in the authorised housing stock is known to exist in the aggregate by year 2006 (Figure 3.4, A / [B+C]). This excess rate reaches to approximately 60 per cent when both authorised and unauthorised stock are considered (Figure 3.4, [A'+A] / [B+C]). In year 2002, Prime Ministry Housing Undersecratariat (PMHU) undertook a research on the housing need of Turkey with respect to urban settlements (provinces), employing the same data as Figure 3.4. Their findings indicate that 17 per cent of the provinces have an excess supply of authorised housing stock by 2000, and a further 22 per cent will have an excess supply by 2010 (4 per cent vacancy rate included) if the existing construction trends prevails. Considering authorised and unauthorised part of the stock together, four fifth of the provinces have an excess supply of housing stock by 2000 (PMHU, 2002).

New housing production is expected to fall consequent to above mentioned trends and circumstances in urban areas. On the contrary, as mentioned in Section 3.2, annual housing production has increased at an accelerated rate during 2002-2006. Almost 600,000 units were produced in 2006 which comprises nearly 3.5 per cent of the existing housing stock in the same year (TURKSTAT, 2001, 2003b, 2008a). 54 per cent of those 600,000 units were in the urban settlements already identified with excess stock in 2000 by the PMHU's research (TURKSTAT, 2008a). It is a fact that, new construction responding to current needs, and employing new materials and new construction technologies is always needed. Yet, 'new housing production' need no longer be the priority in Turkey. As Bademli (1992) highlights, urban agenda should comprise 'urban repairs and improvements in the quality of existing urban environments' rather than 'urban growth and quantity considerations' during the periods of lowering rates of growth in urbanization.

Ownership structure of the Turkish housing stock forms another reason for considering reinvestments. Both owner-occupied and rental stock in Turkey is privately owned (99 per cent of the stock), leaving almost no share for public housing which in turn is allocated to public officers only. In Figure 3.4, the area between the 'number of urban Hhs' and 'number

[52] Details of the data employed in Figure 3.4 and the method of estimating stock losses are presented in Appendix B.

of urban tenants' defines basically the owner-occupied sector (labelled with B). Almost all of the dwelling units are owned by these Hhs where multiple ownership rate is 2.23 ([A'+A+B+C] / B). It is probable that the need for reinvestments will become more significant as this stock is aged. Considering the fact that most of this stock has been produced within a short-span of time and is being aged altogether, and all types of reinvestments are totally left to Hhs' decisions in the free market, the relevance of reinvestment policies become more evident. Furthermore, this stock is dominated by apartment blocks produced under FO relations where decision-making power on buildings is unconditionally fragmented and the possibility of producing joint decisions is minimized. As Balamir (1975) highlights, ownership fragmentation in buildings is to hinder realization of redevelopment decisions in free market environment at future stages of urban lifecycle, leading large sections of the Turkish cities into paralysis. Therefore, individual reinvestment efforts are expected to increase as this stock ages.

Another factor triggering demand for reinvestments is the expansion of housing consumption market. In 1994, housing expenditure was the second major expenditure in Hh budget with a 24.8 per cent share among all consumption expenditures. This figure had risen to 28.4 per cent in 2007 having the highest share among other consumption expenditures (TURKSTAT, 2003c, 2008c)[53]. One of the major reasons underlying the high housing expenditure level is probably the increased dwelling sizes. Larger dwellings, which require greater expenditures to run and maintain, are known to dominate new housing construction (Figure 3.5).

[53] 'Housing expenditure' includes imputed and actual rent, RM spending, expenditures for housing services such as water, electricity, gas etc. Other major consumption expenditures after housing are expenditures for food and beverages, transportation, house furnishing and home appliances.

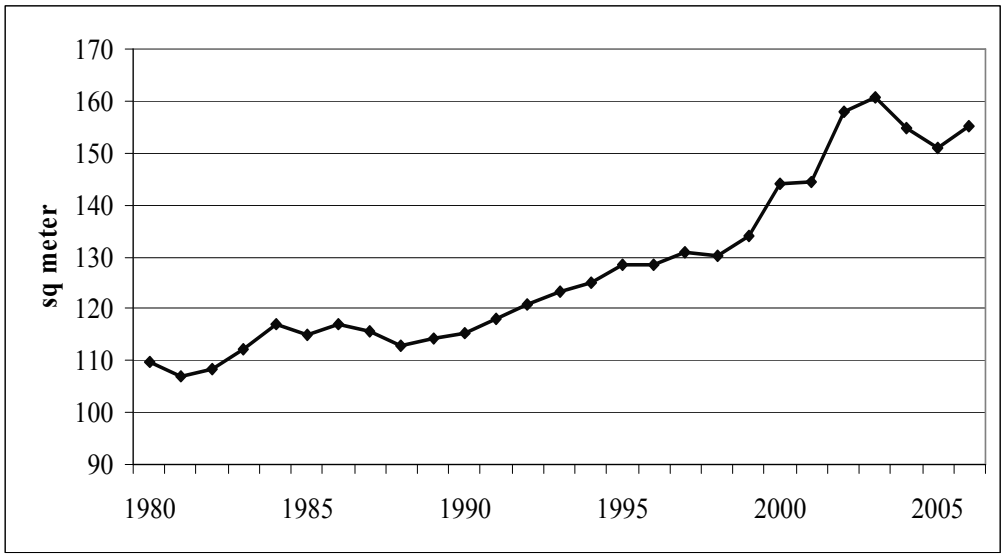


Figure 3.5: Average Dwelling Size in Urban Areas According to Construction Permits: 1980-2006

Source: TURKSTAT, *Building Construction Statistics* (2003b), and *Building Permit Statistics* (2008a).

Other factors also underlie expansion of the housing consumption market. Consumer loans, which became available in recent years, at low interest rates are among them. Hhs can employ the loans to purchase homes, afford RM expenses, or to meet other Hh consumption needs. Housing loans are available for purchases from the existing housing inventory, as well as newly built housing. Availability of these loans triggers the demand for existing dwellings, and probably increases the demand for reinvestments with adjustment purposes. Volume of housing loans consisted 20 per cent of total consumer loans (283 million $) in year 2002, and by 2005 this figure had doubled reaching 44 per cent (9,210 million $), and 47 per cent (26,604 million $) by 2007[54]. Moreover, monthly interest rates for housing loans declined from 2.57 per cent levels in mid 2004 to 0.99 per cent at the end of 2005 (Doğan, 2006). As of December 2009, it rules at 0.95-1.05 per cent levels. However, housing loans as a share of Gross Domestic Product (GDP) still rules low at 1.9 per cent in Turkey, compared to 65 per cent in the USA, 40 per cent in Canada, and 46 per cent in 15 member countries of European Union (EU 15) (Doğan, 2006), not to ignore the fact that Gross National Product (GNP) per person is higher in these countries. On the other hand, loans for RM activities and retrofitting of buildings are also available with shorter repayment periods, 1-36 months, compared to

[54] Derived from BRSA, www.bddk.org.tr.

housing loans[55]. Monthly interest rates for these loans rules at 1.40-1.50 per cent levels as of December 2009.

Furthermore, introduction of higher quality materials, components, new designs and technological developments are effective inducers in reinvestments. Various new construction materials and components have gradually become available in the market with the removal of constraints on imports during 1980s. This was followed by specializations in the sub-sectors of the industry in terms of new services provided for painting, prefabricated construction, kitchen-bathroom modules, roof membering, insulation, woodwork etc. 6500 registered firms, material and service providers, are known to exist in the sector by 2006 (YEM, 2007). Moreover, specialized fairs became regular, contributing to the sector's development with the participation of leading firms in the international market. Interior design as a professional occupation and specialization in education emerged. In addition to these, increasing numbers of 'do it yourself' (DIY) stores have become available in the construction materials market. In 2006, reinvestment works are estimated to represent 14 per cent of the internal market of construction materials industry. About 40 per cent of the materials in this submarket are known to be imports (YEM, 2007). Consequently, availability of various construction materials and an increasing number of specialized firms in reinvestment works promote and facilitate reinvestments especially when supported with consumer loans, financing reinvestments.

Thus, currently relevant reasons for emphasizing reinvestments in the existing housing stock as a priority in Turkey are:

- The need and rising demand for the achievement of safer and higher standard urban environments,
- Declining annual population growth rate curbing the need for additional new housing production,
- Existence of a significant surplus stock likely to curb new starts,
- Dominance of private ownership, and multiple ownership,
- Housing stock most of which has been produced within a short-span of time and ageing altogether,

[55] Detailed information on these types of loans are difficult to obtain since they are usually provided in the 'other loans' category of the available data sources.

- Conditions in financial markets and construction sector favouring extensive reinvestments,
- Enabling and conducive conditions in terms of cheaper materials and new design options.

Many other reasons may prevail for considering social and economic significance of reinvestments in the context of housing and development in Turkey. Thus, it is an imperative to develop reinvestment policies in order to maintain and improve standards of living and quality in existing housing stock and neighbourhoods. Considering the fact that Hhs' are the main decision makers of reinvestments in housing, understanding how individual reinvestment decisions are determined could contribute to devise policies to the encouragement or abatement of the tendencies of reinvestments. Therefore, the next three chapters of this study are devoted to examine Hhs' reinvestment behaviour in the Turkish case.

CHAPTER 4

REINVESTMENT BEHAVIOUR OF HOUSEHOLDS IN TURKEY: FRAMEWORK OF ANALYSIS

4.1. Introduction

Turkish Hhs, as in most countries, are the main decision-makers of reinvestments in housing. Almost 70 per cent of urban Hhs living in flats are self-administered according to the FO Law. Therefore, it is first convenient to identify the rights and responsibilities of Hhs' in FO system regarding reinvestment activities. Within the framework of legal liabilities and rights, Hhs' reinvestment decisions are determined fundamentally by their investment and consumption considerations. Thus, it is necessary to identify and explore the factors affecting Hhs' investment and / or consumption motivations in housing in order to understand how individual reinvestment decisions are determined. With this purpose a conceptual framework to represent Hh reinvestment behaviour in relation to its determinants and outcomes is developed. This is followed by a discussion of factors affecting Hh reinvestment decision and their expected effects on the likelihood and size of reinvestment expenditures.

4.2. Rights and Liabilities of Households Regarding Reinvestments in Housing

Hhs' reinvestment activities in urban Turkey are regulated fundamentally through FO Law (Law No: 634). Other essential components of the regulatory system regarding reinvestments in housing are the Code of Obligations (Law No: 818), the Law on Property Rents (Law No: 6570), and the Civil Law (Law No: 4721). Furthermore, there are numerous cases and court decisions which complement this system. Presenting an extensive review of all relevant legal information in the field is not possible within the scope of this study and is also beyond the author's area of study. Rather, this section attempts to highlight the major rights and liabilities determined by laws regarding Hhs' reinvestments in housing which are relevant for the rest of this study.

First, it is vital to understand how property is defined in the FO system. According to the FO Law, property has two main parts: 'individually owned and independently usable parts', and 'commonly-owned parts' (independent and common parts hereafter). Independent parts are connected to the land with common ownership shares proportionate to their value. This connection cannot be dissolved. Common parts, on the other hand, can be determined by a contract. Yet, the following elements of any property under FO law are considered as commonly owned in all cases: building foundations and main walls, bearing walls, all elements of the building frame, common ceilings / floors / walls that separate independent parts, common circulation areas of building as general entrance doors / stairs / corridors / elevators, caretakers' flats or rooms, laundry rooms, common garages, rooms for electricity control panel / water / gas meters, heating room, water storage tanks, roof, emergency stairways, the main drains and lines for sewage / heating facility / water / gas / electricity / telephone / television, and etc. Other places that are meant for common use are also considered as common parts. Flat owners have rights and responsibilities both on their independent parts and on every unit of the common parts of the property proportionate to their land shares.

Management of the property under FO Law also needs to be highlighted. In this system, the property is managed based on the decisions of flat owners. For properties with eight or more independent parts, flat owners are obliged to elect a manager or management board of three persons. These can be elected among flat owners themselves as well as among third parties. The property is managed in accordance with a 'management plan' registered as ownership is transferred into FO. This is a binding contract for all flat owners. Once a management plan is prepared, it cannot be changed unless four fifth of the flat owners' consent are obtained. Flat owners together have the responsibility to pay for the costs of maintenance, preservation, retrofitting, and repairs of the common parts, as well as the running costs of common installations pro-rata with their land shares. They cannot abandon their right to use on common parts of the property and therefore cannot avoid common costs.

The third point to underline is the rights and liabilities of flat owners regarding maintenance and preservation of structural qualities of the property. According to FO Law, flat owners are compelled to maintain and preserve the architectural, aesthetic, as well as structural qualities of the property. They can do repairs and alteration freely in their individual flats, unless no

damage is done to the main structure. In the common parts of the property, none of the flat owners are entitled to carry out repairs, construction, and paint in different colours without a written consent obtained from four fifth of the flat owners. However, if there is an event of urgency confirmed by a court decision, for instance if the main structure requires urgent retrofitting, then consent of the flat owners is not sought. All alterations and additions aimed at increasing the benefits derived from common parts of the property, on the other hand, have to be decided by the rule of majority both in terms of numbers and land shares. An exception is alteration of heating system from central to individual or vice versa where total construction area of the building is 2000 sq meters or more. The principle of unanimity rules in such a case. If demanded alterations and additions are expensive and luxurious, or if they are not necessarily for the use of all flat owners, then flat owners who do not benefit from those facilities are not obliged to share the costs. Moreover, addition of an independent part or extra space to the property, conversion of a common part to an independent part, demolition of the main structure (unless this operation is ordered legally as a safety precaution) require unanimous decisions of flat owners. If a flat owner avoids his liabilities defined by law and thereby violates the rights of other flat owners unbearably, then the other flat owners can file a court case for the transfer of ownership to the rest of the flat owners.

Finally, rental relations and reinvestments in rental stock need to be emphasized. Flat owners are free to enjoy their rights of occupancy as owner-occupiers or they can let their dwelling units. The rent contract between owner of the rental property and tenant provides tenant with 'right to use' the independent part as well as the common parts of the property. Yet, as the Code of Obligations and several case laws put clearly, all costs associated with the common parts are paid by flat owners. Tenant's responsibilities are the costs stemming from use of independent part; such as monthly payments to caretakers, heating, gas, electricity, water, ordinary RM inside the flat, etc. In the Code of Obligations, it is underlined that, tenant is obliged to deliver the rented property in a good state of repair (as he received it) on termination of rent contract. Yet, the Code of Obligations is a regulatory law, and it is possible to make different arrangements in rent contract regarding the reinvestments in independent parts of the property. Tenants can undertake all types of RM in the flat on the basis of agreement between owner and tenant, unless no damage is done to the main structure. In this case, costs associated with these activities are paid by the tenant. However, in case of tenancy, consumption benefits derived from reinvestments are highly associated with

expected length of stay in the dwelling. Although, Law on Property Rents is often argued to protect tenants' rights more than owners', there are still several ways to evict a tenant. According to the Code of Obligations and Law on Property Rents, owner of the rented property is able to file an eviction action in the court if:

1. Tenant, in written, is committed to evict the dwelling in a predetermined date,
2. Owner, spouse or their children need to occupy the dwelling themselves,
3. Owner, spouse or their children have to use the dwelling as a workplace,
4. Owner is to rebuild or undertake extensive repairs in the property, during which tenant cannot occupy the dwelling. In such cases, tenant has a right to move in the flat back after the construction is completed.
5. Tenant does not pay the rent on time. Owner can give a notice that the rent is unpaid and if this happens twice in a year then owner can seek a court order for eviction.
6. Tenant or spouse has another dwelling in the same city,
7. Tenant lets the dwelling to a third party,
8. Tenant violates the general rules of the building or the rent contract.

2nd and 3rd conditions mentioned above are the most frequently exercised factors in evictions observed in Turkey. Therefore, in principle, tenants can also undertake reinvestments in their dwellings. Yet, likelihood and size of reinvestments in this case are functions of the expected length of tenancy, tenant's willingness to pay for reinvestments, and owner's consent for the reinvestment activities.

The regulatory framework presented above defines the rights and liabilities of Hhs in terms of reinvestments in their dwelling units. Yet, there are numerous factors affecting individual reinvestment decisions which are summarized in the conceptual framework presented in the following section.

4.3. Elements of Household's Reinvestment Decisions: A Conceptual Framework

Housing is both an investment and consumption good for Hhs. At any point in time, basic motive underlying Hhs' decisions related to their dwellings is their investment and consumption considerations. This is also valid for reinvestment decisions. In this case, Hhs'

decisions are a function of Hh characteristics (e.g. mode of tenure, Hh income, Hh type), qualifications of the dwelling unit (e.g. date of construction, size), features of the neighbourhood which the dwelling is located (e.g. security, accessibility), and the general conditions prevailing in the market (e.g. credit availabilities, construction costs, availability of skilled labour). Hhs' subjective evaluations of these factors may lead them to engage in different levels and types of reinvestment works in the existing dwelling or to move a house that better suits the Hh needs. Yet, mobility decisions may still be followed by reinvestment decisions. Another option may be modifying expectations and do nothing to alter housing consumption / investment level. It is possible to represent Hh reinvestment behaviour as in Figure 4.1.

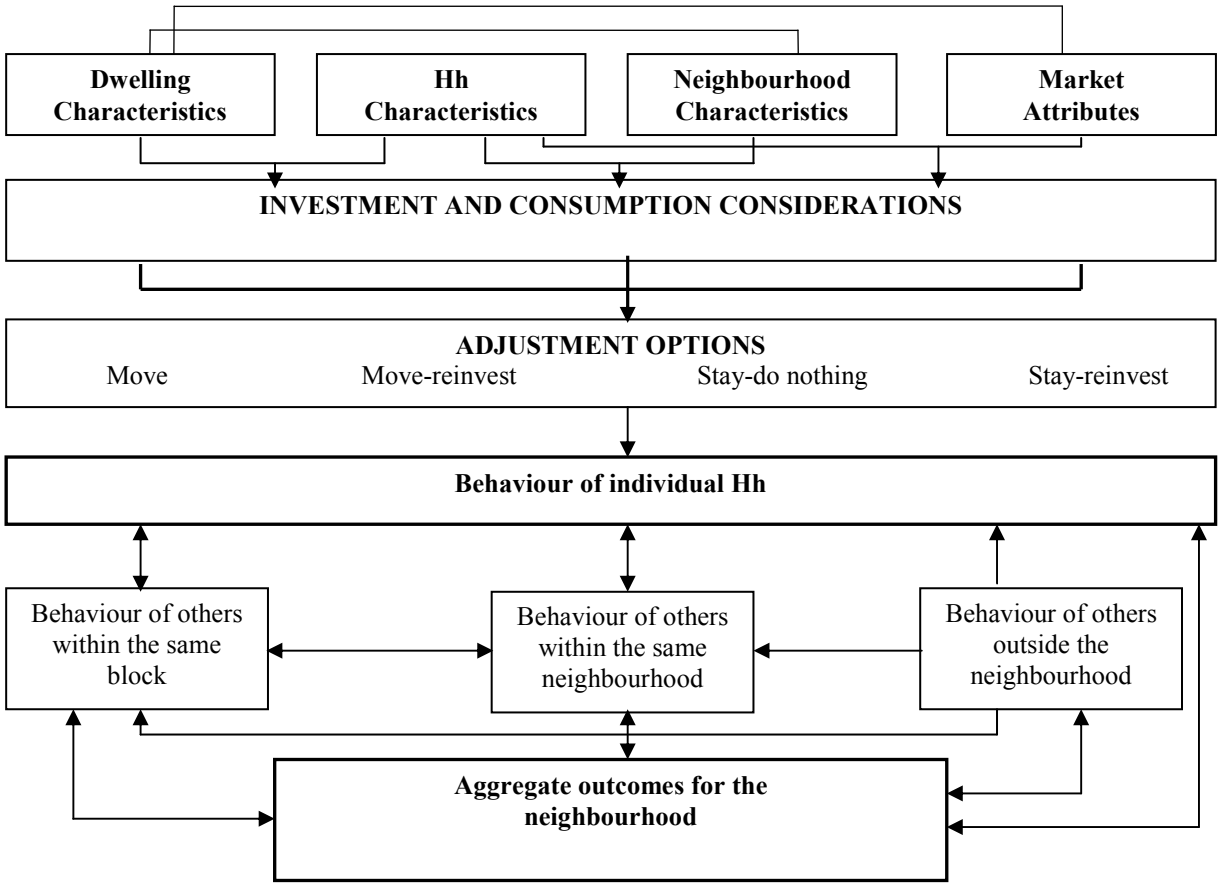


Figure 4.1: Hh Reinvestment Behaviour

Source: Adapted from Galster (1987) according to the needs of this study

Hh behaviour is also affected by the behaviour of other actors in the housing market. These actors may be other Hhs living within the same block or neighbourhood as well as public /

private institutions outside the neighbourhood. Whether other Hhs engage in or refrain from reinvestments may trigger or depress Hh's reinvestment decisions. This is also true for public and private institutions' activities and decisions regarding their investments in the neighbourhood. For instance, new land-use decisions which are evaluated negatively by Hh may discourage reinvestments, whereas public investments to improve the environmental quality may be valued positively by Hh encouraging individual reinvestment decisions. Individual actions in one period produce aggregate outcomes for the neighbourhood in the next period, which in turn affect subsequent individual behaviour (Galster, 1987). In other words, Hhs' reinvestment decisions have broader implications at the macro level[56].

Hh's reinvestment decisions are two separate but interdependent decisions which take place sequentially. At first stage Hh has to decide whether to undertake a reinvestment or not. Conditional upon a positive reinvestment decision, size of the reinvestment expenditure is decided at the second stage. It could be argued that these decisions take place simultaneously rather than being sequential. However, previous studies provide no reason to believe that factors affecting reinvestment event to occur are the same with factors influencing the size of reinvestment expenditure.

Reinvestment works cover a broad range of activities including 'minor repairs' as well as 'rehabilitation investments'. This means there is a wide range of cost items included in this study. It is not possible to list all cost items and their market prices here, yet an exemplary list displaying the minimum and maximum prices for kitchen – bathroom systems, floor / wall surfacing materials, and a number of selected items is presented in Table 4.1. It is clear from the table that minimum and maximum prices differ considerably for most of the items mentioned in the list. Major reason for this is the variety in construction materials sector which is supported both by local products and imports. This indicates that quality considerations of Hhs may be very influential in determination of the size of reinvestment expenditures.

[56] Refer to Section 2.3 for a detailed discussion on macro implications of Hh's reinvestment behaviour.

Table 4.1 An Exemplary List of Cost Items and Market Prices[57]

Name	**Unit Price**
Kitchen Systems	
Single-lever kitchen mixer tap	15 – 250 Euro / piece
Dual-control kitchen mixer tap	55 – 150 Euro / piece
Single-bowl inset sink	20 – 165 Euro / piece
Single-bowl inset sink with drainer	25 – 235 Euro / piece
Two bowl inset sink	45 – 180 Euro / piece
Two bowl inset sink with drainer	115 – 185 Euro / piece
Laminate Worktops: 220x60.6x2.8cm, 126x62x3.8cm, 246x62x3.8cm	25 – 90 Euro / piece
Wood Worktops: 126x62x3.8 cm, 246x62x3.8 cm	50 – 150 Euro / piece
Built-in Kitchens: Cabinets, worktops, interior fittings, hinges, cover panels, deco strip/mouldings, plinths and legs are included in the total price.	
For 10-14 sq meter kitchens	1650 – 5800 Euro
For 5.5-8 sq meter kitchens	1145 – 3000 Euro
240x214 cm	190 – 600 Euro
Bathroom Systems	
Wash-basin mixer tap	20 – 85 Euro / piece
Hand Showers	12 – 20 Euro
Hand Shower Equipment	16 – 40 Euro
Single wash-basin	15 – 85 Euro / piece
Toilets	40 - 115 Euro
Shower Bases + Cabin	110 – 300 Euro / piece
Steam Showers	450 – 1500 Euro / piece
Bathtubs – Classic	150 – 425 Euro / piece
Bathtubs – Whirlpool	800 – 1700 Euro / piece
Built-in Bathrooms: Cabinets, lightning equipment , sink	85 – 500 Euro
Turnkey projects: Replacement of plumbing, bathroom furniture, ceramic tiles, adaptation of electrical system, material costs and workmanship are included in the total price.	
For 5 sq meter bathrooms	1750 – 2250 Euro
For 7 sq meter bathrooms	2250 – 3000 Euro
Floor and Wall Surfacing Materials	
Ceramic Tiles: 20x42.5cm, 25x33cm, 33x33cm, 40x40cm	4 – 10 Euro / sq meter
Wood Flooring:	
Class 31 1380x193x7 mm	10 – 20 Euro / sq meter
Class 32 1285x192x8 mm	10 – 25 Euro / sq meter
Wall Papers 50cmx10m	10 – 25 Euro / roll
Other Materials	
Internal Surface Paints	1.5 – 3 Euro / lt
External Surface Paints	3.5 – 5 Euro / lt
Joint Seal Compound	8 – 10 Euro / 10 kg
Bonding Mortar	3.5 – 17 Euro / 25 kg
Silicone	1.5 – 2.5 Euro / bottle
Cement	10 – 13 Euro / 20 kg
Satin Plaster	3.5 – 5 Euro / 30 kg
Gypsum Plaster	2 – 3.5 Euro / 35 kg
Varnishes	4 – 7 Euro / bottle

Sources: Praktiker Turkey, Bauhaus Turkey, Ikea Turkey, Kaledekor, and Koçtaş Stores.

[57] The prices are obtained from the stores in June 2009.

4.4. Factors Affecting Households' Reinvestment Decisions

This research employs two major data sources in the empirical analysis: (1) Household Budget Survey (HBS) – 2004, (2) Ankara Survey – 2007-2008. Almost all of the Hh and dwelling characteristics employed in previous research are available in each of the databases. Similar to previous research, this study suffers from the lack of information related to dwelling's condition and previously undertaken reinvestment works. Yet, in both of the databases, 'age of the dwelling unit' is available which can be used as a proxy to house condition. Additionally, Ankara Survey provides Hhs' evaluation of the disrepair in their dwelling units. Furthermore, information on reinvestment activities realized in common parts of the apartment block is available in the Ankara Survey. Variables related to the attributes of neighbourhood are not provided in HBS data. Whereas in the Ankara Survey, Hhs' evaluation of their neighbourhood as a subjective measure, and land values per square meter as an objective measure of neighbourhood attributes are also presented. Unfortunately, none of the data sources provide variables to examine the effects of market attributes on reinvestment decisions. Table 4.2 displays available variables in these databases. Detailed description of each data source is provided in Chapter 5 and 6.

Table 4.2 Variables Provided by HBS (2004) and the Ankara Survey (2007-08)

Variable	Measurement Level	Database
Reinvestments		
Reinvestment Expenditure	Continuous	HBS, Ankara Survey
Expenditure for Materials	Continuous	HBS
Expenditure for Services	Continuous	HBS
Purpose of the Reinvestments	Discrete	Ankara Survey
Source of Finance	Discrete	Ankara Survey
Distribution of Payments Through Time	Discrete	Ankara Survey
Type of the Realized Reinvestment Work	Discrete	Ankara Survey
Type of the Planned / Intended Reinvestments	Discrete	Ankara Survey
Difficulties Confronted to Undertake Planned Reinvestments	Discrete	Ankara Survey
Hh Characteristics		
Mode of Tenure	Discrete	HBS, Ankara Survey
Hh Income	Continuous	HBS, Ankara Survey
Availability of Savings	Discrete	HBS
Age of the Hh Head	Continuous	HBS, Ankara Survey
Hh Type	Discrete	HBS
Hh Size	Continuous	HBS, Ankara Survey
Change in Hh Size	Discrete	Ankara Survey
Duration of Occupancy	Continuous	HBS, Ankara Survey
Mobility Expectation	Discrete	Ankara Survey

Table 4.2 (cont.): Variables Provided by HBS (2004) and the Ankara Survey (2007-08).

Occupation Density	Discrete	HBS, Ankara Survey
Qualifications of Dwelling		
Age of dwelling	Continuous	HBS, Ankara Survey
Size of dwelling (number of rooms, floor area)	Continuous	HBS, Ankara Survey
Monthly Rent	Continuous	HBS, Ankara Survey
Repairs and Maintenance in Common Parts of the Apartment Block	Discrete	Ankara Survey
Evaluation of the Dwelling by Hh	Discrete	Ankara Survey
Neighbourhood Features		
Hh evaluation of the neighbourhood: Services Accessibility Safety Environment	Continuous (Scale)	Ankara Survey
Land Values	Continuous	Ankara Survey

4.4.1. Effects of Household Characteristics on Reinvestment Decisions

As mentioned earlier, one major difference of this study from the ones reviewed in Chapter 2 is that it investigates owner-occupant and tenant Hhs' reinvestment decisions together. Therefore, considering the effect of **mode of tenure** on reinvestment decisions is vital for this study. In the Turkish case, basically three types of Hhs can be identified in the FO system with respect to 'mode of tenure': owner-occupants, tenants, and owners of the rental stock. Tenant Hhs can further be divided into sub-categories as 'chronic tenants', 'privileged tenants' and 'voluntary tenants' (Balamir, 1992). 'Chronic tenants' can be identified as Hhs who pay rents for the unit they occupy and who don't have sufficient means for owning a house. 'Voluntary tenants', contrary to chronic ones, may have sufficient means but do not invest in home ownership. Hhs living with parents or in relatives' dwellings, paying rents below market levels or no rent at all can be identified as 'privileged tenants'. This group of Hhs may be in the expectation of moving out or inheriting the unit in the long run. HBS and Ankara Survey provide observations on three tenure categories as owner-occupants, privileged tenants, and tenants. 'Tenants' in this categorization cover both 'chronic' and 'voluntary' tenants; unfortunately it is not possible to identify them separately. No information, however, exists on owners of the rental stock.

Different tenure modes provide Hhs with different rights and responsibilities on the dwelling unit as discussed in Section 4.2. This in turn affects Hhs' investment and consumption

considerations. Home ownership is the preferred form of tenancy in Turkey not only for own consumption by Hhs, but also for investment and financial security (Balamir, 1992, 1999; Türel, 1996). Flat owners are free to enjoy their rights of occupancy as owner-occupiers or they can rent their dwelling units. Yet, reinvestment behaviour of owner-occupiers and Hhs capable of renting their housing property are different in nature. For owner-occupiers, reinvestments provide both consumption and investment benefits; however, rental stock owners receive no direct consumption benefits. On the other hand, tenants' motivation to reinvest differ from owner-occupants' and rental stock owners'. Tenants solely receive consumption benefits from their reinvestments. Two possibilities may arise in the case of privileged tenants' reinvestment behaviour. If those Hhs are expecting to inherit the dwelling unit they occupy, then their reinvestment behaviour could be similar to owner-occupiers. If the expectation is moving out in the long run (e.g. newly married couples) then Hhs are less likely to invest or refrain from reinvesting in the existing dwelling.

For most owner-occupiers, the house they own is probably the single largest investment in the Hh investment portfolio, preserving the value of this investment is therefore significant for them. Reinvestments can help to offset the effects of deterioration, and thus depreciation to some extent, in the inhabited dwelling that would be observed as the dwelling ages and is used. Preservation of asset value means for an owner-occupier that this can later be capitalized in the resale value if the owner decides to sell the property at a future stage of life-cycle. Rental stock owners, on the other hand, are likely to undertake reinvestment work with investment considerations either to secure their initial investments or to capitalize higher rental income where possible. Investment benefits for them are basically associated with expected rental returns to their reinvestments.

Reinvestments also provide consumption benefits to owner-occupiers by increasing and/or adjusting the housing services. One of the reasons for Hhs to prefer home ownership is believed to be the consumption value of the ownership itself. As Megbolugbe and Linneman state (1993);

(1) owner-occupiers are believed to have access to a stock typically consisting of larger and well equipped structures,

(2) they can customise their dwellings according to their tastes,

and as Baum and Hassan (1999) underline;

(3) undertaking substantial reinvestment works is essentially reserved for owner-occupiers.

Although, the 3rd argument is also valid for Turkish Hhs, 1st and 2nd arguments need to be reconsidered:

(1) Turkish housing stock is developed through market mechanisms and almost all of the stock (both owner-occupied and rented) is under private ownership. During the production process no special attention is paid to meet the demands of different Hh groups such as singles, disabled, tenants, etc. Therefore the stock is not differentiated much in terms of number of rooms, floor area, structural quality, and equipments. As Balamir (1999) highlights tenants' conditions in terms of dwelling characteristics are not inferior compared to owner-occupants in the Turkish case.

(2) According to FO law, flat owners are responsible for reinvestments in their dwelling units. Yet, as discussed in Section 4.2, tenants' reinvestments depend fundamentally on the consent of their home owners, as well as willingness and financial means of tenants. Therefore, in principle, tenants can also customise their dwelling units according to their tastes, for instance, they can paint the walls, door-window frames, and they can even make replacements in kitchen and bathroom if they can afford it and have the consent of their home owner. Yet, for tenant Hhs', consumption benefits derived from reinvestments are a function of their length of stay.

Consequently, 'mode of tenure' affects both reinvestment decisions to materialize and size of investments by providing differing incentives to undertake reinvestment work. Since owner-occupiers have both investment and consumption benefits, they are expected to be more likely to undertake reinvestments and size of their expenditure is expected to be higher compared to other groups. Tenants, having high mobility rates and considering the possibility of eviction, are expected to undertake only essential reinvestments for their own consumption. Therefore, reinvestment works and large-scale expenditures are less likely to be realized by tenants. Behaviour of privileged tenants, on the other hand, is expected to be similar to owner-occupiers since it is believed that most of these Hhs are in anticipation of inheriting the dwelling in the long-run. It is also possible that owners (parents) are more likely to reinvest on behalf of their offsprings.

Any type of investment decision requires financial means to realize this decision. In literature, financial ability to undertake reinvestment work is usually measured by **Hh income**. Yet, as Littlewood and Munro (1996) highlight, a number of infrequent large-scale works are difficult to be met out of current income and Hhs may have to employ their **savings** (or some mode of borrowing). Previous empirical evidence display that higher Hh incomes increase both the frequency of nonzero reinvestment expenditures and size of the expenditure itself. This is also expected to be valid for the Turkish Hhs. Rate of owner-occupiers are also likely to increase with increasing Hh income, which may further trigger reinvestment expenditures among high income Hhs. Rate of tenants, on the contrary, is expected to decline with increasing Hh income. However, a portion of high income tenants may be 'voluntary tenants', displaying different consumption patterns compared to other tenants. Therefore, high reinvestment expenditures may be anticipated among high income tenant Hhs. Availability of savings, on the other hand, is expected to be positively correlated with the size of reinvestment expenditures. Hh income can be explored both from HBS and Ankara Survey. Savings, on the other hand, are available in HBS data in terms 'savings deposits of Hhs in bank accounts'. In the Ankara Survey, it is possible to observe whether Hhs employed their savings for reinvestment expenditures or not, but savings as an independent variable is not available for all Hhs.

Similar to budgetary constraints there are also constraints imposed on reinvestment decisions by Hhs' time horizons. Hhs' reinvestment decisions are a function of their expected length of stay in the dwelling in which they can enjoy the benefits of reinvestments. In theory, Hhs with longer expected tenures are more likely to engage in reinvestments. This relationship can be observed directly from the Ankara Survey where **mobility expectation** of Hhs in five years time is provided. In general, direct observation of mobility expectation is rarely available in databases; therefore **age of the Hh head** is usually accepted as an indicator of time horizons or time preferences of Hhs. Younger people are assumed to be more mobile and emphasize the present time more than middle-aged or old-aged people. Elderly Hhs, on the other hand, have shorter time horizons compared to middle-aged. Both the young and old-aged Hhs therefore have shorter expected tenures and limited period of time in which the benefits from reinvestment activities can be enjoyed. Additionally, for elderly Hhs, reinvestments are argued to be a burden since disruption from reinvestment activities are unbearable and organization of reinvestment works are more problematic compared to younger and middle-

aged Hhs. Among the age groups, middle-aged Hhs are usually assumed to be more likely to undertake reinvestment expenditures. This is basically due to their longer expected tenures in the dwelling unit, and also the higher income levels when compared to other Hhs. Yet, findings of the previous studies display contradictory results with regard to the age of the Hh head. In the Turkish context, middle-aged people are also expected to be more likely to undertake reinvestment works compared to younger Hh heads. However, reinvestments of elderly Hhs may not fall behind middle-aged Hhs due to three basic reasons. First, as the age of the Hh head increases, home ownership ratio also increases in Turkey (Sarıoğlu et al., 2007). This may trigger reinvestment expenditures of elderly Hhs. Second, old-aged people most of which are retired have much time to devote on the reinvestment activities, whereas younger people have long working hours and cannot spend time easily on such works. Additionally, likelihood of hiring specialized labour may be more common for elderly Hhs, which may further increase the expenditure levels. Effects of Hh head age on the likelihood and size of reinvestment expenditures can be observed both from HBS and Ankara Survey.

Another variable frequently employed to explore the effects of Hhs' expected length of tenure on reinvestment decisions is **duration of occupancy** in the dwelling unit. Duration of occupancy is usually assumed to have a 'complex to identify' effect on Hhs' reinvestment decisions. Increasing length of stay in the dwelling is accompanied with increasing depreciation rates due to aging and use of the dwelling. In theory, increasing length of stay lowers the incentive for reinvestments since value of the dwelling declines parallel to the length of stay in the dwelling. Yet, as the duration of occupancy increases Hhs are also known to develop social ties with the neighbourhood and the neighbours, and they get used to live in the same dwelling which work against mobility decisions. Reinvestments observed in the first year of occupancy are usually assumed to have adjustment purposes. As the duration of stay lengthens, owner-occupiers (both with investment and consumption considerations) are expected to respond the emerging reinvestment needs as soon as possible if no budget constraints, technical problems, and mobility plans in the near future prevail. If, owners are in expectation of mobility, then they probably do not undertake any investment that they can not capitalize in the resale value. For tenants, the times immediately after their move to the dwelling may be the most preferable time for reinvestments in order to obtain maximum consumption benefits. Increasing length of stay may mean higher probability of eviction for tenants.

As Hhs progress through life cycle stages, changes in Hh size and income result in changing housing needs and preferences. This in turn increases the need for reinvestments. For instance, increasing Hh size due to family formation or child bearing may underline the need for additional housing space, and therefore adaptation of the existing dwelling accordingly. If these types of Hh demands cannot be met in the existing housing, they eventually lead to mobility decisions. Investigating the changes observed in the life cycle of Hhs and their effects on reinvestment decisions is very difficult since retrospective data is rarely available to housing researchers. Previous studies attempt to tackle this problem by employing a combination of Hh type, age of the Hh head, and Hh size variables. None of the employed measures, however, reflect the changes observed in Hh life cycle. Rather they provide information on the current phase of life cycle or Hh composition. Yet, investigating Hh composition through **Hh size** and **Hh type** may still be promising further explanations for Hhs' reinvestment decisions. In this case, Hhs' with different compositions such as married couples with or without children, singles, extended families etc. may expected to display differing reinvestment patterns. Moreover, in the Ankara Survey it is possible to identify **changes in Hh size** during the recent years. Increasing Hh size is expected to affect likelihood and size of reinvestment expenditures positively. Furthermore, changes in Hh size during the Hh life cycle also alter the **occupation density** in current dwelling and therefore affect depreciation rates. Overcrowded dwellings are assumed to depreciate faster due to Hh use, thus require higher levels of reinvestments. If the reason of over-utilisation is Hh's financial limitations that curb the capacity to afford a larger dwelling, then Hh may not respond to reinvestment needs observed in overcrowded dwelling. Effects of occupation density on reinvestments can be explored both from HBS and Ankara Survey by the calculation of 'person per room ratio', employing '**Hh size**' and '**number of rooms**' variables.

4.4.2. Effects of Dwelling Characteristics on Reinvestment Decisions

Dwelling itself has a number of characteristics which affect Hhs' reinvestment decisions. **Age of the dwelling** is one of the most studied dwelling attributes which is used frequently as a proxy for condition of the dwelling in reinvestment literature. As the age of the dwelling increases, generally depreciation is observed in house values due to partial loss of services provided by the housing unit. Therefore, likelihood and size of reinvestments are anticipated to be positively correlated with age of the dwelling. In older dwellings, reinvestments are

expected to be undertaken both to offset the effects of depreciation as an investment consideration, and to improve the services provided by housing unit as a consumption consideration. In the new dwellings, on the other hand, since dwelling condition is expected to be good, reinvestments are likely to be low. In the Turkish case, two points worth mentioning in considering the effects of dwelling age on reinvestment decisions. First, it must be noted that Turkish urban housing stock is relatively young, compared to many other countries, approximately 78 per cent of which is constructed after 1970s. Yet, several earthquakes proved that initial construction quality of this stock is very poor. Second, as mentioned in Chapter 3, the performance displayed in new housing production is very high, even reaching to 500-600 thousand dwelling units in some years, with increasing dwelling sizes. Therefore, greater rates of property transfers are more likely for high income Hhs resulting in the transfer of older dwellings to relatively lower income groups. This in turn may decrease the likelihood of reinvestments in older dwellings since lower income Hhs are expected to be less likely to undertake reinvestments compared to higher income Hhs.

Hhs' reinvestment decisions are also influenced by size of the dwelling. Theoretically, larger dwellings experience reinvestments more frequently since they contain more cost items and opportunities for alterations and remodelling compared to smaller dwellings, and size of expenditures are expected to increase with size of the dwelling. There are two different indicators of dwelling size: **floor area** and **number of rooms**. First one better suits the needs when investigating the effect of dwelling size on reinvestment expenditures. This is due to the standard unit of analysis, sq meter, provided by this variable. In the Turkish case, as mentioned before, a general trend of new construction is to produce larger and larger dwellings. Since new construction (relatively larger stock) is expected to be in good condition it may be less likely to attract reinvestments.

Value of dwelling services also affects Hh's reinvestment decisions. Both HBS and the Ankara Survey provides **monthly rent** which can proxy value of dwelling services. Monthly rent is the actual rent level for tenant Hhs whereas it is the imputed rent for owner-occupiers and privileged tenants. Although, monthly rent is employed as a dwelling characteristic it also reflects characteristics of the neighbourhood. As mentioned before in Section 2.1, housing has the qualities and constraints of land such as location and linkages with surroundings. Furthermore, it is perceived as a 'package' which includes the physical appearance of the

neighbourhood and the social character of people living in it (Smith, 1970). Therefore, there are grounds to assume that identical houses in different neighbourhoods are not valued identically both by Hhs and by the market. Low levels of monthly rents are expected to be associated with poor dwelling and neighbourhood qualities and therefore are expected to be accompanied by low levels of reinvestments.

Since this study investigates basically Hhs' reinvestment decisions in flats, condition of the apartment block is also expected to influence Hh behaviour. The Ankara Survey provides information on the **RM undertaken in common parts of the apartment block**. Hhs are expected to be more likely to undertake reinvestment expenditures in their independent parts if commonly owned parts of the apartment is maintained in good order. Moreover, Ankara Survey provides **Hhs' evaluation of their dwelling units** with respect to its size, state of disrepair, and existence of burglary. Problems regarding the size of the dwelling may be more likely to result in a mobility decision, whereas disrepair and security problems can be eliminated easily by reinvestments.

4.4.3. Effects of Neighbourhood Characteristics on Reinvestment Decisions

In addition to the attributes of Hhs and dwelling units, neighbourhood characteristics are also assumed to affect Hhs' reinvestment behaviour. Declining neighbourhoods are usually assumed to attract less reinvestment compared to other neighbourhoods. Most of the studies reviewed in Chapter 2 attempt to capture the effects of neighbourhood factors on reinvestment behaviour either by employing information on physical conditions of the neighbourhood (e.g. condition of sidewalks, good road surface, adequacy of schools) or via neighbourhood evaluation of Hhs. Ankara Survey provides both subjective and objective measures of neighbourhood characteristics. Hhs' evaluation of neighbourhood in terms of **services**, **accessibility**, **safety**, and **environment** are provided as scale variables. Hhs who are satisfied with the neighbourhood attributes are expected to be more likely to undertake reinvestment work. Moreover, **land values** are also integrated to the Ankara Survey as an objective measure of neighbourhood attributes. Land values in Ankara with respect to district and street names are obtained from the Revenue Administration of the Ministry of Finance. As mentioned in Section 1.3, these values are the minimum land values assessed by Tax Assessment Committees to establish property tax. Since the Ankara Survey provides exact

location of each building, it becomes possible to integrate land values into the database for each case. Higher land values reflect the locational advantages in terms of accessibility, proximity to district / city centres, etc. Therefore, land values and size of reinvestment expenditures are expected to be positively correlated.

In the light of above discussions, determinants of individual reinvestment decisions are explored in the next two chapters. In Chapter 5, raw data of HBS (2004) is employed to investigate reinvestment decisions of urban Hhs living in single family homes and flats. In Chapter 6, data from the Ankara Survey (2007-08) is examined in order to identify the determinants of reinvestment decisions in flats.

CHAPTER 5

EMPIRICAL INVESTIGATION OF REINVESTMENT DECISIONS OF URBAN HOUSEHOLDS IN TURKEY

5.1. Reinvestment Decisions of Households in Urban Turkey

Previous chapter displayed that Turkish Hhs, dominantly owner-occupiers, are the main decision makers of reinvestments in housing. Furthermore, Hh's reinvestment decision is argued to be a function of Hh characteristics, qualifications of the dwelling unit, features of the neighbourhood which the dwelling is located, and the general conditions prevailing in the market. It is also underlined that Hh behaviour is affected by the behaviour of other actors in the housing market (i.e. other Hhs, public / private institutions). In this part of the study, major aim is to identify main Hh and dwelling characteristics affecting Hhs' reinvestment decisions in the Turkish case by employing Household Budget Survey (HBS) 2004 data at the national level[58].

Major argument in this chapter is that Hhs' reinvestments in the existing housing stock constitutes a significant economic activity in urban property, and Hhs' reinvestment expenditures are triggered or abated by a number of factors related to Hh, dwelling, etc. With this argument in mind, this chapter poses a set of questions and attempts to answer them under the limitations of the HBS data:

- What was the total volume of Turkish urban Hhs' reinvestment expenditures in year 2004? Is it possible to argue that Hhs' reinvestment expenditures in urban Turkey constitutes a significant share in residential investments compared to the value of new housing construction in 2004?
- Do frequency and size of reinvestment expenditures vary with respect to seasons? If so, what implications does this variation have on data collection procedures? Does HBS provide a reliable data considering seasonal variations in expenditures?

[58] Recall that with HBS data it is only possible to investigate the effects of Hh and dwelling characteristics on reinvestment decisions.

- Do frequency and size of reinvestment expenditures vary with respect to dwelling type (single family houses vs. flats)? OR, can we observe any substantial differences in reinvestment expenditures undertaken in single family houses and flats?
- Which Hh and dwelling characteristics significantly affect (encourage / discourage) Hhs' reinvestment decisions?
- Based on the significant factors affecting Hhs' reinvestment decisions, is it possible to identify Hhs who are unable / unwilling to reinvest to their dwellings or dwellings which are unlikely to receive reinvestments?

5.2. Method of Analysis

5.2.1. Household Budget Survey Data (Turkey – 2004)

HBS is conducted annually by TURKSTAT since the year 2002 to obtain data on Hh income and consumption expenditures. HBS data is employed basically in computing Consumer Price Index, assessing the poverty level in the country, investigating the trends in consumption patterns, etc. Although HBS is not designed as a housing survey, it is the only data source available at the national level which provides information on Turkish Hhs' **RM expenditures in housing**[59]. HBS also offers a number of Hh and dwelling characteristics which are significant for this research. Therefore, this part of the study employs raw data of HBS (2004) in order to explore the effects of Hh and dwelling characteristics on RM decisions of Hhs[60]. Since the sampling method of HBS has purposes other than housing research, the data is employed here solely as a selected sample. In other words, the cases are not weighted to represent the whole population of Turkey. Appendix C presents the questionnaire form and implementation method of the HBS (2004).

HBS (2004) was conducted through January 1st – December 31st, for a full year in 2004. Each month 720 Hhs were surveyed (70 per cent of whom were urban Hhs) and asked to record their consumption expenditures on a daily basis for a full month period to 'expenditure diaries' provided by TURKSTAT. Therefore, HBS presents a monthly picture of nearly 8600

[59] Detailed information on RM expenditures and the cost items included / excluded under these expenditures are presented in Section 5.2.2.
[60] 2004 HBS data was the most recent raw data available to public during the course of this study. This data was made available to public use in 2008.

individual Hhs' RM expenditures in total. Geographic coverage of the survey is all of the settlements within the borders of the Republic of Turkey. The sampling was based on a two stage stratification of settlements as 'urban areas' (settlements having more than 20,000 inhabitants), and 'rural areas' (settlements with 20,000 and less inhabitants). Within the scope of this study only the RM expenditures of urban Hhs living in apartment blocks and single family houses (5778 cases) are considered. Appendix D presents the data preparation and reduction steps, and applied transformations to the data. All monetary values employed in the analyses are Euro and represent 2004 prices.

HBS results are also available as an interactive database on TURKSTAT's website for years 2002-2006[61]. The interactive database provides national estimates of average monthly consumption expenditures of Hhs for a limited number of variables available in the raw data. This database is employed as well to provide information on Hhs' reinvestments for a five year period where possible.

5.2.2. Dependent and Independent Variables

In this database reinvestment expenditures of Hhs are represented by expenditures on RM activities. These expenditures are provided as a sub-category to expenditures for 'Housing, Water, Electricity, Gas and Other Fuels'. RM expenditures are the expenditures for **materials** used and **professional services** employed for RM of the dwelling[62]. The cost items included in these categories are as follows:

(1) Materials used for RM of the dwelling

-Floor / wall surfacing materials: floorboards, ceramic tiles, vinyl tiles, wallpapers, wall coverings, etc.

-Painting / surfacing materials: paints, varnishes, whitewash, plaster, putty, wallpaper pastes, grout, mortar, brush, paint roller, etc.

-Kitchen-bathroom equipments: sinks, worktops, bathtubs, showers, shower bases, toilets, etc.

[61] This database can be accessed at www.turkstat.gov.tr under 'Income Distribution, Consumption and Poverty' section.

[62] Neither the manuals provided with the raw data of HBS nor the web site of the TURKSTAT presents a detailed description of the cost items included in the RM expenditures. To compile this information was only made possible by several interviews with the Household Budget Statistics Team of TURKSTAT. Their valuable contributions are highly acknowledged.

-Plumbing items: faucets, flush tanks, water meter, pipes, joints, etc.
-Security measures: louvers, barbed wires, barriers, etc.
-Other construction materials: glass, door, window, brick, gravel, cement, sand, etc.

(2) Professional services employed for RM of the dwelling
Every type of professional services provided by repairers, house painters, floor polishers, plumbers, electricians, glaziers, etc.

RM expenditures **exclude** furniture and furnishings, carpets, lighting equipment (i.e. ceiling lights, standard lamps, light bulbs), Hh textiles, Hh appliances, cleaning equipment, glassware, tableware and Hh utensils, cleaning and maintenance products (i.e. detergents, conditioners, polishes), services provided for RM of those materials, domestic services (cooks, maids, cleaners, etc.), and Hh services (dry-cleaning, home care services, etc.). These types of expenditures are included in consumption expenditures for 'Furnishings, Hh Equipments and Hh Maintenance'.

The data on RM expenditures is compiled from the daily Hh records of consumption expenditures which cover information on: (1) name of the purchased good and service, (2) brand, (3) type and detailed definition, (4) scale of measurement, (5) quantity purchased, (6) unit market price, (7) total value, (8) paid in advance, (9) place of purchase. These records are classified during the data entry process according to the Classification of Individual Consumption by Purpose (COICOP), and only the total expenditures in the survey month on classified consumption categories are provided to end-users[63]. This means, ***if the payment was done in instalments only the amount spent in the survey month was considered***. In other words, information on total value of RM work, the detailed definition of expenditures, quantities, unit market prices etc. which are very valuable for this research are lost in the data entry process totally.

Two **dependent variables** are derived from the RM expenditures. First one is a dichotomous variable representing Hhs with 'zero' and 'nonzero' RM expenditures. Hhs with nonzero RM expenditures are referred as '**repairer Hhs**' hereafter. This variable is employed while

[63] COICOP is a reference classification published by the United Nations Statistics Division.

investigating the likelihood of RM decisions. Second dependent variable is an ordinal one which represents 'expenditure categories' for the nonzero RM expenditures. Both the actual expenditure levels and expenditure categories are employed through exploring the size of RM expenditures.

HBS data also provides 7 variables related to the characteristics of the Hhs, and 5 variables representing the qualifications of the dwelling unit which are the **independent variables** of this study (Table 5.1). An additional variable, 'occupation density', is also created and employed using 'Hh size' and 'number of rooms' variables. Furthermore, 'survey month' is also included in the analysis as an independent variable. Therefore, in total 14 independent factors are employed in this part of the study.

Table 5.1 List of Independent Variables Employed in the Analysis

Variable	**Range**
Hh Characteristics	
Mode of Tenure	1. Owner-occupier 2. Privileged-tenant 3. Tenant
Hh Income (monthly average)	25-13,250 Euro
Savings	1. No savings 2. Some savings
Age of the Hh Head	17-99 Years
Hh Type	1. Couples: with children 2. Couples: no child 3. Extended family: with children 4. Extended family: no child 5. Single Parent 6. Single Adult: no child 7. Other family 8. Non-family
Hh Size	1-18 Person
Duration of Occupancy	Less than 1 year-80 years
Occupation Density (calculated)	1. Underoccupation 2. Comfort 3. Overcrowding
Qualifications of Dwelling	
Age of dwelling	Less than 1 year-104 years
Type of dwelling	1. Single family house 2. Flat
Size of dwelling (rooms, floor area)	1-7 rooms, 25-250 sq meters
Monthly Rent (actual and imputed)	10-950 Euro
Other	
Survey Month	1st – 12th Month

5.2.3. Data Analysis

Analysis of the Hhs' reinvestment decisions is done in three major steps[64]. In the first step (Section 5.3), the nature of RM expenditures is explored through univarite and bivariate analyses. Particularly, seasonal distribution of RM expenditures, the share of expenditures for materials and professional RM services, RM decisions in single family houses and flats, and the total volume of RM expenditures compared to new residential investments are examined.

In order to examine the factors affecting the likelihood and the size of RM expenditures, univariate and bivariate analyses are done in the second step, and multivariate analysis is carried out in the third step. In the second step (Section 5.4) the effects of each Hh and dwelling characteristic on Hhs' reinvestment decisions are examined individually. For each independent variable, distribution of repairer Hhs and the size of their RM expenditures are explored. Chi-square and F-statistics are employed to determine the statistically significant Hh and dwelling attributes affecting Hhs' reinvestment decisions. Chi-square is presented as an output of the crosstabulations between the independent variables and the dichotomous dependent variable. Whereas, F-statistics are employed in examining the significance of mean RM expenditure differences for categories of independent variables. Test of statistical significance indicates solely the likelihood that an observed relationship actually exists. It does not point to the strength of the observed relationship (or practical significance). Strength of the relationships is displayed by correlation analysis in the third step.

In the third step (Section 5.5), statistically significant factors identified in the second step are used in multivariate analyses that examine factors influencing the likelihood of RM decisions and size of the RM expenditures. Logistic regression is employed as the method of statistical analysis. This method is preferred fundamentally due to its flexibility compared to other techniques (i.e. multiple regression, discriminant analysis). It has no distributional requirements about independent variables, for instance, independent variables do not have to be normally distributed, they can be any mix of continuous, discrete and dichotomous variables, the distribution of responses on the dependent variable may be nonlinear with one or more independent variables (Tabachnick & Fidell, 2001). Yet, dependent variable in

[64] Refer to Figure 1.2 in Chapter 1 for a flowchart displaying the structure of analyses.

logistic regression has to be discrete. The likelihood of undertaking a nonzero RM expenditure given the Hh and dwelling characteristics is investigated through 'binary logistic regression' method[65]. This method is appropriate when the dependent variable is dichotomous i.e. non-repairers / repairers. Factors affecting the size of RM expenditures are investigated through 'ordinal logistic regression' method[66]. This method allows the dependent variable to have more than two categories which have an order, i.e. categories indicating different RM expenditure levels[67]. More details on the applied techniques are presented in Appendix E. It must be recalled that all monetary values presented in the following sections are monthly averages in Euro and represent 2004 prices (unless otherwise stated) with average conversion rate 1 Euro = 1.85 TRY[68].

5.3. Repairs and Maintenance Expenditures of Households in Urban Turkey

Out of 5778 urban Hhs living in single family houses and flats, 686 Hhs (12 per cent) reported RM expenditures in the survey month[69]. An average repairer Hh spent 50 Euro for RM works while total volume of monthly RM expenditures was nearly 34,300 Euro. Of these expenditures 43 per cent were payments for professional RM services, whereas 57 per cent were for material purchases. As observed from Table 5.2, most of the Hhs spent less than 50 Euro and these expenditures were predominantly for material purchases. The share of material purchases decreases as the expenditure level increases. Only 22 per cent of the repairer Hhs spent over 50 Euro for RM works, yet these Hhs' expenditures constitute 84.4 per cent of the total RM spending. Low rates of repairer Hhs observed in the sample and low levels of reinvestment expenditures undertaken by repairer Hhs can be attributed to the data itself which represents only the expenditures undertaken in the survey month. RM expenditures for a Hh may not take place in every month as expenditures for food. Hhs may employ various reinvestment strategies in different seasons or under different Hh conditions through a year.

[65] 'Binary logistic regression' is also referred as 'logit analysis' in some statistical software, though SPSS performs 'logistic regression' and 'logit analysis' under different procedures. When all of the independent variables are discrete then the results of the logistic regression are the same as logit analysis

[66] 'Ordinal regression' is also referred as 'multinomial logistic regression' depending on the employed statistical software. In SPSS, dependent variables with unordered categories are handled by 'multinomial logistic regression' procedure whereas 'ordinal regression' treats categories as ordered.

[67] Although, size of the RM expenditures is provided as a continuous variable in the HBS, multiple regression method is not preferred since basic assumptions of this method (normality, linearity, and homoscedasticity) are not met.

[68] All tables and figures in Section 5.3, 5.4 and 5.5 are processed by the author for the purposes of this research.

[69] All tenure modes are included.

Therefore, observing the RM expenditures realized in whole year would probably yield higher rates of repairer Hhs with higher expenditure levels.

Table 5.2 Monthly RM Expenditures of All Hhs

Expenditure Categories	Repairer Hhs		Average RM Expenditures (Euro)	Total RM Expenditures (Euro)	Share in Total RM Expenditures (%)	Share of Expenditures for Materials (%)
	Frequency	%				
< 50 Euro	534	77.8	10	5351	15.6	69.2
50-249 Euro	120	17.5	108	12991	37.8	59.4
250+ Euro	32	4.7	500	15996	46.6	51.7
Total	686	100	50	34338	100	57.3

Source: TURKSTAT, *HBS 2004 Raw Data.*

Although, RM works are less dependent on weather conditions compared to other construction activities, frequency and size of RM expenditures may still display variations in different months. For instance, cold or rainy seasons may not be the most appropriate time to undertake works such as repairing a roof, painting, replacing window-frames, etc. Table 5.3 and Figure 5.1 present distribution of Hhs' RM expenditures in 2004 with respect to the month of the survey conducted.

Table 5.3 Seasonal Differences of RM Expenditures

Survey Month	All Hhs (Frequency)	Repairer Hhs		Repairers / All Hhs[1] (%)	Maximum RME (Euro)	Average RME[2] (Euro)	Total RME (Euro)
		Frequency	%				
January	488	38	5.5	7.8	352	21	797
February	483	40	5.8	8.3	105	14	545
March	483	46	6.7	9.5	427	46	2101
April	478	51	7.4	10.7	816	75	3831
May	475	69	10.1	14.5	1204	72	4955
June	485	84	12.2	17.3	1148	36	3039
July	477	69	10.1	14.5	1179	53	3674
August	480	54	7.9	11.3	984	68	3690
September	486	69	10.1	14.2	1180	85	5887
October	478	49	7.1	10.3	589	51	2519
November	479	64	9.3	13.4	253	25	1613
December	486	53	7.7	10.9	382	32	1686
Total	5778	686	100	11.9	1204	50	34338

[1] $\chi^2(11, 5778) = 42.30, p < .05$
[2] $F(11, 674) = 1.88, p < .05$
Source: TURKSTAT, *HBS 2004 Raw Data.*

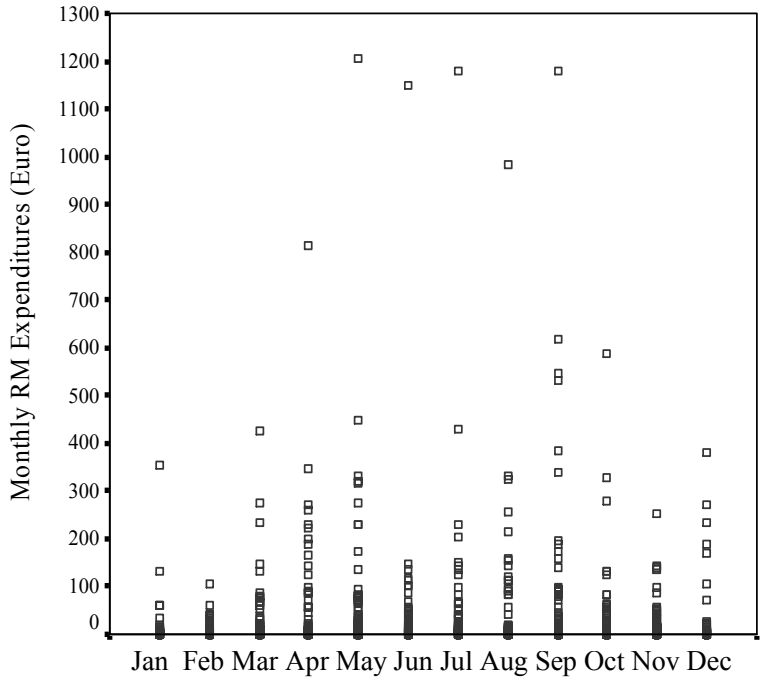


Figure 5.1: Scatter Plot: RM Expenditures in Survey Months

Source: TURKSTAT, *HBS 2004 Raw Data.*

Accordingly, the ratio of repairers to all Hhs displays that Hhs were more likely to undertake RM works during May – September (excluding August)[70]. Highest expenditure levels also took place through these months. Expenditures realized in May and September are 14.4 per cent and 17.2 per cent of the total RM expenditures respectively. Large-scale works, on the other hand, are observed more frequently through March to September (Figure 5.1). Furthermore, chi square and F-statistics provided in the Table 5.3 display that there is a statistically significant relationship between the RM decision and the 'month'.

Single family houses, as well as apartment blocks, are covered in the HBS sample. Usually, Hhs living in single family houses are expected to display higher RM expenditures compared to Hhs living in flats. This is due to the fact that Hhs in single family houses are responsible from RM in all parts of the dwelling including foundation, roof, etc. which are considered as common parts of the building in apartment blocks and maintained by joint efforts of all flat

[70] August is usually preferred for summer vacation and the weather is generally too warm in the whole country so that Hhs may not prefer to undertake messy works. Moreover, especially in eastern and southern regions it may be difficult to find labour for any type of RM activity in hot summer.

owners. However, as Table 5.4 displays, both the ratio of repairer Hhs and the average RM expenditures do not differ significantly in single family houses and apartment flats.

Table 5.4 Summary Statistics: 'Type of Dwelling'

Dwelling Type	All Hhs		Repairer Hhs		Repairers / All Hhs[1] (%)	Average RME[2] (Euro)	Share in Total RME (%)
	Frequency	%	Frequency	%			
Single Family House	1945	33.7	228	33.2	11.7	47	30.9
Flat	3833	66.3	458	66.8	11.9	52	69.1
Total	5778	100	686	100	11.9	50	100

[1] $\chi^2(1, 5778) = 0.06$, $p > .05$
[2] $F(1, 684) = 0.25$, $p > .05$
Source: TURKSTAT, *HBS 2004 Raw Data*.

Table 5.5 displays that, average RM expenditures of all tenures are slightly higher in flats compared to single family houses. Ratio of repairers, on the other hand, is higher in flats for tenants and privileged tenants. Yet, chi square and F statistics produce insignificant results.

Table 5.5 RM Expenditures with respect to 'Type of Dwelling' and 'Mode of Tenure'

	All Hhs		Repairer Hhs		Repairers / All Hhs[1] (%)	Average RME[2] (Euro)
	Frequency	%	Frequency	%		
Owner-occupiers						
Single Family House	1314	35	170	36	12.9	56
Flat	2452	65	308	64	12.6	66
Total	3766	100	478	100	12.7	62
[1] $\chi^2(1, 3766) = .74$, $p > .05$ [2] $F(1, 476) = .44$, $p > .05$						
Tenant-privileged						
Single Family House	165	45	21	42	12.7	29
Flat	205	55	29	58	14.1	39
Total	370	100	50	100	13.5	35
[1] $\chi^2(1, 370) = .11$, $p > .05$ [2] $F(1, 48) = .21$, $p > .05$						
Tenant						
Single Family House	466	28	37	23	7.9	12
Flat	1176	72	121	77	10.3	20
Total	1642	100	158	100	9.6	18
[1] $\chi^2(1, 1642) = 2.12$, $p > .05$ [2] $F(1, 156) = 1.76$, $p > .05$						

Source: TURKSTAT, *HBS 2004 Raw Data*.

According to Table 5.6, Hhs living in single family houses display lower average Hh income, they live in older, smaller, and less valued part of the stock, and occupy their dwellings longer compared to Hhs living in flats. These Hh and dwelling characteristics may be the reason

underlying lower reinvestment levels in single family houses compared to flats. As significance tests in Table 5.4 and 5.5 underline, 'type of dwelling' does not contribute to explain Hhs' RM decisions in HBS data, therefore all repairer Hhs (686 Hhs) are investigated together in the rest of the analysis regardless of their dwelling type.

Table 5.6 Hh and Dwelling Characteristics with respect to 'Type of Dwelling'

Dwelling Type	Hh Characteristics				Dwelling Characteristics		
	Mean				Mean		
	Hh Income (Euro)	Age of Head (Years)	Occupancy (Years)	Owner-occupiers (%)	Age (Years)	Floor Area (Sq Meter)	Monthly Rent (Euro)
Single Family House	410	47.5	15.0	68	26.2	94	55
Flat	720	45.6	8.5	64	16.7	106	109
Total	615	46.2	10.7	65	19.9	102	91

N = 5778 Hhs
Source: TURKSTAT, *HBS 2004 Raw Data*.

According to estimates of TURKSTAT (2002-2006), the total volume of Hhs' average monthly RM expenditures in urban Turkey was nearly 65.6 million Euros in 2004[71]. This estimate covers not only Hhs living in single family houses and flats but also squatter dwellers, public housing, and other Hhs included in the survey. For the Hhs investigated in this study (Hhs living in single family houses and flats) this volume is estimated to be 59.4 million Euro per month (nearly 714 million Euro annually). Annual value of private residential investments for new construction, on the other hand, was approximately 6.71 billion Euros in urban areas in the same year[72]. This means that the share of Hhs' RM expenditures in urban Turkey (in single family houses and flats) was roughly 10.6 per cent of the private residential investments for new construction in 2004. It must be underlined again that the total volume of RM expenditures estimated from HBS data is an underestimate since (1) HBS collects expenditure data on monthly basis and TURKSTAT employs this data without seasonal adjustment, therefore seasonal differences in reinvestment expenditures are disregarded, (2) HBS considers only the expenditures that take place in the survey month, as a result expenditures that were paid in instalments are not totally covered in RM expenditures

[71] In HBS's, TURKSTAT assings a weighting factor to each surveyed Hh based on the sampling procedure. This weighting factor is employed to generalize the survey results to population level.
[72] Urban areas refer to settlements with 20,001 and more inhabitants in HBS data. Therefore, value of private residential investments in new construction is also calculated for these settlements. Data employed in these calculations are construction permit statistics provided in TURKSTAT's website, www.tuik.gov.tr.

data. Total volume of Hhs' RM expenditures is expected to be much above the estimates of TURKSTAT, furthermore it is likely to increase as the building stock expanded and new construction materials are introduced in the market.

5.4. The Effects of Household and Dwelling Characteristics on Repairs and Maintenance Decisions

Hh's reinvestment decisions are affected by a mix set of factors related to; Hh characteristics, qualifications of dwelling unit, neighbourhood features, and market attributes. However, HBS does not provide variables associated with neighbourhood features and market attributes. Therefore, this part of the study is confined to investigate the effects of Hh and dwelling characteristics on the likelihood of RM works and size of the RM expenditures. Major findings of the analysis are summarized at the end of this section (Section 5.4.3).

5.4.1 Household Characteristics

Mode of Tenure

Owner-occupancy is the dominant mode of tenure among the sampled Hhs of HBS (65 per cent) as expected.

Table 5.7 Summary Statistics: 'Mode of Tenure'

Mode of Tenure	All Hhs		Repairer Hhs		Repairers / All Hhs[1] (%)	Average RME[2] (Euro)	Share in Total RME (%)
	Frequency	%	Frequency	%			
Owner-occupier	3766	65.2	478	69.7	12.7	62	87
Tenant-privileged	370	6.4	50	7.3	13.5	35	5
Tenant	1642	28.4	158	23	9.6	18	8
Total	5778	100	686	100	11.9	50	100

[1] $\chi^2(2, 5778) = 11.32, p < .05$
[2] $F(2, 683) = 7.91, p < .05$
Source: TURKSTAT, *HBS 2004 Raw Data*.

Considering the ratio of repairer Hhs among tenure modes, privileged tenants and owner-occupiers are more likely to undertake RM works compared to tenant Hhs (Table 5.7). The highest average RM expenditure level is displayed by owner-occupiers. An average owner-occupier spends approximately 3.4 times more than an average tenant, and 1.8 times more

than an average privileged tenant. More than four fifth of the total RM spending is realized in the owner-occupied sector. Although, owner-occupier repairers are only 3 times of the repairer tenants in absolute numbers, their share in total RM expenditures is 11 times of the tenants' RM expenditures.

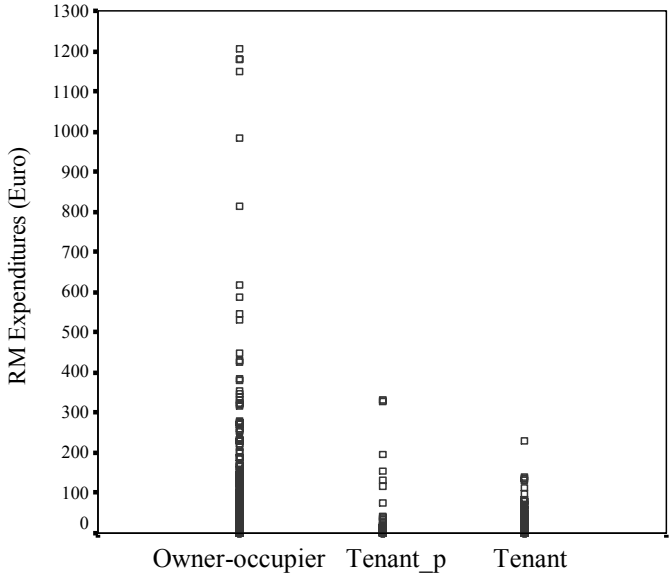


Figure 5.2: Monthly RM Expenditures with respect to Mode of Tenure
Source: TURKSTAT, *HBS 2004 Raw Data*.

Highest expenditure levels for privileged tenants and tenants are 332 Euro and 229 Euro respectively. Expenditures larger than these in the sample are reserved only for owner-occupiers (Figure 5.2). 27 per cent of the repairer owner-occupiers display RM expenditures above 50 Euro. Whereas this ratio is 14 per cent for privileged tenants and 11 per cent for tenant Hhs.

In terms of Hh characteristics there are fundamental differences between tenure modes (Table 5.8). Owner-occupiers are evidently older, having higher average income levels, and occupy the dwelling longer compared to other Hhs. Although, privileged tenants and tenants resemble each other in terms of Hh income and age of Hh head, their length of stay in the dwelling differs considerably. With an average 4 years of occupancy in dwelling, it is not surprising to observe the lowest rate of repairers and low levels of RM expenditures among tenant Hhs. In terms of dwelling characteristics all tenure modes are very similar to each other. Yet, privileged tenants occupy relatively older part of the stock. Comparatively high average

dwelling age is observed for these Hhs since 45 per cent of them occupy single family houses and these houses are older compared to flats (refer to Table 5.5 and Table 5.6 in Section 5.3). Moreover, owner-occupiers consume slightly more dwelling space compared to other Hhs. Tenants' dwelling conditions in terms of dwelling age and size, on the other hand, are not inferior compared to owner-occupiers in the Turkish case.

Table 5.8 Household and Dwelling Characteristics for 'Mode of Tenure'

Mode of Tenure	Hh Characteristics			Dwelling Characteristics		
	Mean			Mean		
	Hh Income (Euro)	Age of Head (Years)	Occupancy (Years)	Age (Years)	Rooms (Number)	Floor Area (Sq Meter)
Owner-occupier	674	49.6	13.5	19.5	3.5	104
Tenant-privileged	525	40.3	10.8	23.9	3.4	97
Tenant	501	39.8	4.2	19.8	3.3	99
Total	615	46.2	10.7	19.9	3.4	102

N = 5778
Source: TURKSTAT, *HBS 2004 Raw Data*.

RM expenditures with respect to mode of tenure can also be explored for 2002-2006 period, employing interactive database of HBS (Figure 5.3) [73]. Accordingly, in urban areas of Turkey, expenditures on owner-occupied stock display higher levels compared to rental stock in every year observed, though type of investments and their effects on depreciation rates are unknown. These results support the argument that 'owner-occupied housing units tend to be better maintained than rental units'. No information however is available on reinvestment expenditures of the rental stock owners regarding units rented to tenant Hhs. On the other hand, expenditures of privileged tenants display always higher levels than tenant Hhs and lower levels than owner-occupiers. This result is in line with these Hhs' situation since they are neither owner-occupiers nor tenants.

[73] In the interactive database, it is not possible to differentiate repairer and non-repairer Hhs. Number of repairer Hhs is only available for 2004 HBS since raw data of the survey is processed by the author for this research. Therefore in Figure 5.3, for each tenure mode 'expenditure per Hh' was calculated by dividing total RM expenditures to all Hhs in that tenure category. Furthermore, interactive database does not provide any information on 'survey month'. As a result, it is not possible to examine whether seasonality effect is the same for tenure modes in different survey years.

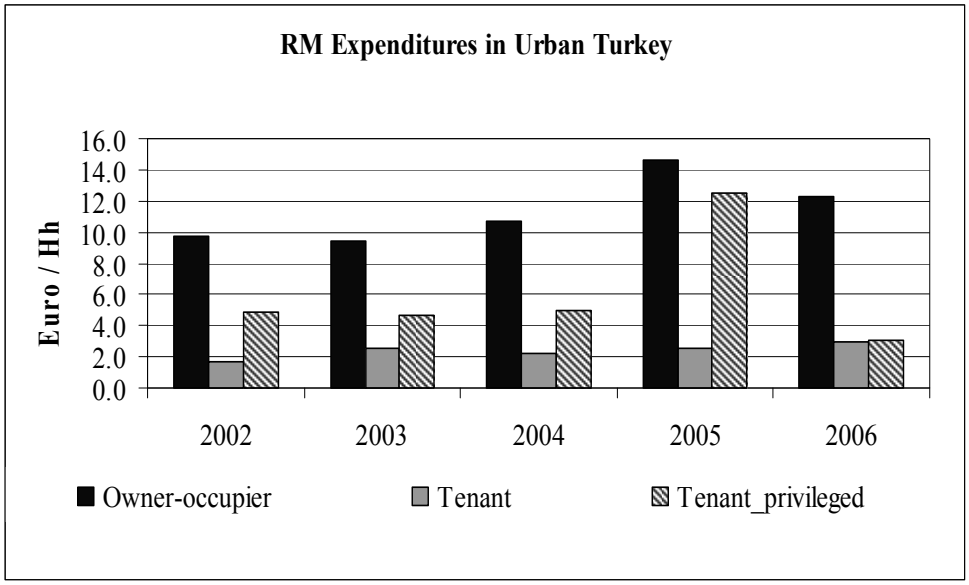


Figure 5.3: Monthly Average RM Expenditures per Urban Hh with respect to Mode of Tenure (2008 constant prices)

Source: TURKSTAT, *Hh Consumption Expenditure Database*: 2002-06.

Hh Income and Savings

Hhs in the HBS sample are clustered at low income values (Figure 5.4). 53 per cent of the surveyed Hhs have less than 500 Euro monthly income. Five equal income categories are created from the ordered list of Hhs with respect to lowest income to the highest one, and these quintiles are employed to explore the effect of Hh income on RM expenditures. In Table 5.9, ratio of repairer Hhs displays that Hhs in the lowest and low income quintiles are less likely to perform RM works compared to Hhs in the highest three quintiles. The lowest average expenditure level is displayed in the lowest quintile whereas the highest average expenditure is realized by Hhs in the highest income quintile. Although average incomes of the top three quintiles (medium, high, and highest) differ considerably from each other, the ratio of repairer Hhs among these groups remains almost the same. Yet, average RM expenditures of highest income Hhs are approximately 2.8 times and 2.3 times greater than high income and middle income Hhs respectively. Unexpectedly, average RM expenditures of high income Hhs is lower compared to middle income Hhs. Furthermore, highest and middle income Hhs realize more than two thirds of the total RM expenditures (48 and 21 per cent respectively).

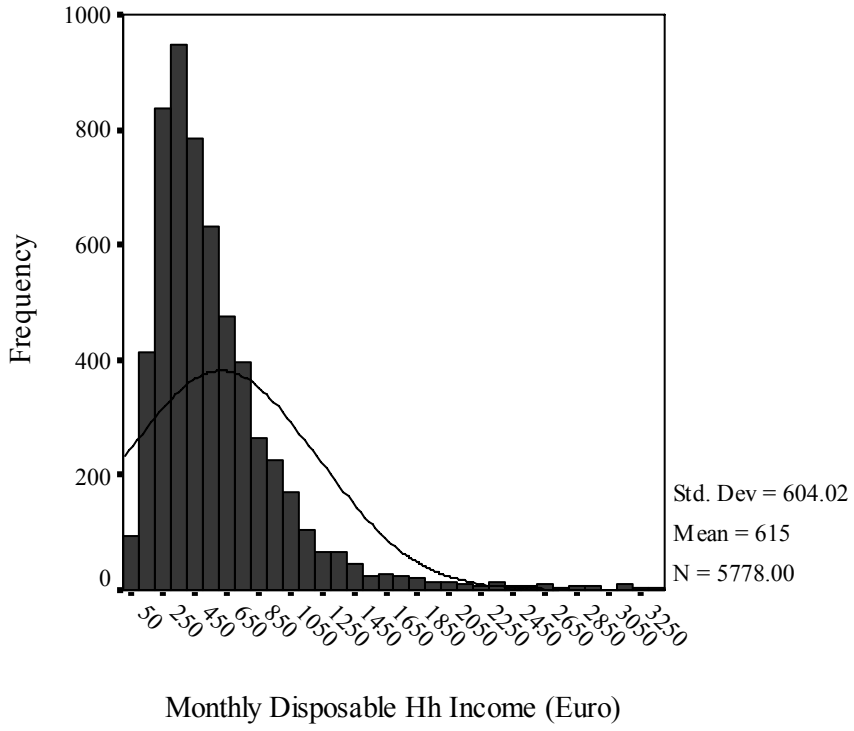


Figure 5.4: Disposable Hh Income[74]

Source: TURKSTAT, *HBS 2004 Raw Data*.

Table 5.9 Summary Statistics: 'Disposable Hh Income'

Income Quintiles	All Hhs		Repairer Hhs			Repairers / All Hhs[1] (%)	Average RME[2] (Euro)	% of Owner-occupiers
	Freq.	Average Hh Income (Euro)	Freq.	%	Average Hh Income (Euro)			
Lowest	1155	200	74	10.8	215	6.4	16	47
Low	1156	340	121	17.6	341	10.5	31	63
Medium	1156	477	165	24.1	477	14.3	44	68
High	1156	672	162	23.6	678	14.0	36	72
Highest	1155	1389	164	23.9	1371	14.2	100	76
Total	5778	615	686	100	686	11.9	50	65

[1] $\chi^2(4, 5778) = 52.57$, $p < .05$
[2] $F(4, 681) = 9.39$, $p < .05$
Source: TURKSTAT, *HBS 2004 Raw Data*.

[74] Income values above 3400 Euro are not displayed in the figure in order to obtain a more visible graphic. Yet, the statistics provided with the figure are valid for all cases.

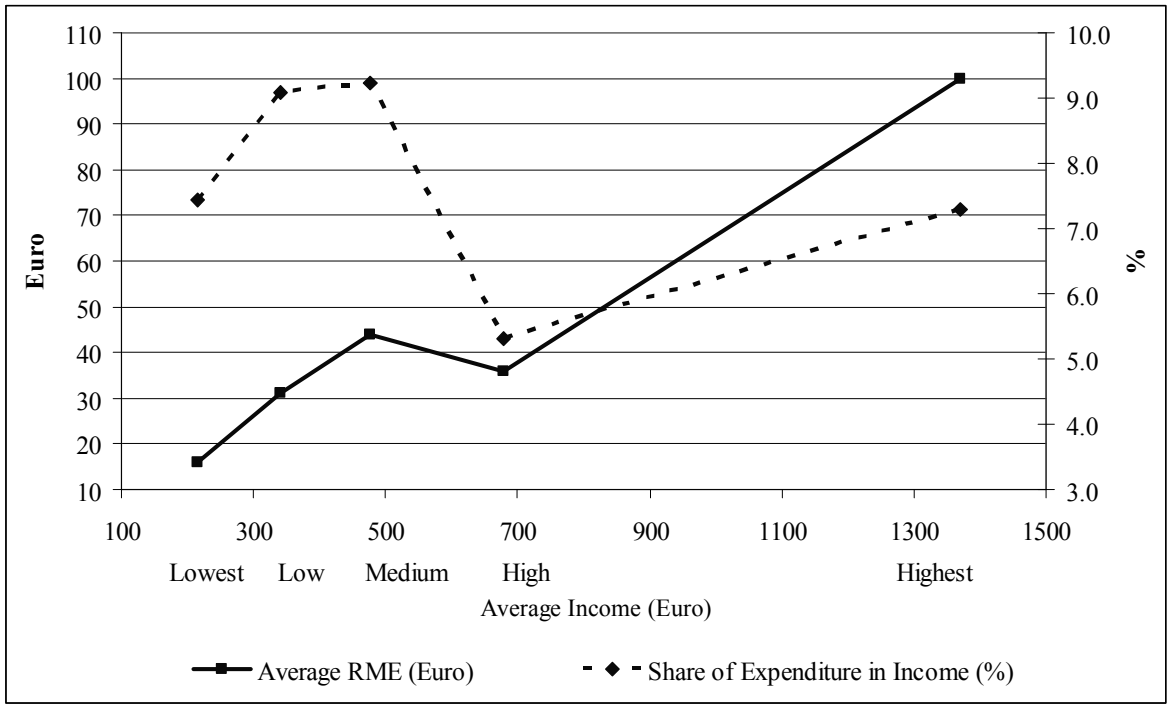


Figure 5.5: Average RM Expenditures and Share of RM Expenditure in Hh Income
Source: TURKSTAT, *HBS 2004 Raw Data*.

Figure 5.5 displays the share of RM expenditures in the Hh budget with respect to income quintiles[75]. Low and middle income Hhs devote the highest share (nearly 9 per cent) from their budget for RM activities whereas high income Hhs devote the lowest share (5 per cent). Although highest income Hhs undertake sizeable RM expenditures it is clear that the share of RM expenditures in their budget is lower compared to low and middle income Hhs. Lowest income quintile, on the other hand, devotes the same portion of their budget with highest income Hhs (7.4 per cent) to RM expenditures.

Further exploration of the relationship between the size of RM expenditures and Hh income in Figure 5.6 displays that moving from the lowest quintile to the highest, increasing Hh income increases the number of Hhs with larger expenditures (except for high income quintile). Among lowest income repairers only 8 per cent displays RM expenditures above 50 Euro whereas this ratio reaches to 35 per cent for Hhs in the highest income quintile.

[75] Share of RM expenditure in income is calculated from the Table 5.9 by division of average RME to average Hh income (column 8 to 6).

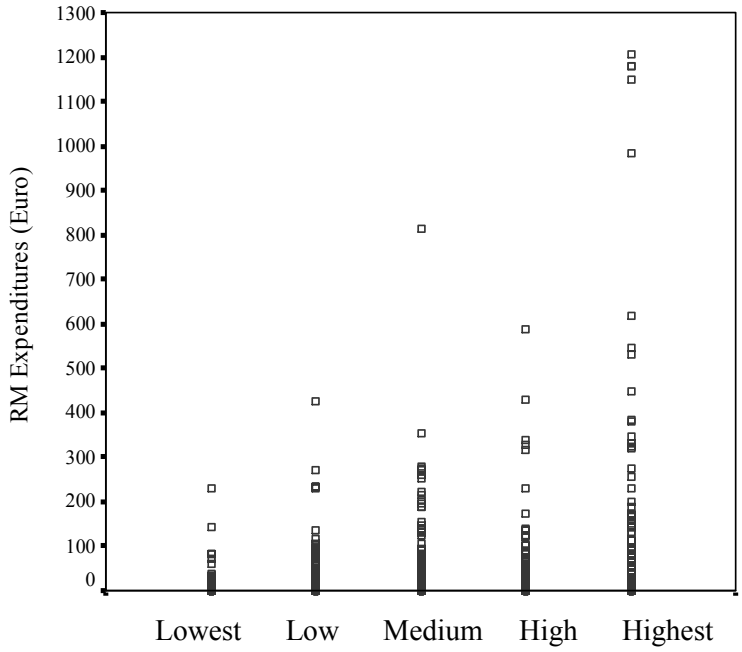


Figure 5.6: Monthly RM Expenditures with respect to Income Quintiles
Source: TURKSTAT, *HBS 2004 Raw Data*.

As displayed above in Table 5.9, moving from the lowest quintile to the highest one on income scale, share of owner-occupiers is steadily increasing. In all income quintiles owner-occupancy is the dominant mode of tenure, yet in the lowest quintile 47 per cent of the Hhs are owner-occupiers whereas 45 per cent are tenants. Expenditure data can be further disaggregated with respect to 'Hh income' and 'mode of tenure' (Table, 5.10, Figure 5.7).

Table 5.10 'Ratio of Repairers' with respect to 'Hh Income' and 'Mode of Tenure'

Income Quintiles	Owner-Occupier			Tenant_privileged			Tenant		
	All Hhs		Repairers / All Hhs (%)	All Hhs		Repairers / All Hhs (%)	All Hhs		Repairers / All Hhs (%)
	Freq.	%		Freq.	%		Freq.	%	
Lowest	541	14	7	98	26	3	516	31	6
Low	724	19	11	80	22	16	352	21	9
Medium	789	21	15	66	18	20	301	18	12
High	833	22	14	69	19	23	254	15	12
Highest	879	23	15	57	15	9	219	13	13
Total	3766	100	13	370	100	14	1642	100	10

Source: TURKSTAT, *HBS 2004 Raw Data*.

According to Table 5.10, for all tenure categories ratio of repairer Hhs display its lowest values in lowest income quintile. For owner-occupiers and tenants, increasing Hh income

increases the ratio of repairers almost consistently. Yet, top three quintiles display very similar repairer ratios. Privileged tenants, on the other hand, display considerably high ratio of repairers in medium and high income quintiles compared to other Hhs.

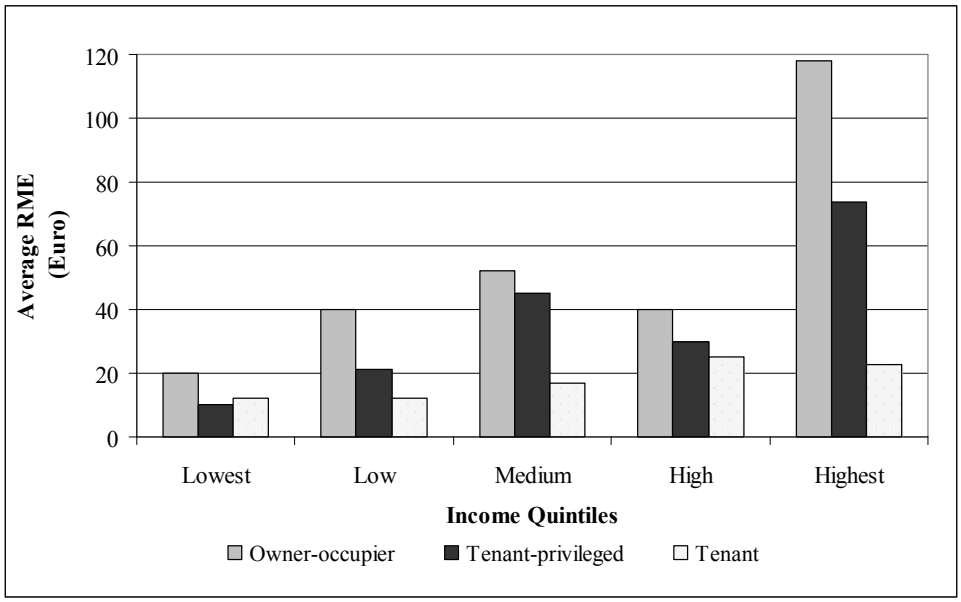


Figure 5.7: Average RM Expenditures with respect to Mode of Tenure and Income Quintiles
Source: TURKSTAT, *HBS 2004 Raw Data.*

According to Figure 5.7, lowest average RM expenditures are observed in the lowest income quintile for all tenure modes. For owner-occupiers and privileged tenants, highest average RM expenditures are displayed in the highest income quintile. For tenant Hhs, as expected, average expenditure levels reach to its peak in high and highest income quintiles. Average RM expenditures for owner-occupiers and privileged tenants in high income quintile are below the expenditures of middle income Hhs. Interactive HBS data can be employed to investigate if the observed pattern is unique to 2004 survey or it is also relevant for other HBSs (Figure 5.8)[76]. Accordingly, expenditure pattern observed in 2004 survey is relevant only for 2005 survey. In 2002 and 2003 surveys, the size of RM expenditures increases with increasing Hh incomes for all income quintiles, and in 2006 survey only the highest quintile does not fit into this picture.

[76] In interactive database, it is not possible to produce three-way crosstabulations (i.e. RM * income * tenure mode). Therefore, only RM expenditures with respect to income quintiles are presented in Figure 5.8 for time-series data.

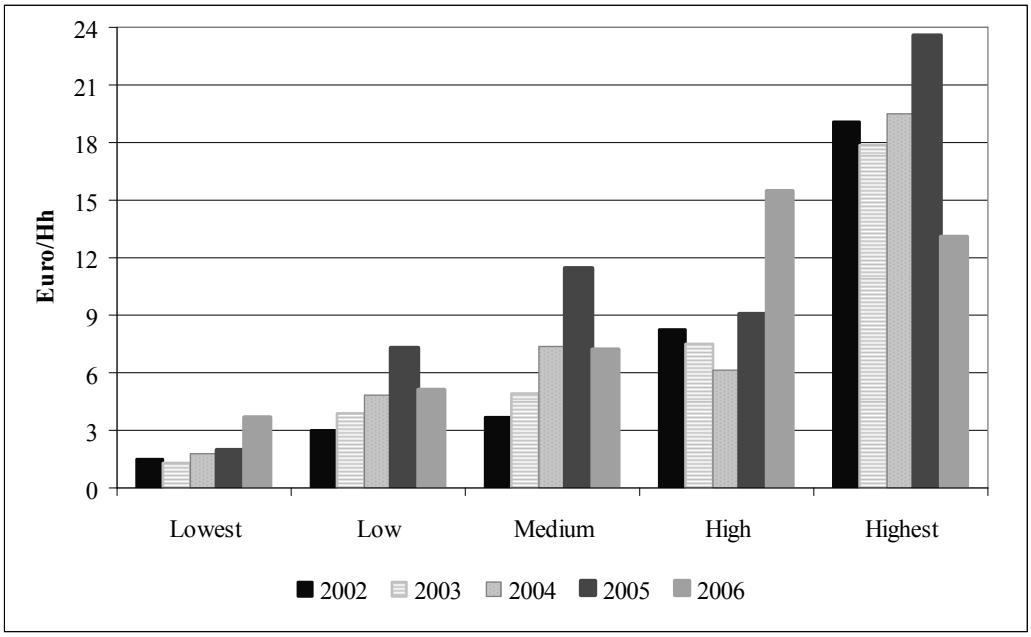


Figure 5.8: Monthly Average RM Expenditures per Urban Hh with respect to Income Quintiles (2008 constant prices)[77]

Source: TURKSTAT, *Hh Consumption Expenditure Database*: 2002-06.

Table 5.11 displays Hh and dwelling characteristics of Hhs with respect to income quintiles and tenure modes. For all tenure modes, there are basic differences among the income quintiles in terms of dwelling characteristics. Moving from the lowest quintile to the highest on the income scale age of dwelling consistently declines whereas size of dwelling (floor area) increases for all tenure categories. This means that lowest income Hhs occupy the older and smaller part of the stock, where deterioration is more likely due to aging and Hh use compared to other dwellings. Considering the low rates of repairers among this group and the low average expenditure levels, high rates of depreciation and loss of quality are likely to appear in this part of stock.

[77] As mentioned earlier in footnote 73, number of repairer Hhs can not be identified in the interactive database. Therefore all Hhs in each income quintile is employed in the calculation of 'expenditure per Hh' in income quintiles. It must also be noted that sample sizes for 2004, 2005 and 2006 surveys are the same (8640 Hhs), whereas sample size for 2002 survey is 9600 Hhs and 2003 survey is 25,920 Hhs.

Table 5.11 Household and Dwelling Characteristics for 'Income Quintiles' and 'Mode of Tenure'

Income Quintiles	Hh Characteristics			Dwelling Characteristics		
	Mean			Mean		
	Age of Head (Years)	Occupancy (Years)	Hh Size (Person)	Age (Years)	Rooms (Number)	Floor Area (Sq Meter)
Owner-occupier						
Lowest	52.1	17.5	3.8	24.5	3.1	93
Low	51.2	14.9	3.7	21.2	3.4	99
Medium	49.8	13.7	3.9	19.4	3.5	102
High	48.2	12.3	4.1	18.2	3.6	106
Highest	48.0	10.8	4.0	16.2	3.8	115
Privileged-tenant						
Lowest	40.8	11.3	4.2	28.3	3.0	88
Low	42.1	10.7	4.1	23.9	3.4	96
Medium	38.9	10.0	3.9	22.7	3.3	98
High	38.8	11.9	3.8	22.4	3.5	100
Highest	40.3	9.9	4.0	19.8	3.8	109
Tenant						
Lowest	39.5	4.1	4.0	24.0	3.1	90
Low	39.2	4.2	3.9	21.1	3.3	96
Medium	39.7	4.3	4.0	17.7	3.5	101
High	40.7	4.2	4.0	16.6	3.6	106
Highest	41.1	4.0	3.8	14.6	3.7	114

N = 5778

Source: TURKSTAT, *HBS 2004 Raw Data*.

The relationship between Hh savings and reinvestment decisions can also be explored from HBS. It is clear from Table 5.12 that Hhs having some savings are more likely to undertake RM works and their average expenditures are 2.4 times greater than Hhs with no savings. 21 per cent of Hhs with no savings display RM expenditures above 50 Euro whereas this ratio reaches to 39 per cent for Hhs having some savings. It must also be noted that 65 per cent of the Hhs who have no savings are owner-occupiers, this ratio reaches to 78 per cent for Hhs with some savings.

Table 5.12 Summary Statistics: 'Hh Savings'

Hh Savings	All Hhs		Repairer Hhs		Repairers / All Hhs[1] (%)	Average RME[2] (Euro)
	Frequency	%	Frequency	%		
No Savings	5616	97.2	658	95.9	11.7	47
Some Savings	162	2.8	28	4.1	17.3	113
Total	5778	100	686	100	11.9	50

[1] $\chi^2(1, 5778) = 4.66, p < .05$

[2] $F(1, 684) = 7.29, p < .05$

Source: TURKSTAT, *HBS 2004 Raw Data*.

Age of the Hh Head

The youngest Hh head in the HBS sample is 17 years old whereas the oldest one is 99. Although the difference between the minimum and maximum values is large, as Figure 5.9 displays, age distribution of the Hh heads in the sample is very close to a normal distribution with a mean of 46 years. Age of the Hh head is recoded into seven age cohorts for practical purposes.

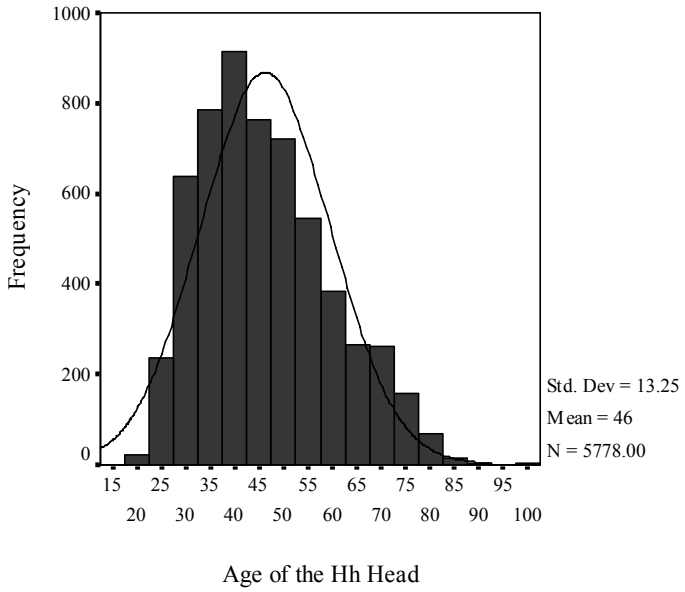


Figure 5.9: Age of the Hh Head

Source: TURKSTAT, *HBS 2004 Raw Data*.

In Table 5.13, lowest ratios of repairers are observed among 17-24 and 25-34 age cohorts as expected. Also, the youngest cohort displays the lowest average RM expenditures. Most of these Hhs are tenants and they are highly mobile (Table 5.14). The highest ratio of repairers and average RM expenditures (14.4 per cent, 81 Euro), on the other hand, is realized in the 65-74 age category. Ratio of repairers in the 75+ group (12.5 per cent) is also as high as middle-aged Hh heads. These Hhs are the least mobile ones among the surveyed Hhs, and they occupy the oldest part of the stock. Although, these Hhs display the lowest average income levels compared to other Hhs (Table 5.14), their RM expenditures are higher than expected. Contrary to the findings of previous research in the field (i.e. Mendelsohn, 1977; Shear, 1983; Montgomery, 1992; Littlewood and Munro, 1996) older Hh heads in the Turkish case are inclined to carry out RM works. It is clear from Table 5.13 that, percentage of owner-occupiers increases with age, and high ownership ratios are accompanied with high percentages of repairer Hhs in older age groups. Yet, variations in average RM expenditure of

Hhs with respect to Hh head age are not parallel with changes observed in owner-occupancy ratios. Hhs whose Hh head age is between 25-54 years display very similar RM expenditure levels though the rate of owner-occupancy among these groups and average incomes are significantly different from each other. Significance tests provided in Table 5.13 display that, although the relationship between age of the Hh head and occurrence of RM works proved to be significant ($p < .05$), this is not true for the size of RM expenditures ($p > .05$).

Table 5.13 Summary Statistics: 'Age of the Hh Head'

Age Cohorts	All Hhs		Repairer Hhs		Repairers / All Hhs[1] (%)	Average RME[2] (Euro)	% of Owner-occupiers
	Frequency	%	Frequency	%			
17-24	65	1.1	5	0.7	7.7	6	34
25-34	1107	19.2	101	14.7	9.1	48	38
35-44	1735	30.0	206	30.0	11.9	45	58
45-54	1425	24.7	183	26.7	12.8	42	76
55-64	783	13.6	99	14.4	12.6	59	84
65-74	487	8.4	70	10.2	14.4	81	89
75+	176	3.0	22	3.2	12.5	39	84
Total	5778	100	686	100	11.9	50	65

[1] $\chi^2(6, 5778) = 13.78, p < .05$
[2] $F(6, 679) = 1.07, p > .05$
Source: TURKSTAT, *HBS 2004 Raw Data.*

Table 5.14 Household and Dwelling Characteristics with respect to 'Age of the Hh Head'

Age Cohorts	Hh Characteristics			Dwelling Characteristics		
	Mean			Mean		
	Hh Income (Euro)	Occupancy (Years)	Hh Size (Person)	Age (Years)	Rooms (Number)	Floor Area (Sq Meter)
17-24	475	4.5	3.5	19.1	3.2	97
25-34	531	5.0	3.8	17.7	3.3	100
35-44	635	7.8	4.5	17.9	3.5	103
45-54	704	11.1	4.1	19.1	3.5	104
55-64	658	15.3	3.5	21.8	3.5	104
65-74	507	20.7	2.9	27.2	3.3	98
75+	406	24.7	2.4	31.1	3.3	95
Total	615	10.7	3.9	19.9	3.4	102

N = 5778
Source: TURKSTAT, *HBS 2004 Raw Data.*

Furthermore, as Table 5.14 displays, average Hh income, Hh size, and size of the dwelling displays an inverted u-shape with increasing Hh head age. Duration of occupancy, on the

other hand, consistently increases as the age increases. Age of the dwelling also increases as the age of the Hh head increases (excluding the youngest group).

Duration of Occupancy

Duration of occupancy is provided as years in the database. Distribution of Hhs with respect to their length of stay in the dwelling displays a skewed distribution to the left with a mean of 10.7 years (Figure 5.10).

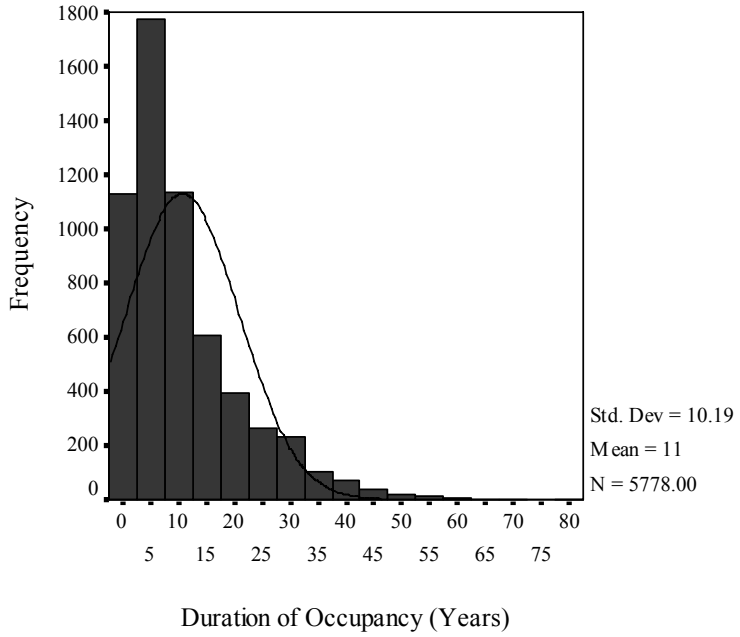


Figure 5.10: Duration of Occupancy

Source: TURKSTAT, *HBS 2004 Raw Data*.

Nearly 11 per cent of all Hhs have one year or less length of stay in the dwelling. These Hhs are referred as **'recent movers'** hereafter. Recent movers constitute 25 per cent of tenants, 6 per cent of privileged tenants and 5 per cent of owner-occupiers. According to Table 5.15, recent movers display the lowest ratio of repairer Hhs, however their average RM expenditure level takes the third highest rank among other groups. As discussed earlier in Chapter 4, reinvestments in the first year of occupancy are usually assumed to have adjustment purposes. It must be recalled that RM expenditures observed in HBS are monthly expenditures. If it was possible to examine annual RM expenditures, then the ratio of repairer Hhs observed among

recent movers would probably be much above this rate[78]. As duration of occupancy in the dwelling is extended, likelihood of undertaking RM works increases. Ratio of owner-occupiers also consistently increases in the same direction. Excluding the recent mover Hhs, average RM expenditures first increase up to 77 Euro in 11-20 years group, then decrease.

Table 5.15 Summary Statistics: 'Duration of Occupancy'

Duration of Occupancy	All Hhs		Repairer Hhs		Repairers / All Hhs[1] (%)	Average RME[2] (Euro)	% of Owner-occupiers
	Frequency	%	Frequency	%			
1 year or less	628	10.9	62	9.0	9.9	49	32
2-5 years	1716	29.7	186	27.1	10.8	27	45
6-10 years	1310	22.7	139	20.3	10.6	43	71
11-20 years	1293	22.4	174	25.4	13.5	77	85
21-40 years	737	12.8	107	15.6	14.5	57	93
40+ years	94	1.6	18	2.6	19.1	48	96
Total	5778	100	686	100	11.9	50	65

[1] $\chi^2(5, 5778) = 18.94$, $p < .05$
[2] $F(5, 680) = 3.09$, $p < .05$
Source: TURKSTAT, *HBS 2004 Raw Data*.

Figure 5.11 displays that there is one extreme case (an owner-occupier) among recent movers with a very high expenditure level which affects the mean of this group. Excluding this extreme case, the relationship between the size of RM expenditures and duration of occupancy is like an inverted u-shape. Until the duration of occupancy reaches to 20 years, increasing length of stay in the dwelling increases the size of RM expenditures. After 20 years of occupancy in the same dwelling, frequency of repairers increases, yet size of the RM expenditures decreases.

[78] This issue is further investigated with the Ankara Survey data where annual RM expenditures are provided.

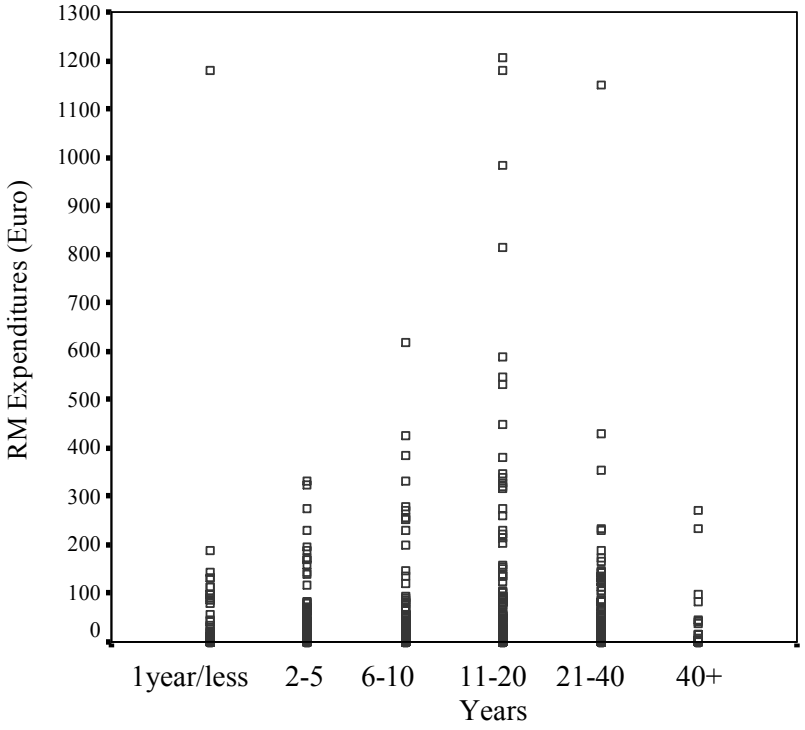


Figure 5.11: Monthly RM Expenditures with respect to Duration of Occupancy
Source: TURKSTAT, *HBS 2004 Raw Data*.

In Table 5.16, RM expenditures of Hhs are further disaggregated with respect to 'mode of tenure' and 'duration of occupancy'. For both tenure types, highest ratios of repairers are observed among the Hhs who stay longer in the dwelling. These Hhs occupy the oldest and smallest part of the stock (Table 5.17) where the need for reinvestments may arise more frequently due to physical deterioration and depreciation. Yet, average RM expenditures for these Hhs do not differentiate much compared to the rest of Hhs. As displayed in Table 5.17, these are elderly Hhs with limited financial capacity. Moreover, for owner-occupiers, in line with the theory, value of the dwelling services declines as length of stay in the dwelling increases (Table 5.17). In other words, in the owner-occupied sector Hhs who occupy the dwelling longer are more likely to respond the frequent need for reinvestments due to aging of the stock, yet either their limited financial capacity or value declines in the dwelling lowers the incentive for large scale reinvestments. For tenants, contrary to expectations, Hhs with 5 years or less length of stay in the dwelling display lowest ratio of repairers and lowest average expenditure levels. As Table 5.17 displays, these Hhs occupy relatively newer part of the stock.

Table 5.16 RM Expenditures with respect to 'Duration of Occupancy' and 'Mode of Tenure'

Duration of Occupancy	Owner-occupiers			Tenants		
	All Owner-occupiers (Frequency)	Repairers / All Owners (%)	Average RME (Euro)	All Tenants (Frequency)	Repairers / All Tenants (%)	Average RME (Euro)
1 year or less	199	11.6	105	408	9.1	16
2-5 years	770	13.4	32	849	8.7	13
6-10 years	925	10.1	55	273	11.4	23
11-20 years	1095	13.7	83	99	13.1	32
21-40 years	687	13.4	62	12	25.0	26
40+ years	90	18.9	50	1	--	--
Total	3766	12.7	62	1642	9.6	18

Source: TURKSTAT, *HBS 2004 Raw Data*.

Table 5.17 Household and Dwelling Characteristics for 'Duration of Occupancy' and 'Mode of Tenure'

Duration of Occupancy	Hh Characteristics			Dwelling Characteristics		
	Mean			Mean		
	Hh Income (Euro)	Age of Head (Years)	Hh Size (Person)	Age (Years)	Monthly Rent[1] (Euro)	Floor Area (Sq Meter)
Owner-occupier						
≤ 1 year	793	42.3	3.9	10.4	118	111
2-5 years	762	43.4	4.0	12.6	108	109
6-10 years	734	46.1	4.1	14.2	104	106
11-20 years	638	51.0	4.1	19.7	95	103
21-40 years	556	59.1	3.5	32.3	83	98
40+ years	401	65.6	2.9	53.4	57	88
Tenant						
≤ 1 year	468	36.7	3.7	18.5	76	101
2-5 years	519	39.0	4.0	19.1	79	99
6-10 years	510	43.3	4.2	21.0	71	98
11-20 years	484	47.5	4.0	26.0	69	94
21-40 years	301	64.0	2.5	35.1	74	93

N = 5778

[1] For owner-occupiers 'monthly rent' represents 'imputed rents'.

Source: TURKSTAT, *HBS 2004 Raw Data*.

Hh Composition

Hh composition can be explored through Hh size and Hh type variables. Hh size is a continuous variable whereas Hh type is categorical. Surveyed Hhs display a varied Hh size structure from 1 to 18 person Hhs. Table 5.18 displays distribution of Hhs and their RM expenditures with respect to Hh Type. Accordingly, most (63%) of the Hhs in the sample are couples with children. Extended families on the other hand have 14 per cent share in society. The highest ratio of repairers is observed among 'extended families' whereas highest average

expenditure levels are displayed by 'other family' and 'single adult' categories[79]. Chi-square test and F-statistics display that neither the likelihood of undertaking RM works nor the size of RM expenditures have a significant relationship with type of Hh[80]. As argued before in Section 4.4.1, variables such as Hh type and Hh size solely reflect the current phase of the Hh life-cycle. Yet, it is the changes observed in Hh life cycle which may lead to RM expenditures.

Table 5.18 Summary Statistics: 'Hh Type'

Hh Type	All Hhs		Repairer Hhs		Repairers / All Hhs[1] (%)	Average RME[2] (Euro)	Average Hh Size	Average Hh Head Age
	Freq.	%	Freq.	%				
Couples: with children	3635	62.9	413	60.2	11.4	45	4.2	42.4
Couples: no child	707	12.2	94	13.7	13.3	59	2.0	56.5
Extended Family: with children	725	12.5	103	15.0	14.2	58	5.9	49.0
Extended Family: no child	95	1.6	13	1.9	13.7	14	3.7	52.3
Single Parent	294	5.1	37	5.4	12.6	59	3.1	47.4
Single Adult: no child	258	4.5	23	3.4	8.9	67	1.1	61.4
Other Family	52	0.9	3	0.4	5.8	69	2.4	49.8
Non-family	12	0.2	--	--	--	--	2.8	22.2
Total	5778	100	686	100	11.9	50	3.9	46.2

[1] $\chi^2(7, 5778) = 12.12$, $p > .05$
[2] $F(6, 679) = 0.54$, $p > .05$
Source: TURKSTAT, *HBS 2004 Raw Data*.

Occupation Density

'Occupation density' is not directly available in HBS but can be computed for each Hh from the variables 'Hh size' and 'number of rooms in the dwelling'. For this purpose, in Table 5.19 three zones of occupation density are identified as comfort zone, underoccupation, and overcrowding according to international occupancy standards with reference to earlier studies (Balamir, 1996b; Oğuz, 2003). The grey cells in the table indicate the comfort zone. The cells below the comfort zone show the overcrowding zone, whereas the cells above display underoccupancy. Oğuz (2003) displays the occupation densities for urban Turkey as 30.62 per

[79] 'Other family' category covers relatives living in the same dwelling.
[80] The relationship between 'Hh size' and 'RM decisions' (both likelihood and size) is also insignificant where $\chi^2(9, 5778) = 10.99$, $p > .05$, and $F(9, 676) = 0.31$, $p > .05$.

cent underoccupation, 44.03 comfort, 25.35 overcrowding in year 2000. Findings of the HBS (2004) present very similar figures with slight changes on comfort and overcrowding zones.

Table 5.19 Distribution of Hhs with respect to 'Hh Size' and 'Number of Rooms' (%)

Hhs (persons)	Dwellings (rooms)					Total
	1	2	3	4	5+	
1	0.03	0.62	2.06	1.52	0.03	4.27
2	0.05	0.92	7.67	6.58	0.38	15.59
3	0.07	1.04	9.88	9.99	0.71	21.69
4	0.12	1.68	12.82	13.83	1.19	29.65
5	0.10	0.93	6.94	6.78	0.31	15.07
6+	0.07	1.26	5.90	6.11	0.38	13.72
Total	0.45	6.46	45.28	44.81	3.01	100
Zones	*Overcrowding*: 23.19		*Comfort*: 46.05		*Underoccupation*: 30.75	

Source: TURKSTAT, *HBS 2004 Raw Data.*

As mentioned earlier, reinvestment decisions in overcrowded dwellings have further significance for this study since those types of dwellings are more likely to deteriorate physically due to Hh use. Table 5.20 displays that Hhs living in overcrowded dwellings are less likely to undertake RM and they display the lowest average RM expenditures. This also holds true when the data is disaggregated to owner-occupiers and tenants (Table 5.21). Yet, the relationship of occupation density with the likelihood of undertaking RM works and size of the nonzero RM expenditures is displayed to be insignificant by chi-square and F tests (Table 5.20).

Table 5.20 Summary Statistics: 'Occupation Density'

Occupation Density	All Hhs		Repairer Hhs		Repairers / All Hhs[1] (%)	Average RME[2] (Euro)	Share in Total RME (%)
	Frequency	%	Frequency	%			
Underoccupation	1780	31	216	31	12.1	61	38
Comfort	2645	46	326	48	12.3	47	45
Overcrowding	1353	23	144	21	10.6	40	17
Total	5778	100	686	100	11.9	50	100

[1] $\chi^2(2, 5778) = 2.59, p > .05$
[2] $F(2, 683) = 1.26, p > .05$
Source: TURKSTAT, *HBS 2004 Raw Data*.

Table 5.21 RM Expenditures with respect to 'Occupation Density' and 'Mode of Tenure'

Occupation Density	Owner-occupiers				Tenants			
	All Owner-occupiers		Repairers / All Owners (%)	Average RME (Euro)	All Tenants (Frequency)		Repairers / All Tenants (%)	Average RME (Euro)
	Freq.	%			Freq.	%		
Underoccupation	1278	34	13.1	68	413	25	9.0	20
Comfort	1632	43	13.2	62	832	51	10.3	20
Overcrowding	856	23	11.2	54	397	24	8.8	10
Total	3766	100	12.7	62	1642	100	9.6	18

Source: TURKSTAT, *HBS 2004 Raw Data*.

Table 5.22 displays that overcrowded dwellings in owner-occupied and rental sector accommodate lowest income Hhs, and value of housing services is very low in this part of the stock. Therefore, overcrowded dwellings (both in owner-occupied and rental sector) require policy measures to improve living conditions and quality of life.

Table 5.22 Household and Dwelling Characteristics for 'Occupation Density' and 'Mode of Tenure'

Occupation Density	Hh Characteristics			Dwelling Characteristics		
	Mean			Mean		
	Hh Income (Euro)	Occupancy (Years)	Hh Size (Person)	Age (Years)	Rooms (Number)	Monthly Rent[1] (Euro)
Owner-occupier						
Underoccupation	715	15.4	2.3	21.1	3.7	118
Comfort	688	12.1	3.9	18.3	3.5	97
Overcrowding	587	13.2	6.4	19.5	3.2	70
Tenant						
Underoccupation	625	4.0	2.4	17.9	3.7	103
Comfort	485	4.2	3.8	19.7	3.3	72
Overcrowding	404	4.3	5.9	22.2	3.0	57

N = 5778

[1] For owner-occupiers 'monthly rent' represents 'imputed rents'.

Source: TURKSTAT, *HBS 2004 Raw Data*.

5.4.2 Dwelling Characteristics

Age of the Dwelling

Dwelling age is also provided as a continuous variable in the HBS where the oldest dwelling is constructed in year 1900 and the newest one in 2004. Figure 5.12 displays that age values are slightly clustered to the left, on relatively new dwellings, with a mean value of 20 years. Age of the dwelling is recoded into six categories.

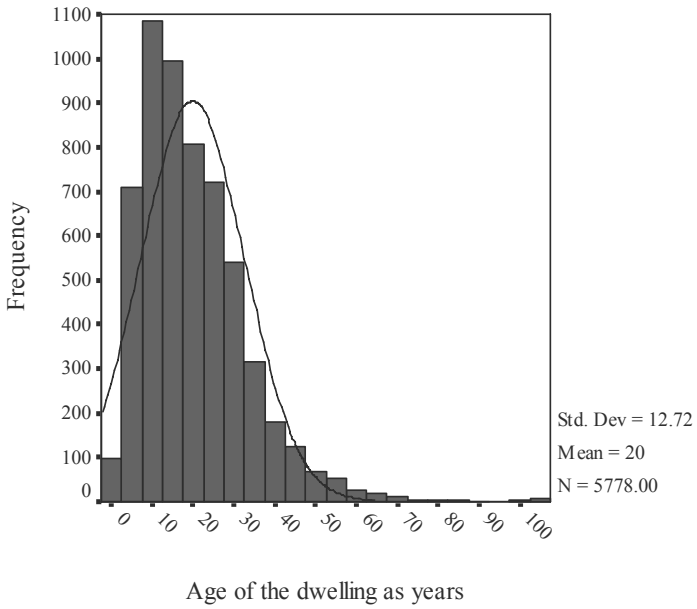


Figure 5.12: Age of the Dwelling

Source: TURKSTAT, *HBS 2004 Raw Data*.

Almost 80 per cent of the surveyed Hhs live in the dwellings built after 1975 as expected (Table 5.23). The ratio of repairers is low among these Hhs compared to Hhs living in older part of the stock. This finding is in line with the expectations. Contrary to prior expectations, average RM expenditures increases as age of the dwelling decreases (excluding the oldest and the newest part of the stock). The highest RM expenditures per sq meter is observed in the oldest part of the stock, but 1955-1964 stock displays the lowest average RM expenditures. Neither the likelihood nor the size of RM works display a statistically significant relationship with age of the dwelling in HBS data.

Table 5.23 Summary Statistics: 'Age of the Dwelling'

Age of the Dwelling	All Hhs		Repairer Hhs		Repairers / All Hhs[1] (%)	Average RME[2] (Euro)	Average RME per Sq Meter (Cent)
	Frequency	%	Frequency	%			
Pre-1955	178	3.1	24	3.5	13.5	53	70
1955-1964	257	4.4	37	5.4	14.4	18	19
1965-1974	696	12.0	91	13.3	13.1	44	45
1975-1984	1382	23.9	163	23.8	11.8	53	54
1985-1994	2068	35.8	244	35.6	11.8	66	58
1995-2004	1197	20.7	127	18.5	10.6	30	30
Total	5778	100	686	100	11.9	50	49

[1] $\chi^2(5, 5778) = 4.81$, $p > .05$

[2] $F(5, 680) = 1.89$, $p > .05$

Source: TURKSTAT, *HBS 2004 Raw Data*.

According to Table 5.24, moving from the oldest to the newest stock, average Hh income, size of the dwelling, and monthly rent consistently increases whereas age of the Hh head and duration of occupancy decreases. As underlined previously, lowest and low income Hhs display the lowest ratios of repairers and lowest average RM expenditures. Nearly 69 per cent of the oldest stock and 56 per cent of the dwellings built during 1955-1964 period are occupied by these Hhs (Table 5.25). In other words, lowest end of the stock is basically occupied by Hhs in the lowest end of the income brackets. This part of the stock therefore requires special policy measures to prevent the dead end and loss of quality.

Table 5.24 Household and Dwelling Characteristics with respect to 'Age of the Dwelling'

Age of the Dwelling	Hh Characteristics				Dwelling Characteristics		
	Mean				Mean		
	Hh Income (Euro)	Age of Head (Years)	Occupancy (Years)	Hh Size (Person)	Rooms (Number)	Floor Area (Sq Meter)	Monthly Rent (Euro)
Pre-1955	376	55.2	25.9	3.7	3.1	87	48
1955-1964	457	53.0	22.5	3.7	3.2	91	69
1965-1974	490	50.4	17.8	3.7	3.2	94	76
1975-1984	552	46.9	12.2	3.9	3.3	98	88
1985-1994	665	44.7	8.3	4.0	3.5	105	97
1995-2004	746	42.9	4.1	4.0	3.7	111	102
Total	615	46.2	10.7	3.9	3.4	102	91

N = 5778
Source: TURKSTAT, *HBS 2004 Raw Data*.

Table 5.25 Distribution of Owner-occupiers, Low and Lowest Income Hhs, Recent Movers, and Overcrowded Dwellings with respect to 'Age of the Dwelling'

Age of the Dwelling	Owner-occupiers (%)	Low and Lowest Income Hhs (%)	Recent Movers (%)	Overcrowded Dwellings (%)
Pre-1955	59	69	7	27
1955-1964	67	56	5	26
1965-1974	66	52	7	25
1975-1984	60	45	10	26
1985-1994	66	35	9	23
1995-2004	70	30	19	19
Total	65	40	11	23

Source: TURKSTAT, *HBS 2004 Raw Data*.

Size of the Dwelling

'Floor area of the dwelling' is provided as a continuous variable in the HBS the mean value of which is 102 sq meters (Figure 5.13). The smallest dwelling in the sample has 25 sq meters floor area whereas the largest one has 250 sq meters. Size of the dwelling is recoded into five categories.

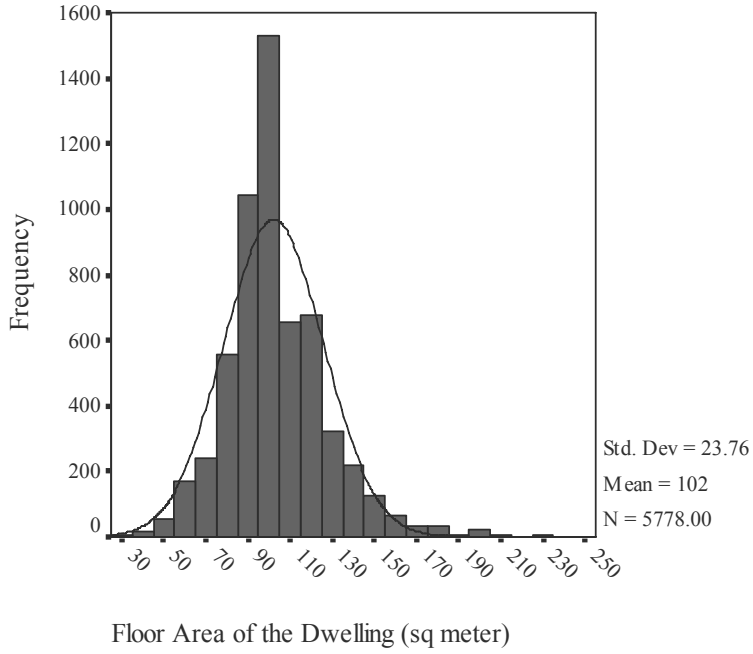


Figure 5.13: Size of the Dwelling

Source: TURKSTAT, *HBS 2004 Raw Data*.

Table 5.26 reveals that ratio of repairers is slightly increasing as size of the dwelling increases (excluding the largest stock). Although this finding is in line with the previous findings in the literature, the relationship is displayed to be statistically insignificant. Yet, when 'number of rooms' is employed as an indicator of the dwelling size, the relationship between undertaking RM and size of the dwelling prove to be significant ($\chi^2(6, 5778) = 21.41$, $p < .05$)[81]. In line with the expectations, increasing dwelling size is accompanied with decreasing dwelling age in the Turkish case (Table 5.27). As mentioned in Chapter 3, trend in the Turkish construction sector for a couple of decades is to produce larger and larger dwellings. Prior expectation was therefore to observe low levels of RM in the larger part of the stock which is predominantly composed of new dwellings. Moving from the smallest part of the stock to the largest,

[81] No repairers exist however in the smallest (having 1 room) and in the largest (having 7 rooms) part of the stock.

average RM expenditures increase steadily (excluding the smallest stock)[82]. Yet, average RM expenditures per sq meter reveals that smallest and largest parts of the stock receive the highest average RM expenditures whereas rest of the stock displays similar averages per sq meter.

Table 5.26 Summary Statistics: 'Size of the Dwelling'

Size of the Dwelling (sq meter)	All Hhs		Repairer Hhs		Repairers / All Hhs[1] (%)	Average RME[2] (Euro)	Average RME per Sq Meter (Cent)
	Frequency	%	Frequency	%			
25-70	467	8.1	46	6.7	9.9	50	76
71-90	1584	27.4	174	25.4	11.0	38	45
91-110	2197	38.0	278	40.5	12.7	47	46
111-140	1240	21.5	159	23.2	12.8	56	44
141+	290	5.0	29	4.2	10.0	117	74
Total	5778	100	686	100	11.9	50	49

[1] $\chi^2(4, 5778) = 6.34$, $p > .05$
[2] $F(4, 681) = 2.52$, $p < .05$
Source: TURKSTAT, *HBS 2004 Raw Data*.

Table 5.27 Household and Dwelling Characteristics with respect to 'Size of the Dwelling'

Size of the Dwelling (sq meter)	Hh Characteristics				Dwelling Characteristics		
	Mean				Mean		
	Hh Income (Euro)	Age of Head (Years)	Occupancy (Years)	Hh Size (Person)	Age (Years)	Rooms (Number)	Monthly Rent (Euro)
25-70	369	46.4	12.8	3.6	27.8	2.4	54
71-90	491	46.3	11.7	3.8	23.0	3.1	76
91-110	579	46.4	10.6	4.0	19.1	3.5	86
111-140	752	45.9	9.2	4.1	15.9	3.9	113
141+	1382	45.7	8.0	4.0	13.1	4.4	169
Total	615	46.2	10.7	3.9	19.9	3.4	91

N = 5778
Source: TURKSTAT, *HBS 2004 Raw Data*.

In the largest part of the stock, high average Hh income (1382 Euro) and high rates of owner-occupancy (77 per cent) may be the major reason triggering high levels of RM expenditures (Table 5.27, Table 5.28). The smallest part of the stock, on the other hand, is predominantly occupied by lowest and low income Hhs (66 per cent), and it is the oldest and most overcrowded part of the stock with low rental values. Although this part of the stock receives

[82] When 'number of rooms' variable is employed, the relationship between RM expenditures and size of the dwelling becomes insignificant where $F(4, 681) = 0.74$, $p > .05$.

the highest average RM expenditures per sq meter, ratio of repairer Hhs is still below the averages. Considering the fact that smallest part of the stock is also the lowest end of the stock occupied mostly by Hhs in the lowest end of the income bracket, this part of the stock requires special attention in policy designs.

Table 5.28 Distribution of Owner-occupiers, Low and Lowest Income Hhs, Recent Movers, and Overcrowded Dwellings with respect to 'Size of the Dwelling'

Size of the Dwelling (sq meter)	Owner-occupiers (%)	Low and Lowest Income Hhs (%)	Recent Movers (%)	Overcrowded Dwellings (%)
25-70	52	66	14	42
71-90	61	50	9	27
91-110	68	38	10	22
111-140	69	28	13	18
141+	77	14	13	11
Total	65	40	11	23

Source: TURKSTAT, *HBS 2004 Raw Data*.

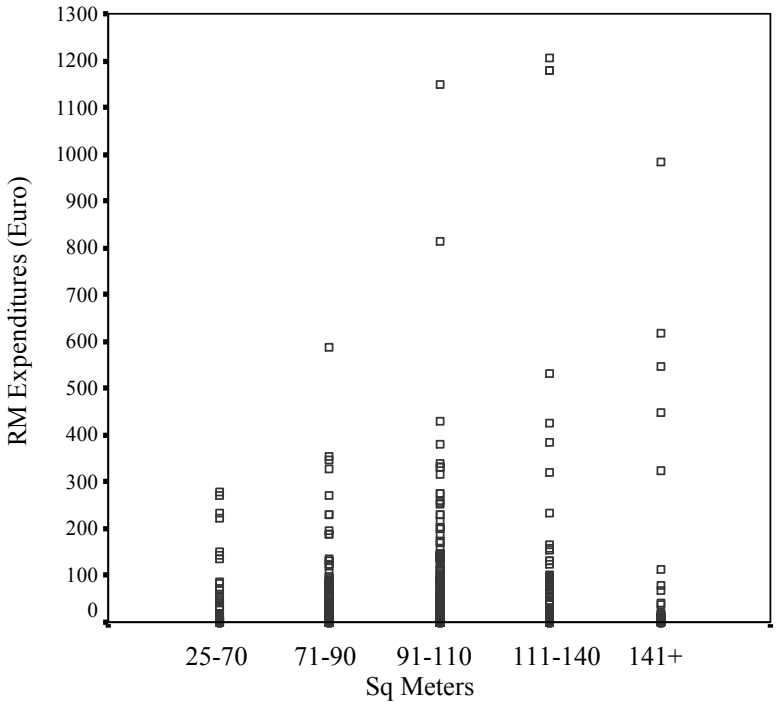


Figure 5.14: Monthly RM Expenditures with respect to Dwelling Size
Source: TURKSTAT, *HBS 2004 Raw Data*.

In Figure 5.14, the relationship between size of the RM expenditures and dwelling size is further explored. In the smallest part of the stock the highest RM expenditure is below 300 Euro. In the larger part of the stock, on the other hand, a number of infrequent large scale RM

expenditures are observed. Yet, 30.4 per cent of the Hhs in the smallest stock display expenditures above 50 Euro, whereas this ratio declines to 19.5 per cent in 111-140 sq meter dwellings, and to 27.6 per cent in the largest part of the stock. In other words, as size of the dwelling increases the share of small-scale expenditures (below 50 Euro) also increases[83].

Monthly Rent

Monthly rent is available in the HBS as a continuous variable and represents the actual rent paid by tenants and imputed rents reported by owner-occupiers and privileged-tenants. Imputed rents are defined by TURKSTAT as the relative rent in the same apartment or neighbourhood under the same market conditions. Figure 5.15 displays that there are few Hhs at the right end of the distribution having relatively high rents, and most of the Hhs are clustered at the left side of the distribution. Monthly rent is recoded into five categories[84].

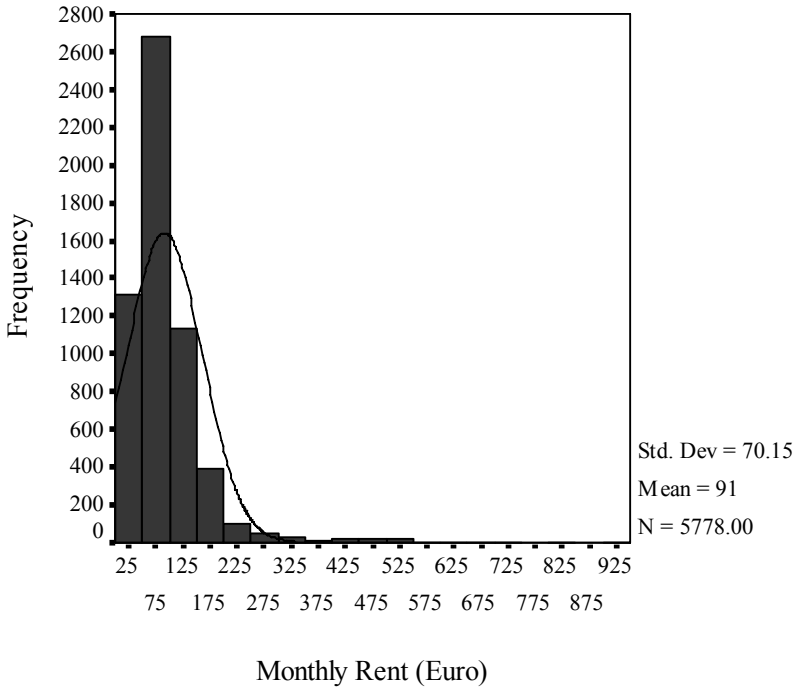


Figure 5.15: Monthly Rents

Source: TURKSTAT, *HBS 2004 Raw Data*.

As seen from Table 5.29 lowest ratios of repairers are observed at the lowest and highest end of the rent scale. Hhs in the 201-300 Euro rent bracket displays the highest ratio of repairers.

[83] This also holds true when RM expenditures per sq meter are observed.

[84] It was not possible to create five equal categories for 'monthly rent' variable since rental values were the same for 20 per cent cut points.

Clearly, average RM expenditures increases steadily with increasing rental value of the dwelling.

Table 5.29 Summary Statistics: 'Monthly Rent'

Monthly Rent (Euro)	All Hhs		Repairer Hhs		Repairers / All Hhs[1] (%)	Average RME[2] (Euro)
	Frequency	%	Frequency	%		
< 50	1313	22.7	127	18.5	9.7	23
50-100	2689	46.5	338	49.3	12.6	47
101-200	1512	26.2	188	27.4	12.4	58
201-300	154	2.7	25	3.6	16.2	108
300+	110	1.9	8	1.2	7.3	244
Total	5778	100	686	100	11.9	50

[1] $\chi^2(4, 5778) = 12.80, p < .05$
[2] $F(4, 681) = 7.98, p < .05$
Source: TURKSTAT, *HBS 2004 Raw Data*.

Although Hhs in the highest end of the monthly rent scale display the lowest ratio of repairers, their average RM expenditures are the highest. As seen from Table 5.30, these Hhs' average Hh income is almost 4 times more than an average Hh's income in the sample. Furthermore, these Hhs are predominantly owner-occupiers (80 per cent, Table 5.31) and they occupy relatively newer and larger part of the stock. On the contrary, Hhs in the lowest end of the rent scale display the lowest average income levels, and occupy the oldest and smallest part of the stock. Moreover, 77 per cent of these Hhs are lowest and low income Hhs and 42 per cent of the stock is overcrowded (Table 5.31). Lowest rate of owner-occupancy is also displayed among these Hhs (55 per cent).

Table 5.30 Household and Dwelling Characteristics with respect to 'Monthly Rent'

Monthly Rent (Euro)	Hh Characteristics			Dwelling Characteristics		
	Mean			Mean		
	Average Income (Euro)	Occupancy (Years)	Hh Size (Person)	Age (Years)	Rooms (Number)	Floor Area (Sq Meter)
< 50	319	12.5	4.5	25.7	3.0	90
50-100	531	10.4	3.9	19.0	3.5	101
101-200	817	9.9	3.6	17.1	3.6	109
201-300	1334	8.4	3.3	15.2	4.0	122
300+	2439	9.2	3.1	15.7	4.2	140
Total	615	10.7	3.9	19.9	3.4	102

N = 5778
Source: TURKSTAT, *HBS 2004 Raw Data*.

Table 5.31 Distribution of Owner-occupiers, Low and Lowest Income Hhs, Recent Movers, and Overcrowded Dwellings with respect to 'Monthly Rent'

Monthly Rent (Euro)	Owner-occupiers (%)	Low and Lowest Income Hhs (%)	Recent Movers (%)	Overcrowded Dwellings (%)
< 50	55	77	12	42
50-100	61	40	11	23
101-200	78	14	11	12
201-300	81	1	12	5
300+	80	-	9	4
Total	65	20	11	23

Source: TURKSTAT, *HBS 2004 Raw Data*.

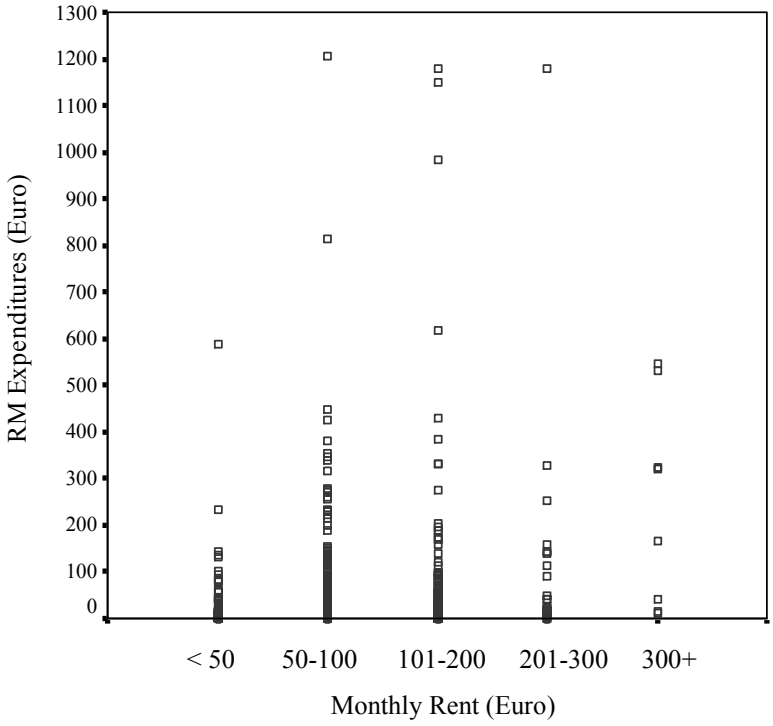


Figure 5.16: Monthly RM Expenditures with respect to Monthly Rent
Source: TURKSTAT, *HBS 2004 Raw Data*.

Figure 5.16 displays that largest RM expenditures are observed for 101-200 and 201-300 Euro rent categories. Moving from the lowest rent category to the highest the share of RM expenditures above 50 Euro level increases from 11 per cent to 63 per cent consistently. Based on these findings, in the lowest end of the stock (< 50 Euro category) it can be argued that poor dwelling conditions prevail not only due to age of the stock but also due to lack of RM activities and overutilization. Considering the fact that 37 per cent of this stock is rented,

this part of the stock requires special policies to cope with low standards of housing both for owner-occupied and rented sector.

5.4.3 Summary of the Findings

Major findings derived from the analysis of HBS data on the effects of Hh and dwelling characteristics on Hhs' reinvestment decisions are summarized below (Table 5.32).

Table 5.32 Summary of the Findings

	Major Findings
Mode of Tenure	• Mode of tenure affects both the likelihood of RM decisions and size of the RM expenditures. • Tenants are less likely to undertake RM works and they display the lowest average RM expenditure levels. • Although, privileged tenants are more likely to be repairers compared to other tenures, large-scale expenditures are only reserved for owner-occupiers. • Tenure modes differ fundamentally in terms of their Hh characteristics (income, Hh head age, duration of occupancy). • Dwelling conditions (age, size) of tenants and owner-occupiers are very similar to each other. Owner-occupiers consume slightly more dwelling space compared to other tenures.
Hh Income	• Hh income affects both the likelihood of RM decisions and size of the RM expenditures. • Hhs in the lowest income quintile are less likely to undertake RM works and their average RM expenditures are low compared to other Hhs. Furthermore, they occupy relatively older and smaller part of the stock. Therefore these Hhs' reinvestment behaviour is considered problematic. • Large-scale expenditures are more likely for highest income Hhs.
Savings	• Availability of savings affects both the likelihood of RM decisions and size of the RM expenditures. • Most of the Hhs (78 %) who reported to have some savings are owner-occupiers.
Hh Head Age	• Hh Head age affects only the likelihood of RM decisions. • The youngest cohort (17-24) is less likely to carry out RM works and they display the lowest average RM expenditures. • Contrary to the findings in the literature, elderly Hh heads in Turkey are inclined to carry out RM works. • Average Hh income, Hh size, and dwelling size displays an inverted u-shape with increasing Hh head age. Rate of owner-occupancy, duration of occupancy, and dwelling age (excluding the youngest group) increases as the age increases.

Table 5.32 (cont.): Summary of the Findings

Duration of Occupancy	• Duration of occupancy affects both the likelihood of RM decisions and size of the RM expenditures. • As duration of occupancy in the dwelling extended, likelihood of doing RM works increases. • The relationship between the size of RM expenditures and duration of occupancy is like an inverted u-shape. • As duration of occupancy in the dwelling is extended, average dwelling age consistently increases whereas size of the dwelling decreases. • For owner-occupiers, value of the dwelling services also declines as length of stay in the dwelling increases. Owner-occupiers with longer length of stay in the dwelling are more likely to respond the frequent need for reinvestments due to aging of the stock, yet the size of their RM expenditures is limited. • For tenants, longer length of tenure (increased dwelling age) increases the likelihood of undertaking RM works.
Occupation Density	• No significant relationship exists between occupation density and RM decisions. • Overcrowded dwellings are less likely to receive RM expenditures both in owner-occupied and rental sector. This part of the stock accommodates lowest income Hhs, and value of housing services is very low compared to the rest of the stock. Therefore, reinvestment behaviour in this part of the stock is considered problematic.
Dwelling Age	• Age of the dwelling does not significantly contribute to explain Hhs' reinvestment decisions. • Ratio of repairers is relatively high among the pre-1975 dwellings. • Although, pre-1955 dwellings receive the highest average RM expenditures per sq meter, 1955-1964 dwellings have the lowest ones. These dwellings are basically occupied by Hhs in the lowest end of the income brackets. This is the smallest part of the stock where value of dwelling services is low. Therefore, stock losses and loss of quality is more likely in this part of the stock.
Dwelling Size	• Dwelling size affects both the likelihood of RM decisions and size of the RM expenditures. • Lowest ratio of repairers and highest RM expenditures per sq meter are observed in the smallest and largest part of the stock. • The smallest part of the stock is predominantly occupied by lowest and low income Hhs and it is the oldest and most overcrowded part of the stock with low rental values. This part of the stock requires special attention in policy designs. • Largest part of the stock is predominantly occupied by owner-occupiers with high average income levels. This part of the stock is composed of younger dwellings with higher rental values and ratio of overcrowded dwellings is relatively low.
Monthly Rent	• Monthly rent affects both the likelihood of RM decisions and size of the RM expenditures. • Lowest ratios of repairers are observed at the lowest and highest end of the rent scale. Yet, average RM expenditures increases steadily with increasing rental value of the dwelling. • Hhs in the lowest end of the rent scale display lowest average income levels, and occupy the oldest and smallest part of the stock. These Hhs are predominantly lowest and low income Hhs 37 per cent of whom are tenants. Furthermore, ratio of overcrowded dwellings is relatively high among the dwellings in lowest end of the rent scale. This part of the stock requires special policies to cope with low standards of housing both for owner-occupied and rented sector.

5.5. Multivariate Analyses of the Factors Affecting Household's Reinvestment Decisions and Findings

In this study, Hh's reinvestment decisions are considered as two separate but interdependent decisions which take place sequentially. At first stage Hh has to decide whether to undertake reinvestment or not. Conditional upon a positive reinvestment decision, size of the reinvestment expenditure is decided at the second stage. In this section, empirical estimation of this **sequential model** is done using multivariate analysis techniques in order to explain Hhs' reinvestment decisions in urban Turkey. It must be recalled that, as in most studies ideal information is not available in HBS data. Available database lacks 'neighbourhood features' and 'market attributes' which are significant elements of the analysis framework developed in Chapter 4. The empirical models formulated here therefore inevitably contended with 'Hh characteristics' and 'dwelling attributes' as explanatory variables. The choice of the variables employed in the models is basically determined in line with the results of significance tests (chi square and F-statistics) displayed in Section 5.4[85]. Accordingly, there are a number of factors which have significant effects on Hhs' RM decisions (Table 5.33):

Table 5.33 Independent Factors Affecting Hhs' RM Decisions Significantly

Independent Variables	Likelihood of RM Decision	Size of the RM Expenditures
Hh Characteristics		
Mode of Tenure	✓	✓
Hh Income	✓	✓
Savings	✓	✓
Hh Head Age	✓	×
Duration of Occupancy	✓	✓
Dwelling Characteristics		
Number of Rooms	✓	×
Floor Area	×	✓
Monthly Rent	✓	✓
Other Factors		
Season	✓	✓

✓ Statistically significant relationship
× Statistically insignificant relationship

[85] Correlations between independent variables and RM expenditures are also examined to detect additional significant relationships (refer to Table 5.34). Yet, no additional significant factor is detected in relation to RM expenditures. 'Duration of occupancy', however, displays an insignificant correlation coefficent with RM expenditures. Though, it is included in the analysis since F-statistics identify it to be significant in explaining RM Expenditures.

Since RM decision is considered as a sequential event, two separate models are employed to investigate the factors affecting the likelihood and size of the RM expenditures:

- **The first model** (likelihood of RM decisions) seeks to identify what differentiates repairer / non-repairer Hhs in relation to:
  (1) mode of tenure,
  (2) Hh income,
  (3) savings,
  (4) Hh head age,
  (5) duration of occupancy,
  (6) number of rooms,
  (7) monthly rent, and
  (8) season.

Three basic multivariate analysis methods can be considered appropriate to identify factors which discriminate between repairers and non-repairers. These are;
- Discriminant function analysis,
- Logit analysis,
- Logistic regression.

Discriminant analysis has a number of distributional assumptions (i.e. normality, homogeneity of variances, no outliers) and it requires independent variables to be continuous. Analysis in Section 5.4 displays that most of the variables in HBS data have skewed distributions, and outliers are intrinsic to these variables. Furthermore, there are discrete independent variables which are significant for this research as well as continuous ones. Contrary to discriminant analysis, logit analysis and logistic regression do not have distributional assumptions. In other words, independent variables employed in these methods do not have to be normally distributed, linearly related, and equal variance within each group is not required (Tabachnick & Fidell, 2001). Previous studies in the field almost always employ logit analysis or logistic regression method while investigating the likelihood of reinvestment decisions (refer to Appendix A). The major difference between logit analysis and logistic regression is that independent variables in logit analysis have to be discrete whereas they can be any mix of continuous, discrete and dichotomous variables in logistic regression. Therefore, logistic regression is preferred as the method of statistical analysis in

this part of the study in order to investigate likelihood of RM decisions. Since the dependent variable in the first model is dichotomous (non-repairers / repairers) **binary logistic regression method** is applied in SPSS (ver. 11.5).

- **The second model** (size of the RM expenditures) attempts to identify Hhs having different ranges of RM expenditures (i.e. high / low RM expenditures) among the repairers based on:
  (1) mode of tenure,
  (2) Hh income,
  (3) savings,
  (4) duration of occupancy,
  (5) floor area,
  (6) monthly rent, and
  (7) season.

In the second model, two basic multivariate analysis methods can be employed in order to identify the factors which influence the size of RM expenditures. These are;
- Multiple regression,
- Logistic regression.

Previous studies in the field which investigate the size of reinvestment expenditures often employ multiple regression if the dependent variable of the analysis is continuous. HBS also provides RM expenditures as a continuous variable. Yet, multiple regression has distributional assumptions such as normality, linearity, homogeneity of variances, and no outliers which are not met by the HBS data. Especially the dependent variable, RM expenditures, displays a highly skewed distribution, and includes several outliers omission of which means loss of valuable information[86]. Therefore, a special type of logistic regression, **ordinal regression method**, is preferred as the method of statistical analysis to investigate the size of RM expenditures[87]. Ordinal regression has no distributional assumptions, it handles dependent variables with ordered categories, and independent variables may be any mix of continuous, discrete and dichotomous variables. Thus, RM expenditures are categorized into three as expenditures (1) below 25 Euro, (2) 25-99 Euro, and (3) above 100 Euro, to be

[86] Omitting these outliers from the analysis is not appropriate since the aim of the second model is to identify factors affecting size of the RM expenditures.
[87] Ordinal regression is sometimes referred as PLUM (polytomous universal model) or proportional odds model.

employed as the dependent variable of the second model. Appendix E provides further details on binary and ordinal logistic regression methods.

In Table 5.34, correlations are presented to observe the associations among variables and to check signs of multicollinearity[88]. None of the variables employed in the models are multicollinear, which means all of them can be employed together in the analysis. Results of the binary logistic regression (the first model) and ordinal regression (the second model) are presented in Table 5.35 and 5.36 respectively. Binary logistic regression evaluates the probability of having done RM whereas ordinal logistic regression considers the probability of having spent above 100 Euro for RM and all expenditure levels that are ordered before it. The first model is run separately for all Hhs, owner-occupiers, and tenants whereas the second model considers all repairers, repairer owner-occupiers, and repairer tenants individually[89].

In both tables (5.35 and 5.36), logistic coefficients (B), 'odds ratios' (Exp(B)), and the significance level (*) of the coefficients are presented[90]. In logistic regression usually **'odds ratios'** of the ***significant coefficients*** are employed in order to explain the impacts of independent variables on the probability of the event of interest. For continuous variables (i.e. number of rooms, age of the Hh head), 'odds ratios' less than 1 correspond to decreases in probability of the event with a unit change in the independent variable. For instance, in binary logistic regression model in this study, 'odds ratios' less than 1 mean decreases in the probability of undertaking RM works. Whereas, in ordinal regression model employed in this study, 'odds ratios' less than 1 correspond to decreases in the likelihood of high RM expenditure levels. Similarly 'odds ratios' more than 1 correspond to increases. Values very close to 1 indicate that unit changes in that independent variable do not affect the dependent variable. For categorical independent variables evaluation of odds ratio is always done compared to the reference category (REF).

[88] As Tabachnick and Fidell (2001) underline, multicollinearity refers to a situation in which two or more variables are highly correlated (r >.65). If multicollinear variables exist in a multivariate analysis, then the coefficients calculated for indepedent variables may be misleading. In case of multicollinearity, employing only one of the multicollinear variables in analysis is suggested.

[89] None of the models is applied separately for privileged tenants due to small sample size. Rather, privileged tenants are covered in the 1st model among all Hhs and in the 2nd model among all repairers. For tenant Hhs, 'savings' is not employed as an independent variable in the models. Most of the tenants (98 per cent) don't have savings and inclusion of this variable increases the error term in the models considerably.

[90] Complete SPSS outputs of the binary and ordinal logistic regression analyses are presented in Appendix E.

Table 5.34 Measures of Association: Pearson, Eta Correlations and Crammer's V[91]

	RM Exp.	Income	HhH Age	Occupancy	Hh Size	Dw. Age	Rooms	Floor Area	Rent	Tenure	Savings	Density
RM Exp.	1	.22**	.05	.07	-.04	-.00	.05	.10*	.19**	.15**	.10**	.06
Income	.22**	1	.05	-.06**	.00	-.17**	.28**	.35**	.58**	.13**	.13**	.10**
HhH Age	.05	.05	1	.51**	-.21**	.24**	.02	-.01	.08**	.34**	.07**	.31**
Occupancy	.07	-.06**	.51**	1	-.09**	.56**	-.09**	-.12**	-.08**	.41**	.02	.12**
Hh Size	-.04	.00	-.21**	-.09**	1	-.08**	.01	.05**	-.17**	.01	.09**	.79**
Dw. Age	-.00	-.17**	.24**	.56**	-.08**	1	-.23**	-.29**	-.17**	.08**	.02	.06**
Rooms	.05	.28**	.02	-.09**	.01	-.23**	1	.67**	.32**	.10**	.05**	.34**
Floor Area	.10*	.35**	-.01	-.12**	.05**	-.29**	.67**	1	.37**	.10**	.05**	.21**
Rent	.19**	.58**	.08**	-.08**	-.17**	-.17**	.32**	.37**	1	.14**	.13**	.26**
Tenure	.15**	.13**	.34**	.41**	.01	.08**	.10**	.10**	.14**	1	.05**	.07**
Savings	.10**	.13**	.07**	.02	.09**	.02	.05**	.05**	.13**	.05**	1	.11**
Density	.06	.10**	.31**	.12**	.79**	.06**	.34**	.21**	.26**	.07**	.11**	1

* p < .05
** p < .01
Source: TURKSTAT, *HBS 2004 Raw Data*.

[91] Associations among continuous variables are investigated through Pearson correlations whereas nominal by interval or ratio associations are examined by Eta coefficients. Crammer's V is employed as a measure of association among nominal variables. Eta and Crammer's V values range from 0 to 1, whereas Pearson correlation coefficient varies from -1 to 1. Nominal variables are 'mode of tenure', 'savings', and 'occupation density'.

Table 5.35 Binary Logistic Regression Model: Likelihood of RM Decisions

Dependent Variable: Probability of having done RM (0: non-repairers, 1: repairers)						
	All Hhs		**Owner-occupiers**		**Tenants**	
Independent Variables	B	Odds Ratio	B	Odds Ratio	B	Odds Ratio
Constant	-3.09	0.05***	-2.73	0.07***	-2.61	0.07**
Hh Characteristics						
Mode of Tenure						
Owner-Occupier	0.02	1.02	NA	NA	NA	NA
Privileged Tenant	0.28	1.32	NA	NA	NA	NA
Tenant (REF)	0.00	1.00	NA	NA	NA	NA
Hh Income						
Lowest Income (REF) (Mean 200 Euro)	0.00	1.00	0.00	1.00	0.00	1.00
Low Income (Mean 340 Euro)	0.52	1.67***	0.45	1.57*	0.39	1.48
Middle Income (Mean 477 Euro)	0.90	2.46***	0.87	2.39***	0.74	2.10**
High Income (Mean 672 Euro)	0.89	2.44***	0.83	2.28***	0.75	2.11**
Highest Income (Mean 1389 Euro)	0.96	2.62***	0.95	2.58***	1.00	2.71**
Savings						
No Savings (REF)	0.00	1.00	0.00	1.00	NA	NA
Some Savings	0.36	1.43	0.43	1.54	NA	NA
Age of the Hh Head						
Hh Head Age (in 10 years)	0.06	1.06	0.02	1.02	0.08	1.08
Duration of Occupancy						
1 Year or Less	-0.80	0.45*	-0.82	0.44*	-1.23	0.29
2-10 Years	-0.78	0.46**	-0.79	0.46**	-1.23	0.29
11-40 Years (11-20 Years for Tenants)	-0.56	0.57*	-0.58	0.56*	-0.95	0.39
More than 40 Years (REF) (20+ Years for Tenants - REF)	0.00	1.00	0.00	1.00	0.00	1.00
Dwelling Characteristics						
Dwelling Size						
Number of Rooms	0.19	1.21**	0.15	1.16	0.24	1.28
Monthly Rent						
Monthly Rent (in 50 Euros)	-0.11	0.90**	-0.10	0.90*	-0.18	0.84
Other						
Season						
Winter (REF)	0.00	1.00	0.00	1.00	0.00	1.00
Spring	0.30	1.35*	0.25	1.29	0.21	1.24
Summer	0.53	1.71***	0.55	1.73***	0.42	1.52
Autumn	0.37	1.45**	0.44	1.56**	0.15	1.16
Log Likelihood	4092.62		2800.40		1011.82	
χ^2	118.14*** (16df)		65.52*** (14df)		28.25** (13df)	
Nagelkerke R^2	0.04		0.03		0.04	
N	5778		3766		1642	

REF = Reference Category NA = Not Applicable *p < .05, ** p < .01, ***p < .001

Table 5.36 Ordinal Logistic Regression Model: Size of the RM Expenditures[92]

Dependent Variable: Ordered RM Expenditures: (1) Less than 25 Euro, (2) 25-99 Euro, (3) 100 Euro or More						
	All Repairers		**Repairer Owner-Occupiers**		**Repairer Tenants**	
Independent Variables	B	Odds Ratio	B	Odds Ratio	B	Odds Ratio
Household Characteristics						
Mode of Tenure						
Owner-Occupier (REF)	---	---	NA	NA	NA	NA
Privileged Tenant	-0.59	0.56	NA	NA	NA	NA
Tenant	-0.79	0.45**	NA	NA	NA	NA
Hh Income						
Lowest Income Hhs(REF)	---	---	---	---	---	---
Low Income Hhs	0.70	2.01	0.93	2.54	0.69	2.00
Middle Income Hhs	0.92	2.51*	1.20	3.32*	0.38	1.47
High Income Hhs	0.57	1.77	0.88	2.41	0.16	1.18
Highest Income Hhs	1.30	3.67**	1.67	5.32**	1.13	3.09
Savings						
No Savings (REF)	---	---	---	---	---	---
Some Savings	0.74	2.09	0.56	1.76	NA	NA
Duration of Occupancy						
1 Year or Less (REF)	---	---	---	---	---	---
2-10 Years	-0.33	0.72	-0.53	0.59	0.28	1.32
11-20 Years	-0.20	0.82	-0.44	0.64	0.98	2.68
More than 20 Years	0.08	1.08	-0.01	0.99	1.77	5.88
Dwelling Characteristics						
Dwelling Size						
Floor Area (in 25 sq meters)	-0.13	0.88**	-0.7	0.93	-0.47	0.62**
Monthly Rent						
Monthly Rent (in 50 Euros)	0.26	1.30**	0.19	1.21*	0.83	2.30**
Other						
Season						
Winter (REF)	---	---	---	---	---	---
Spring	1.51	4.54***	1.58	4.87***	2.19	8.92*
Summer	0.99	2.69**	0.93	2.55**	2.10	8.18*
Autumn	1.04	2.84***	0.96	2.60**	1.47	4.37
Log Likelihood	948.75		719.88		142.88	
χ^2	97.22*** (15df)		59.33*** (13df)		26.86** (12df)	
Nagelkerke R^2	0.16		0.14		0.23	
N	686		478		158	

REF = Reference Category NA = Not Applicable * p < .05, ** p < .01, ***p < .001

[92] Ordinal logistic regression procedure in SPSS does not produce 'odds ratios' as an output. Odds ratios are calculated in Microsoft Excel employing B coefficients (Exp (B)).

Table 5.37 summarizes the results of the two models in explaining the likelihood of RM decisions and size of the RM expenditures.

Table 5.37 Results of the Empirical Models: Factors Affecting Hhs' RM Decisions

Independent Variables	**Likelihood of RM Decision (1st Model)**			**Size of the RM Expenditures (2nd Model)**		
	All Hhs	Owner-occ.	Tenants	All Repairers	Repairer Owners	Repairer Tenants
Hh Characteristics						
Mode of Tenure	×	NA	NA	✓	NA	NA
Hh Income	✓	✓	✓	✓	✓	×
Savings	×	×	NA	×	×	NA
Hh Head Age	×	×	×	NA	NA	NA
Duration of Occupancy	✓	✓	×	×	×	×
Dwelling Characteristics						
Dwelling Size	✓	×	×	✓	×	✓
Monthly Rent	✓	✓	×	✓	✓	✓
Other Factors						
Season	✓	✓	×	✓	✓	✓

✓ Variable with a significant coefficient
× Variable with an insignificant coefficient
NA: Not Applicable

The most significant findings of the multivariate analyses (Table 5.35, 5.36) can be highlighted as follows:

For all Hhs;

- **'Mode of tenure'** does not display significant coefficients in the first model (likelihood of RM works). In other words, being a repairer or non-repairer is not significantly associated with Hhs' mode of tenure. Yet, in line with the expectations and previous findings, tenants' RM expenditures are more likely to be small-scale expenditures compared to owner-occupiers' RM expenditures (odds ratio = 0.45).
- **'Hh income'** significantly affects the likelihood of a Hh's RM decisions. However, size of the RM expenditures can only be differentiated significantly for middle and highest income Hhs compared to the lowest income Hhs. Highest income Hhs in urban Turkey are 2.6 times as likely to be repairers compared to lowest income Hhs. Furthermore, they are 3.7 times more likely to spend larger amounts for RM works. Even low income Hhs are 1.7 times more likely to be repairers compared to the lowest income Hhs. As bivariate analysis in previous section and correlation analysis (Table 5.34) display,

lowest income Hhs occupy the oldest and smallest part of the stock where value of the dwelling services is relatively low. In other words, lowest income Hhs who experience problems in RM of their dwellings already occupy the lowest end of the stock where physical deterioration is more likely due to aging and overutilization. High rates of depreciation and loss of quality are expected to appear in this part of stock.

- As Hh's **'duration of occupancy'** in the dwelling lengthens, the probability of being a repairer increases (odds ratios rising from 0.45 to 1)[93]. In HBS sample, increasing length of stay in the dwelling is associated with increasing dwelling age (r = 0.56, Table 5.34). Theoretically ageing of the dwelling is argued to lower the incentive for reinvestments, though above finding displays that more frequent need for RM is inevitable due to aging. Yet, the effects of duration of occupancy on the size of RM expenditures are not proved to be significant. As bivariate analysis displays, Hhs with longer length of stay in the dwelling display lower RM expenditures. The RM works undertaken by these Hhs are most probably works to fix a vital malfunctioning component of the dwelling due to aging.
- In line with the theoretical discussion, increasing **'dwelling size'** increases the likelihood of undertaking RM works (odds ratio = 1.21). Contrary to the previous findings in literature, increasing 'dwelling size' decreases the likelihood of engaging in large-scale reinvestments in the Turkish case (odds ratio = 0.88). In other words, in larger dwellings RM works are more frequent, though size of the expenditures are relatively smaller compared to smaller dwellings. As displayed earlier in Section 5.4, largest part of the stock is composed of newer dwellings. Therefore, it is not surprising to observe low RM expenditures in this part of the stock.
- In this study **'monthly rent'** is employed as a proxy for 'value of the dwelling services' and low levels of monthly rents are assumed to be associated with poor dwelling conditions and neighbourhood qualities. Bivariate analysis in previous section and correlation analysis (Table 5.34) support this assumption displaying that Hhs at the lowest end of the rent scale are Hhs in the lowest end of the income scale (r = 0.58) and they occupy the older and smaller part of the stock. Hhs at the highest end of the rent scale, on the other hand, are high income Hhs who reside in the newer and larger

[93] It must be recalled that in HBS data RM expenditures are observed as monthly expenditures. Therefore, it is not possible to observe the adjustment investments of recent movers following their move to the dwelling. If it was possible to observe annual RM expenditures, probably likelihood of recent movers' RM decisions would be much higher than observed in the HBS data.

dwellings. The first model indicates that, as value of the dwelling services increases the likelihood of doing RM works decreases (odds ratio = 0.90). Yet, repairers occupying the higher valued dwellings are 1.3 times more likely to spend higher amounts for RM works compared to repairers residing in lower valued dwellings. In other words, Hhs are more likely to undertake RM in areas where poor dwelling conditions and / or neighbourhood qualities prevail, yet size of the RM expenditures remains residual.

- Since the RM expenditures in HBS are expenditures made in the survey month, including **'season'** in the regression models is useful to display that these types of expenditures vary reliably through the year. Hhs who were surveyed through summer season are 1.7 times more likely to carry out RM compared to Hhs surveyed in the winter period. Similarly, Hhs surveyed in the spring and autumn seasons are more likely to be repairers compared to Hhs surveyed in the winter season. Furthermore, large-scale RM expenditures are more likely among Hhs who were surveyed through spring season (odds ratio = 4.5) compared to Hhs surveyed in the winter season. Also in autumn and summer seasons higher RM expenditures are more likely compared to winter season (odd ratios 2.8 and 2.7 respectively). In other words, seasonal bias is unavoidable with HBS data in investigating the Hhs' RM decisions.

Most of the findings stated above for all Hhs are also valid for owner-occupiers. Yet, **in the owner-occupied sector;**

- The effects of 'dwelling size' on the likelihood and size of the RM expenditures are not significant.
- The gap between the RM expenditure volumes of highest – lowest income Hhs and middle – lowest income Hhs is wider for owner-occupier repairers than for tenants (odds ratios are 5.32 and 3.32 respectively).

In the rental sector;

- For tenant Hhs, 'Hh income' is the only significant factor which affects the likelihood of RM decisions. Highest income tenants are 2.7 times as likely to undertake RM compared to the lowest income ones, whereas middle and high income tenants are almost 2 times more likely to be repairers compared to the lowest income tenants. Yet, the effects of Hh income on the size of RM expenditures are not significant for tenants.

- Tenant Hhs are less likely to spend larger amounts for RM works compared to owner-occupiers (odds ratio = 0.45). Yet, a number of factors increase the likelihood of larger RM expenditures among the repairer tenants:
  (1) Hhs occupying the smaller part of the stock are more likely to spend larger amounts for RM works.
  (2) Hhs living in higher valued dwellings are 2.3 times more likely to undertake higher RM expenditures.
  (3) Large-scale RM expenditures are almost 8-9 times more likely in spring and summer seasons compared to winter period.

As chi square values at the bottom of Table 5.35 and 5.36 display, both models have a significant overall fit. Yet, explanatory power (R^2) of the first model is very weak, whereas in the second model R^2 is within the range of previous studies in the literature (7 to 20 per cent)[94]. To complement the analysis made in this chapter, similar bivariate and multivariate analyses are undertaken with the data of Ankara Survey in the next chapter. The Ankara Survey data not only covers additional variables for investigating Hhs' reinvestment behaviour but also considers Hhs' annual reinvestment expenditures. Comparison of the findings from the analysis of HBS and Ankara Survey are presented at the end of the next chapter (Chapter 6). An overall interpretation of the findings from the analysis of both databases and discussion of macro implications of Hhs' reinvestment behaviour in the Turkish case is provided in Chapter 7.

[94] It must be noted that R^2 values provided in logistic regression are approximations to R^2 in linear regression, and Nagelkerke R^2 usually tends to be lower than the corresponding OLS R^2.

CHAPTER 6

INVESTIGATION OF REINVESTMENT DECISIONS: THE CASE OF ANKARA

6.1. Reinvestment Decisions of Households in Urban Ankara

In this part of the study, major aim is to identify main Hh, dwelling, and neighbourhood characteristics affecting Hhs' reinvestment decisions in the apartment stock of urban Ankara by employing Ankara Survey (2007-08) data. Major argument is that frequency and size of Hhs' reinvestment expenditures in the existing housing stock is much above the estimates of TURKSTAT, and neighbourhood features as well as Hh and dwelling characteristics have a significant role in explaining Hhs' reinvestment decisions. Additionally, this part of the study aims to expose the types of reinvestments undertaken by Hhs and to identify problems in reinvestment issues, therefore has a crucial contribution to this study. This chapter basically seeks answers to the following questions:

- Is it possible to argue that frequency and size of reinvestments in urban areas are much above the estimates of TURKSTAT?
- What is the major purpose of the Hhs' reinvestments and how do they finance these activities?
- What type of reinvestments are more frequently undertaken by different tenure modes (owner-occupiers, tenants, privileged tenants)?
- What are the difficulties confronted by Hhs when they decide to reinvest in their dwelling units?
- Which Hh, dwelling, and neighbourhood characteristics significantly affect (trigger / hinder) Hhs' reinvestment decisions? Do additional variables provided by the Ankara Survey improve the explanatory power (R^2) of the employed statistical models to explain Hhs' reinvestment decisions?
- Based on the significant factors affecting Hhs' reinvestment decisions, is it possible to identify Hhs who are unable / unwilling to reinvest to their dwellings or dwellings which are unlikely to receive reinvestments?

6.2. Method of Analysis

6.2.1. Ankara Survey Data

The second data source employed in the investigation of urban Hhs' reinvestment behaviour is a survey sample obtained through the 'Household Mobility in Housing Stock' project (2000-2008), funded by METU. Major aim of this survey was to provide data related to Turkish housing stock and Hhs in order to study housing processes such as 'affordability', 'entry to homeownership', 'Hh mobility', 'reinvestments in existing stock', 'housing management', 'housing wealth and inheritance', etc. With this aim, the survey provides a comprehensive data set for the empirical investigation of Hhs' reinvestment behaviour in this research. The Ankara Survey overcomes a number of the HBS's shortcomings especially by providing crucial information on:

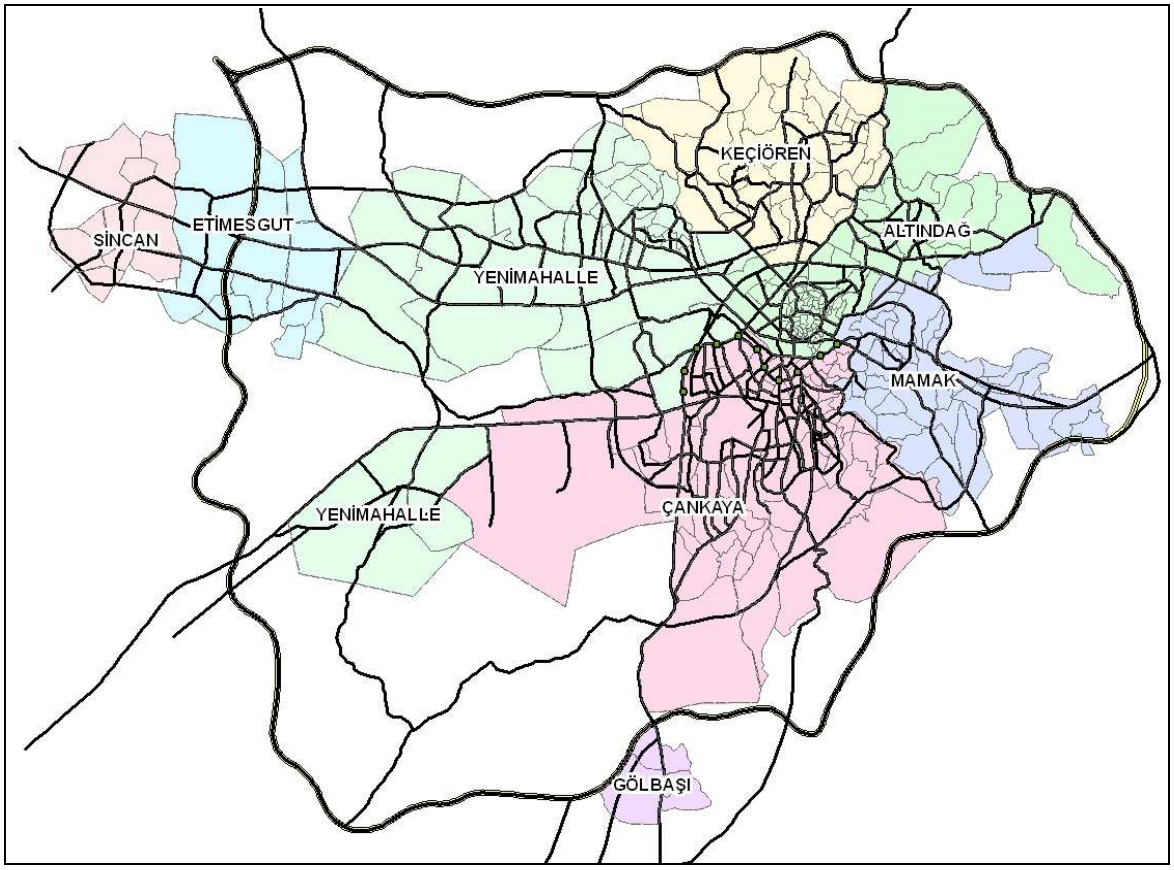
- Hhs' annual reinvestment expenditures,
- Type and purpose of the work done,
- Realized and planned reinvestments,
- Hhs' subjective evaluation of the neighbourhood features,
- The exact location of each building which makes it possible to integrate an objective measure of neighbourhood attributes, 'land values'.

'Household Mobility in Housing Stock' project was partially a follow-up of a previous study conducted in 1984 in the apartment stock of Ankara[95]. Following the method employed in the 1984 survey, a Hh questionnaire was designed and implemented in the apartments of Ankara in 2007-2008. Survey design and implementation, data preparation and reduction stages of the Ankara Survey are presented in Appendix G, questionnaire form of the Ankara Survey is provided in Appendix H.

Geographic coverage of the Ankara Survey is the central districts of Ankara metropolitan area namely; Çankaya, Yenimahalle, Keçiören, Altındağ, Mamak (Refer to Map 6.1). More than 8000 Hhs (regardless of mode of tenure) in approximately 950 buildings were visited throughout the survey. The response rate however remained approximately 25 per cent. Yet,

[95] Both projects are designed and implemented by Prof. Balamir. Detailed analysis of the data provided by the 1984 project is undertaken by Balamir (1992).

no significant bias for the purposes of analyses in this study is generated due to low response rates[96]. This part of the study employs the Ankara Survey data in order to investigate the effects of Hh, dwelling, and neighbourhood characteristics on Hhs' reinvestment decisions.



Map 6.1 Central Districts of Ankara Metropolitan Area

6.2.2. Dependent and Independent Variables

In the Ankara Survey, reinvestment expenditures of Hhs are represented by expenditures on RM activities undertaken in the last 12 months. Cost items included under RM activities cover regular RM, replacement of electrical system / plumbing, kitchen and bathroom remodelling, painting, wall covering, etc.[97] Two **dependent variables** are derived from the Ankara Survey. The dichotomous dependent variable represents Hhs with 'zero' and 'nonzero' RM expenditures. The likelihood of Hhs' RM decisions based on Hh, dwelling, and neighbourhood attributes is investigated through the dichotomous dependent variable. Second

[96] Refer to Appendix F for comparison of distributions in Ankara Survey with the general distributions.
[97] Refer to Appendix H, section 'e' of the question 49 to see all of the cost items included in the questionnaire.

dependent variable is the 'expenditure categories' for the nonzero RM expenditures. In identification of the factors affecting the size of RM expenditures 'RM expenditure categories' are employed.

Table 6.1 List of Independent Variables Employed in the Analysis.

Variable	Range	Missing Cases
Hh Characteristics		
Mode of Tenure	1. Owner-occupier 2. Privileged-tenant 3. Tenant	---
Hh Income	1. Less than 500 Euro 2. 500-1000 Euro 3. 1000-1500 Euro 4. 1500-2500 Euro 5. 2500-5000 Euro 6. More than 5000 Euro	51 cases
Age of the Hh Head	18-99 Years	26 cases
Hh Size	1-11 Person	24 cases
Change in Hh Size	1. Hh size decreased since Hh moved to this dwelling 2. No change 3. Hh size increased since Hh moved to this dwelling	121 cases
Duration of Occupancy	Less than 1 year-46 years	61 cases
Mobility Expectation in five years time	1. No 2. Yes	67 cases
Occupation Density	1. Underoccupation 2. Comfort 3. Overcrowding	52 cases
Qualifications of Dwelling		
Age of Dwelling	8-46 years	---
Size of Dwelling (number of rooms, floor area)	1-8 rooms 45-300 sq meters	29 cases 54 cases
Monthly Rent (Imputed and Actual Rents)	1. Less than 175 Euro 2. 175-275 Euro 3. 276-400 Euro 4. More than 400 Euro	213 cases
RM in Common Parts of the Apartment Block	Interior and/or exterior painting Yes/No Insulation, roof/elevator repairing Yes/No Landscaping Yes/No Installations/infrastructure repairing Yes/No	224 cases
Evaluation of Dwelling by Hh	Existence of Burglary Yes/No Size of the dwelling is small Yes/No Dwelling is in disrepair Yes/No	79 cases
Neighbourhood Features		
Hh evaluation of neighbourhood: Services Accessibility Safety Environment	1. Extremely Poor 2. Below Average 3. Average 4. Above Average 5. Excellent	121 cases (services) 112 cases (accessibility) 104 cases (safety) 106 cases (environment)
Land Value per sq meter	20-500 Euro	---

The Ankara Survey also provides 19 **independent variables** crucial for this study (Table 6.1). These variables represent Hh characteristics, qualifications of the dwelling unit, and subjective and objective measures of neighbourhood attributes. Most of these variables are obtained directly from the questions in the Hh questionnaire (i.e. Hh income, Hh head age, size of the dwelling), whereas others are calculated employing several questions (i.e. 'occupation density', 'change in Hh size'). There are also variables external to the Hh questionnaire. 'Age of the dwelling', for instance, was available in the FO records which were the basis of the sampling. 'Land values', on the other hand, were provided as a list with respect to district and street names by Revenue Administration of the Ministry of Finance (2006). Since the exact location of each building is known in the Ankara Survey, it was possible to integrate 'land values' as an additional variable to the data. Table 6.1 displays the independent variables available in the Ankara Survey with their range of responses and missing cases.

6.2.3. Data Analysis

Three major steps are followed during the analysis of Ankara Survey data[98]. In the first step (Section 6.3), the nature of reinvestment expenditures is explored through univariate and bivariate analyses. For Hhs who undertook reinvestment activities in the preceding year, particularly major purpose of the reinvestment work done, total reinvestment spending and distribution of payments through time, source of finance, and type of the work done were investigated. For all Hhs, regardless of the reinvestment work done in the last 12 months, planned reinvestments and difficulties confronted in doing these works are also explored.

In the second step (Section 6.4), individual effects of each Hh and dwelling characteristics, and neighbourhood features on Hhs' reinvestment decisions are examined. For each independent variable mentioned in Table 6.1, distribution of repairer Hhs and their average RM expenditures are explored[99]. Chi-square and F-statistics are employed to determine factors (Hh, dwelling, and neighbourhood features) affecting Hhs' reinvestment decisions significantly.

[98] Refer to Figure 1.2 in Chapter 1 for a flowchart displaying the structure of analyses.
[99] Since the Ankara Survey data measures RM expenditures at interval scale, average RM expenditures reported in this chapter are calculated based on interval means.

Multivariate analyses of the factors affecting the likelihood of RM decisions and size of the RM expenditures are done in the third step (Section 6.5). Analyses in this step employ the statistically significant factors (Hh, dwelling, and neighbourhood factors) determined in the second step. Moreover, correlation analysis is also presented to observe the relationships among variables. Similar to the analyses conducted with HBS data (refer to Section 5.2.3); the likelihood of undertaking a nonzero RM expenditure given the Hh, dwelling, and neighbourhood features is investigated through 'binary logistic regression' method. Moreover, factors influencing the size of RM expenditures are investigated through 'ordinal logistic regression' method. Details of the applied techniques are presented in Appendix E. It must be noted that in the following sections all monetary values presented are in Euro and represent 2007-2008 prices (unless otherwise stated) where average conversion rate is 1 Euro = 2.00 TRY[100].

6.3. Repairs and Maintenance Expenditures of Urban Households in Ankara

In urban Ankara, 32 per cent (593 Hhs) of the surveyed Hhs (1846 Hhs) reported to carry out RM in the year preceding the survey. An average repairer Hh spent approximately 1350 Euro annually for RM works. Ratio of repairers in the Ankara Survey is 2.7 times higher compared to the HBS findings and average monthly RM spending is 2.3 times of the country averages observed in the HBS. More than half of the repairer Hhs in the Ankara Survey (55 per cent of all Hhs) spent more than 500 Euro for RM works annually (Table 6.2).

Table 6.2 Annual RM Expenditures of 'Tenure Modes'

Expenditure Categories (Euro)	Owner-occupier		Tenant-privileged		Tenant		All Hhs	
	Hhs	%	Hhs	%	Hhs	%	Hhs	%
< 500	124	31.9	17	34.7	115	87.1	256	44.9
500-1500	131	33.7	18	36.7	14	10.6	163	28.6
1501-2500	63	16.2	6	12.2	2	1.5	71	12.5
2501-5000	33	8.5	3	6.1	1	.8	37	6.5
5000 +	38	9.8	5	10.2	-	-	43	7.5
Total	389	100	49	100	132	100	570	100

Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

[100] All tables and figures in Section 6.3, 6.4 and 6.5 are processed by the author for the purposes of this research.

As Table 6.2 displays, compared to the HBS, distribution of Hhs is more balanced among the expenditure categories. Nearly two thirds of reinvestment expenditures by owner-occupiers and privileged tenants are above 500 Euro. On the contrary, expenditures above 500 Euro are very rare among tenant Hhs (13 per cent).

More than half of the repairer Hhs defined the reinvestment works they undertook as 'non-discretionary RM', and a further 34 per cent classified the major purpose of the reinvestments done as 'beautification' and 'ease-of-use' (Table 6.3). Although these works have an investment value, they may be considered predominantly consumption oriented investments. For tenants, 'non-discretionary RM' represents nearly two thirds of the responses. In other words, tenants are more likely to engage in RM works when it becomes unavoidable. For privileged tenants, 'non-discretionary RM' represents 42 per cent of the responses. Reinvestments aiming to ensure 'ease-of-use' in the dwelling are also very common among privileged tenants (35.4 per cent). It is a fact that, these Hhs' housing choice is not basically determined by their demands and needs. Rather, they make use of the opportunities provided by their family or relatives. This may in turn call for adjustment investments such as investments for 'ease-of-use' in the dwelling occupied. Investment oriented expenditures, on the other hand, such as improving the quality of dwelling and increasing the value of dwelling services constitute 10.3 per cent of all responses. Obviously, owner-occupier Hhs are more likely to engage in investment oriented works compared to other tenures. Non-discretionary works are also common among owner-occupiers (51 per cent). Moreover, 21 per cent of owner-occupiers classified the major purpose of the reinvestment work done as 'beautification'. In other words, consumption considerations are the basic motivation under reinvestment works even for owner-occupiers.

Table 6.3 Purpose of the RM Work with respect to 'Mode of Tenure'

Purpose of the RM Work	Owner-occupier		Tenant-privileged		Tenant		All Hhs	
	Hhs	%	Hhs	%	Hhs	%	Hhs	%
Non-discretionary RM	201	51.3	20	41.7	90	66.7	311	54.1
Ease-of-Use	50	12.8	17	35.4	18	13.3	85	14.8
Quality Improvement	39	9.9	4	8.3	3	2.2	46	8.0
Beautification	82	20.9	6	12.5	22	16.3	110	19.1
House Value Increase	12	3.1	1	2.1	-	-	13	2.3
Other	8	2.0	-	-	2	1.5	10	1.7
Total	392	100	48	100	135	100	575	100

Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

Table 6.4 ‘RM Expenditures’ with respect to ‘Purpose of the RM Work’ for All Hhs

Purpose of the RM Work	RM Expenditures (Euro)							
	-500		500-1500		1500+		Total	
	Hhs	%	Hhs	%	Hhs	%	Hhs	%
Non-discretionary RM	170	56	76	25	58	19	304	100
Ease-of-Use	24	29	31	37	28	34	83	100
Quality Improvement	5	12	20	47	18	42	43	100
Beautification	41	39	31	30	32	31	104	100
House Value Increase	4	31	3	23	6	46	13	100
Other	6	60	2	20	2	20	10	100
Total	250	45	163	29	144	26	557	100

Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

In Table 6.4, the major purpose of Hhs’ reinvestments and the total costs paid is explored together. Accordingly, most of the RM expenditures categorized under ‘non-discretionary RM’ are below 500 Euro. These expenditures are most probably undertaken to fix a malfunctioning element, or to repair a damaged part of the dwelling. On the contrary, RM works aimed at quality improvement, house value increase, ease-of-use, and beautification constitute voluminous expenditures.

In the Ankara Survey, Hhs were also asked to report the major source of finance employed in reinvestment works (Table 6.5).

Table 6.5 Financial Source Employed to Undertake RM Works

Source of Finance	Owner-occupier		Tenant-privileged		Tenant		All Hhs	
	Hhs	%	Hhs	%	Hhs	%	Hhs	%
Savings	187	47.3	11	22.4	34	26.2	232	40.4
Loans	18	4.6	4	8.2	1	.8	23	4.0
Incur a Debt	72	18.2	14	28.6	13	10.0	99	17.2
Hh Income	113	28.6	18	36.7	73	56.2	204	35.5
Sale of Property / Assets	-	-	1	2.0	1	.8	2	0.3
Other	5	1.3	1	2.0	8	6.2	14	2.4
Total	395	100	49	100	130	100	574	100

Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

Accordingly, 47 per cent of owner-occupiers reported Hh savings as major source of finance whereas 56 per cent of tenants employed Hh income to finance reinvestments (Table 6.5). Privileged tenants, on the other hand, reported to incur a debt and utilize their savings as well

as employing Hh income to finance reinvestments. Furthermore, the overall picture displays that, share of Hhs who employ consumer loans for RM activities is very low (4 per cent). Rather than applying for bank loans, 17 per cent of repairer Hhs preferred to incur a debt. This debt may cover payments done with credit cards as well as money borrowed from friends / family.

As Table 6.6 displays, RM works carried out of monthly income are mainly below 500 Euro. As discussed earlier in Chapter 4, large scale works are difficult to be met out of current income and Hhs may have to employ their savings or some mode of borrowing to finance these works. Findings of the Ankara Survey are also in line with this argument displaying that Hhs who employ a bank loan, incur a debt, or utilize their savings are more likely to engage in voluminous RM expenditures.

Table 6.6 'RM Expenditures' with respect to 'Source of Finance'

Source of Finance	RM Expenditures (Euro)							
	-500		500-1500		1500+		Total	
	Hhs	%	Hhs	%	Hhs	%	Hhs	%
Savings	85	37	70	31	72	32	227	100
Loans	2	9	6	27	14	64	22	100
Incur Debt	25	26	39	40	34	35	98	100
Hh Income	128	65	42	21	26	13	196	100
Sale of Property / Assets	1	50	-	-	1	50	2	100
Other	7	50	4	29	3	21	14	100
Total	248	44	161	29	150	27	559	100

Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

Although, a large share of the Hhs (46 per cent) preferred to pay the cost of RM in advance, most of them distributed their payments through time (Table 6.7). Moreover, most of the Hhs who employed their savings and Hh Income to finance RM work paid the costs in advance (65 per cent and 50 per cent respectively). On the contrary, payments of Hhs who employed bank loans for RM works usually continue longer than one year. Almost 75 per cent of the Hhs who incur debt to finance RM works preferred payments longer than 6 months.

Table 6.7 'Distribution of Payments' with respect to 'Source of Finance'[101]

Distribution of Payments	Source of Finance											
	Savings		Loan		Incur Debt		Hh Income		Other		Total	
	Hhs	%	Hhs	%	Hhs	%	Hhs	%	Hhs	%	Hhs	%
In Advance	142	65	1	5	1	1	93	50	7	58	244	46
In 3 Months	28	13	-	-	6	6	26	14	1	8	61	11
3-6 Months	23	10	3	14	18	19	31	17	2	17	77	14
6-9 Months	7	3	2	9	23	24	13	7	-	-	45	8
9-12 Months	13	6	2	9	26	27	16	9	1	8	58	11
Longer than 12 Months	6	3	14	64	23	24	6	3	1	8	50	9
Total	219	100	22	100	97	100	185	100	12	100	535	100

Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

The Ankara Survey also provides information about type of the reinvestment works undertaken by Hhs. Hhs were allowed to report up to five major reinvestment projects undertaken during the year preceding the survey. Table 6.8 displays type of the reinvestments undertaken by Hhs with respect to tenure modes. Accordingly, painting / wall covering was clearly the most frequently undertaken reinvestment work among all tenure modes, with more than half of the repairers reported work done in the last 12 months. Regular RM, reported by one third of all repairers, had the highest incidence in the remaining categories. This type of reinvestment is obviously more common among tenants. The incidence of kitchen and bathroom remodelling, replacement of electrical system / plumbing, and replacement of floor covering was close to each other, with almost one fourth of all repairers were engaged in those works during the year preceding the survey. Kitchen remodelling was more common among owner-occupiers, whereas bathroom remodelling was carried out both by owner-occupiers and privileged tenants in similar rates. Replacement of electrical system / plumbing, on the other hand, was more frequent among tenants compared to other tenures. Replacement of floor covering displayed the second highest incidence among the reinvestment works carried out by privileged tenants.

[101] Two Hhs who identify the source of finance as 'sale of property or assets' did not indicate the distribution of the RM expenses through time.

Table 6.8 Type of the Reinvestments Undertaken by Households in the Last 12 Months[102]

Type of the Reinvestment	Owner-occupier		Tenant-Privileged		Tenant		All Hhs	
	Hhs	% of N	Hhs	% of N	Hhs	% of N	Hhs	% of N
Regular RM	110	29	12	26	58	48	180	33
Replacement of Electrical System / Plumbing	94	25	13	28	42	34	149	27
Kitchen Remodelling	128	34	10	22	13	11	151	28
Bathroom Remodelling	114	30	15	33	13	11	142	26
Wall Added / Demolished	20	5	1	2	2	2	23	4
Replacement of Heating System	50	13	7	15	17	14	74	14
Painting / Wall Covering	200	53	24	52	70	57	294	54
Carton-Pierre	38	10	4	9	1	1	43	8
Retrofitting against Seismic Hazards	1	0.3	1	2	4	3	6	1
Replacement of Floor Covering	108	28	16	35	13	11	137	25
Replacement of door / window frames	77	20	13	28	17	14	107	20
Balcony Closed	37	10	5	11	2	2	44	8
Insulation	17	4	2	4	4	3	23	4
Safety Precautions	58	15	6	13	12	10	76	14
Suspended Ceiling	5	1	-	-	-	-	5	1
Other	19	5	1	2	8	7	28	5
Total	1076	N = 380	130	N = 46	276	N = 122	1482	N = 548

Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

As Table 6.8 displays, one of the least reported works by repairers was retrofitting against seismic hazards. Yet, this may be usual since earthquake vulnerability is considered low in urban Ankara compared to other parts of Turkey. The share of repairers adding insulation was also very low for all types of tenures. It is probable that in apartment blocks, adding exterior insulation to whole building to ensure energy efficiency is more common than adding interior insulation to individual flats. Clearly, adding or demolishing wall for creating additional or larger spaces was also not very common among the surveyed Hhs.

From the Ankara Survey, it is also possible to investigate Hhs' reinvestment plans in their dwellings. According to Table 6.9, 34 per cent of all Hhs (628 Hhs) reported that they plan to

[102] Among the 593 repairer Hhs, 548 of them reported the type of the RM works undertaken. Percentages sum more than 100 since each Hh was allowed to state up to five major reinvestments undertaken in the last 12 months.

reinvest in their dwellings. Among these Hhs, 225 of them (36 per cent) are already repairers in the year preceding the survey. Of all Hhs, 46 per cent neither undertook reinvestments in the preceding year nor do they plan to do so in the near future.

Table 6.9 Realized and Planned Reinvestments

Planned Reinvestments	Realized Reinvestments				Total	
	No		Yes			
	Hhs	% of all Hhs	Hhs	% of all Hhs	Hhs	% of all Hhs
No	850	46.0	368	19.9	1218	66
Yes	403	21.8	225	12.2	628	34
Total	1253	67.9	593	32.1	1846	100

Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

Hhs who plan to undertake reinvestments in their dwellings were asked to report up to five major reinvestment projects they intend to do (Table 6.10) and to underline major difficulties confronted in doing these works (Table 6.11). According to Table 6.10, painting / wall covering is the most demanded type of reinvestment among all tenure modes. In the remaining categories, kitchen and bathroom remodelling has the highest incidence reported by more than one fourth of potential repairers. These types of reinvestments are more frequently emphasised by privileged tenants. Incidence of reinvestments for retrofitting and adding insulation is high among the planned reinvestments compared to actual reinvestment works undertaken in the year preceding to the survey. Surprisingly, these types of reinvestment works are more commonly reported by tenant Hhs.

Table 6.10 Type of the Planned Reinvestments[103]

Type of the Planned Reinvestment	Owner-occupier		Tenant-Privileged		Tenant		All Hhs	
	Hhs	% of N	Hhs	% of N	Hhs	% of N	Hhs	% of N
Regular RM	76	18	7	13	32	23	115	18
Replacement of Electrical System / Plumbing	56	13	5	9	22	16	83	13
Kitchen Remodelling	113	26	16	30	34	24	163	26
Bathroom Remodelling	103	24	21	39	40	29	164	26
Wall Adding / Demolishing	16	4	-	-	4	3	20	3
Replacement of Heating System	23	5	6	11	18	13	47	7
Painting / Wall Covering	153	35	23	43	46	33	222	35
Carton-Pierre	15	3	4	7	3	2	22	4
Retrofitting against Seismic Hazards	34	8	5	9	15	11	54	9
Replacement of Floor Covering	70	16	11	20	22	16	103	16
Replacement of door / window frames	62	14	11	20	29	21	102	16
Closing a Balcony	54	12	6	11	11	8	71	11
Insulation	36	8	4	7	18	13	58	9
Safety Precautions	40	9	10	19	27	19	77	12
Suspended Ceiling	2	0.5	2	4	-	-	4	1
Other	14	3	2	4	7	5	23	4
Total	867	N = 434	133	N = 54	328	N = 140	1328	N = 628

Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

In Table 6.11, major difficulties identified by Hhs in doing the planned reinvestments are presented. For all tenure modes, the major obstacle to planned reinvestments was reported as high costs. For owner-occupiers and privileged tenants, having no spare time to devote to these activities (time constraints) stand as the second major problem. Unavailability of skilled labour for the planned reinvestments has the highest incidence among the remaining categories for owner-occupiers and privileged tenants. For tenants, having the consent of home owner for the planned works, and time constraints takes the second and third ranks respectively.

[103] Percentages sum more than 100 since each Hh was allowed to state up to five major reinvestment projects they intend to do in the near future.

Table 6.11 Major Difficulties Confronted in doing the Planned Reinvestments[104]

Difficulties	Owner-occupier		Tenant-Privileged		Tenant		All Hhs	
	Hhs	% of N	Hhs	% of N	Hhs	% of N	Hhs	% of N
High Costs	233	58	30	60	66	52	329	56
Time Constraints	179	44	18	36	28	22	225	39
Unavailability of Skilled Labour	56	14	9	18	8	6	73	13
Technical Difficulties	29	7	7	14	7	5	43	7
Legal Constraints	10	2	1	2	2	2	13	2
Requires Consent of the Home Owner	-	-	3	6	55	43	58	10
Requires Unanimous / Collective Decision in the Apartment	34	8	8	16	9	7	51	9
Other	30	7	4	8	10	8	44	8
Total	571	N = 405	80	N = 50	185	N = 128	836	N = 583

Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

The information provided in this section, based on the Ankara Survey, offers new insights into the nature of Hhs' reinvestment expenditures, though it is confined to be descriptive at this stage of the study. The issues mentioned above are the least studied aspects of Hh reinvestment decisions in the literature due to lack of data. Yet, they are valuable contributions to understand the internal dynamics and determinants of Hhs' reinvestment decisions.

6.4. The Effects of Household and Stock Characteristics on Repairs and Maintenance Decisions

The Ankara Survey data provides most of the Hh and dwelling characteristics which are available in the HBS data as well as additional information such as 'change in Hh size', 'mobility expectation of Hhs', 'RM in common parts of the apartment block', and 'evaluation of dwelling by Hhs'[105]. Furthermore, neighbourhood features which are not available in HBS data are also provided by the Ankara Survey data. In this part of the study these factor sets (Hh, dwelling, and neighbourhood variables) are evaluated with respect to their effects on

[104] Percentages sum more than 100 since each Hh was allowed to state up to two major difficulties faced in doing the planned reinvestment works.
[105] Refer to Table 4.2 in Chapter 4 for a comparison of available variables in HBS and the Ankara Survey.

Hh's reinvestment decisions. Major findings of the analysis are summarized at the end of this section (Section 6.4.4).

6.4.1. Household Characteristics

Mode of Tenure

Similar to the HBS results, owner-occupancy is the dominant mode of tenure among the sampled Hhs in the Ankara Survey (67 per cent). Ratio of repairer Hhs among tenure modes displays that privileged tenants are more likely to carry out reinvestments compared to owner-occupiers and tenants (Table 6.12). The highest average RM expenditure level is displayed by owner-occupiers. Privileged tenants have a very close average to owner-occupiers' average expenditures. An average owner-occupier spends approximately 4.4 times more than an average tenant. Similar to the HBS findings, more than four fifth of the total reinvestment spending is realized in the owner-occupied stock. As mentioned in previous section (Table 6.2), nearly two thirds of reinvestment expenditures by owner-occupiers and privileged tenants are above 500 Euro. On the contrary, large scale expenditures are very rare among tenant Hhs.

Table 6.12 Summary Statistics: 'Mode of Tenure'

Mode of Tenure	All Hhs		Repairer Hhs		Repairers / All Hhs[1] (%)	Average RME[2] (Euro)	Share in Total RME (%)
	Frequency	%	Frequency	%			
Owner-occupier	1238	67.1	404	68.1	32.6	1669	84
Tenant-privileged	114	6.2	51	8.6	44.7	1566	10
Tenant	494	26.8	138	23.3	27.9	383	7
Total	1846	100	593	100	32.1	1362	100

[1] $\chi^2(2, 1846) = 12.44, p < .05$
[2] $F(2, 567) = 32.55, p < .05$
Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

Tenure modes differ fundamentally in terms of Hh characteristics, though attributes of the stock they occupy resemble to each other (Table 6.13). Tenant Hhs are younger, having low average income levels, and more mobile compared to privileged tenants and owner-occupiers. Tenure modes display no major differences in terms of 'age of the dwelling' and 'number of rooms'. Tenants and privileged tenants consume slightly less dwelling space in sq meters

compared to owner-occupiers. Moreover, land values of the dwellings occupied by privileged-tenants are lower compared to other tenures.

Table 6.13 Household and Stock Characteristics for Mode of Tenure

Mode of Tenure	Hh Characteristics			Stock Characteristics			
	Mean			Mean			
	Hh Income (Euro)	Age of Head (Years)	Occupancy (Years)	Age (Years)	Rooms (Number)	Floor Area (Sq Meter)	Land Value (Euro / Sq Meter)
Owner-occupier	1390	49.7	13.7	27.9	3.7	110	117
Tenant-privileged	1318	45.5	11.8	28.0	3.5	104	106
Tenant	1203	40.8	4.8	28.2	3.6	105	117
Total	1336	47.1	11.3	28.0	3.7	108	116

N = 1846

Source: Balamir, M., *Ankara Survey 2007-08 Raw Data.*

Although findings of the HBS and Ankara Survey are similar for tenants and owner-occupiers, characteristics and expenditure patterns of privileged tenants differ significantly in these surveys. Contrary to the HBS findings, privileged tenants in the Ankara Survey do not resemble to tenants in terms of Hh characteristics and reinvestment expenditure patterns. Rather they have much common properties with owner-occupiers. Among the 114 privileged tenants in the survey, 67 per cent of them defined themselves as owner-occupiers by completing the owner-occupiers' questionnaire form rather than tenants'. Among the remaining privileged-tenants who preferred to fill out tenants' questionnaire forms, 40 per cent of them reported to be tenants in parents' or relatives' dwelling. It is probable that, in the Ankara case most of the Hhs in privileged tenant category are in the expectation of inheriting the dwelling unit they occupy.

Hh Income

More than half of the Hhs (57 per cent) in the Ankara Survey are clustered at the lowest end of the income brackets (1000 Euro or less) whereas 9.4 per cent of the Hhs reported above 2500 Euro monthly income (Table 6.14). Ratio of repairers displays that Hhs in the highest income brackets (above 2500 Euro) are more likely to undertake reinvestment works. Surprisingly, Hhs in the lowest income category (below 500 Euro) display the third highest ratio of repairers. However, similar to HBS findings, their average reinvestment expenditures

remain the lowest compared to other groups. Highest average RM expenditures, on the other hand, are realized by Hhs in the 1000-1500 Euro and 2500-5000 Euro income brackets rather than Hhs in the highest income group.

Table 6.14 Summary Statistics: 'Hh Income'

Hh Income (Euro)	All Hhs		Repairer Hhs		Repairers / All Hhs[1] (%)	Average RME[2] (Euro)	% of Owner-occupiers
	Frequency	%	Frequency	%			
< 500	371	20.7	134	23.4	36.1	891	61
500-1000	655	36.5	187	32.6	28.5	1353	64
1000-1500	377	21.0	112	19.5	29.7	1780	72
1500-2500	223	12.4	60	10.5	26.9	1358	74
2500-5000	64	3.6	37	6.5	57.8	1730	80
5000 +	105	5.8	43	7.5	41.0	1438	68
Total	1795	100	573	100	31.9	1361	67

[1] $\chi^2(5, 1795) = 33.55$, $p < .05$
[2] $F(5, 545) = 3.83$, $p < .05$
Source: Balamir, M., *Ankara Survey 2007-08 Raw Data.*

As observed in Table 6.15, almost two thirds of lowest income Hhs' expenditures are below 500 Euro. High ratio of repairers observed among this group indicates that there is demand for RM activities in the dwellings occupied by lowest income Hhs. Yet, it is probable that this demand is obstructed to some extent by income constraints.

Table 6.15 'RM Expenditures' with respect to 'Hh Income'

Hh Income (Euro)	RM Expenditure Categories (Euro)						Total	
	< 500		500-1500		1500 +			
	Hhs	%	Hhs	%	Hhs	%	Hhs	%
< 500	81	63	25	20	22	17	128	100
500-1000	73	41	61	34	45	25	179	100
1000-1500	39	36	28	26	40	37	107	100
1500-2500	22	37	23	38	15	25	60	100
2500-5000	13	35	13	35	11	30	37	100
5000 +	19	48	9	23	12	30	40	100
Total	247	45	159	29	145	26	551	100

$\chi^2(10, 551) = 32.07$, $p < .05$
Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

As displayed above in Table 6.14, the share of owner-occupiers increases with increasing income (excluding highest income Hhs) and owner-occupancy is the dominant mode of tenure for all income categories in the Ankara Survey. In Table 6.16 and Figure 6.1 RM expenditures are further disaggregated with respect to Hh income and mode of tenure. Contrary to the HBS findings, Hhs in the lowest end of the income brackets (below 500 Euro) are not less likely to

be repairers compared to other Hhs (Table 6.16). In owner-occupied and rented sectors, highest ratio of repairers is observed among Hhs in 2500-5000 Euro income category.

Table 6.16 'Ratio of Repairers' with respect to 'Hh Income' and 'Mode of Tenure'

Hh Income (Euro)	Owner-Occupier			Tenant_privileged			Tenant		
	All Hhs		Repairers / All Hhs (%)	All Hhs		Repairers / All Hhs (%)	All Hhs		Repairers / All Hhs (%)
	Freq.	%		Freq.	%		Freq.	%	
< 500	227	19	38	26	23	42	118	25	31
500-1000	421	35	29	46	41	46	188	39	23
1000-1500	271	22	31	16	14	25	90	19	27
1500-2500	165	14	26	12	11	50	46	10	24
2500-5000	51	4	57	3	3	33	10	2	70
5000 +	71	6	37	8	7	88	26	5	38
Total	1206	100	32	111	100	45	478	100	28

Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

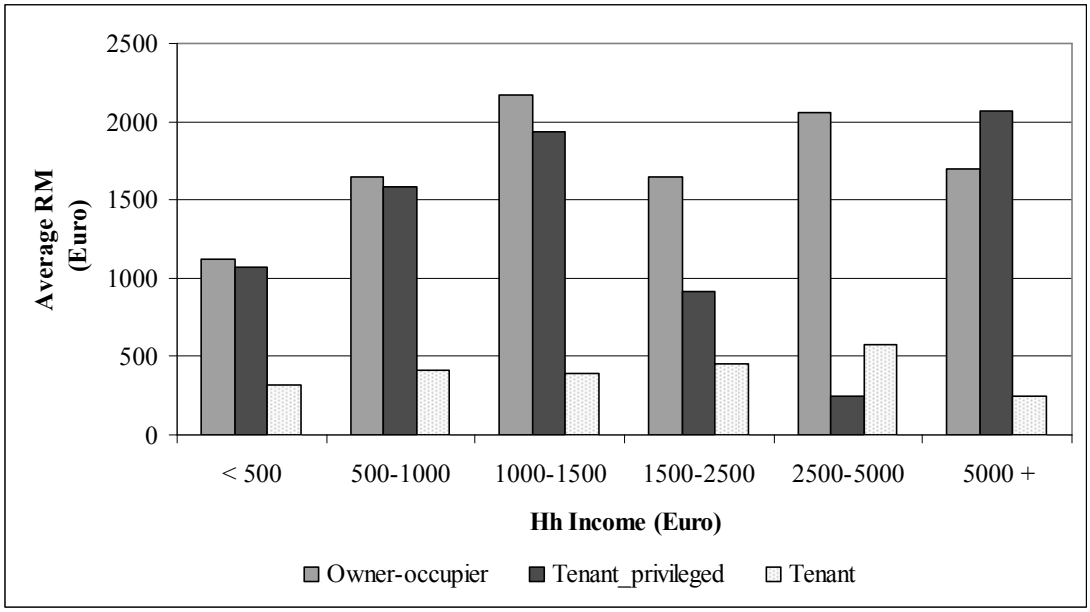


Figure 6.1: Average RM Expenditures with respect to Mode of Tenure and Income Categories
Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

Similar to the HBS findings, in owner-occupied sector the stock occupied by lowest income Hhs receives the lowest level of investments. As Table 6.17 displays, this is relatively the smaller part of the stock with lower rental and land values. Hhs who occupy this stock are older compared to the rest of the owner-occupiers and occupy the dwelling longer. For tenant Hhs, the size of annual reinvestments remains below 500 Euro for all income categories (excluding 2500-5000 Euro category). Similar to owner-occupiers, tenants in the lowest

income bracket occupy the smaller part of the stock where rental and land values are lower compared to other tenants. This means that lowest end of the owner-occupied and rental stock (in terms of size and value) is occupied by Hhs with limited financial capacity whose RM spending is relatively low compared to other Hhs. These findings are in line with the HBS findings. Yet, the stock occupied by lowest income owner-occupiers and tenants is not the oldest part of the stock as observed in the HBS.

Table 6.17 Household and Stock Characteristics with respect to Income Categories and Mode of Tenure

Hh Income (Euro)	Hh Characteristics			Stock Characteristics			
	Mean			Mean			
	Age of Head (Years)	Occupancy (Years)	Hh Size (Person)	Age (Years)	Floor Area (Sq Meter)	Monthly Rent[1] (Euro)	Land Value (Euro / Sq Meter)
Owner-occupier							
< 500	54.4	16.9	3.0	27.4	96	232	102
500-1000	49.3	14.2	3.1	28.6	107	261	113
1000-1500	46.8	11.7	3.2	28.3	114	281	123
1500-2500	46.8	11.0	3.3	26.5	126	313	126
2500-5000	53.2	14.1	3.6	26.7	128	319	118
5000 +	50.6	13.2	3.7	28.8	107	260	135
Privileged-tenant							
< 500	48.0	11.1	3.0	29.0	101	202	93
500-1000	44.6	13.9	3.5	27.2	105	211	101
1000-1500	45.9	14.1	3.3	29.0	107	262	97
1500-2500	43.3	8.0	3.3	30.7	100	283	142
2500-5000	48.0	3.3	3.3	39.3	120	233	68
5000 +	41.2	6.9	2.7	17.5	102	173	118
Tenant							
< 500	40.2	4.3	3.4	28.1	96	215	96
500-1000	40.7	4.9	3.3	28.9	105	249	119
1000-1500	41.8	5.6	3.2	27.6	111	281	120
1500-2500	40.5	4.3	3.1	28.2	109	318	152
2500-5000	37.8	4.4	3.8	29.6	102	265	106
5000 +	42.9	5.0	2.7	27.8	108	316	138

N = 1846

[1] For owner-occupiers and privileged-tenants 'monthly rent' represents 'imputed rents'.

Source: Balamir, M., *Ankara Survey 2007-08 Raw Data.*

Age of the Hh Head

The youngest Hh head in the Ankara sample is 18 years old whereas the oldest one is 99. As Figure 6.2 displays, age distribution of the Hh heads in the sample is very close to a normal distribution with a mean of 47 years. Age of the Hh head is recoded into seven age cohorts in order to compare the results with HBS survey.

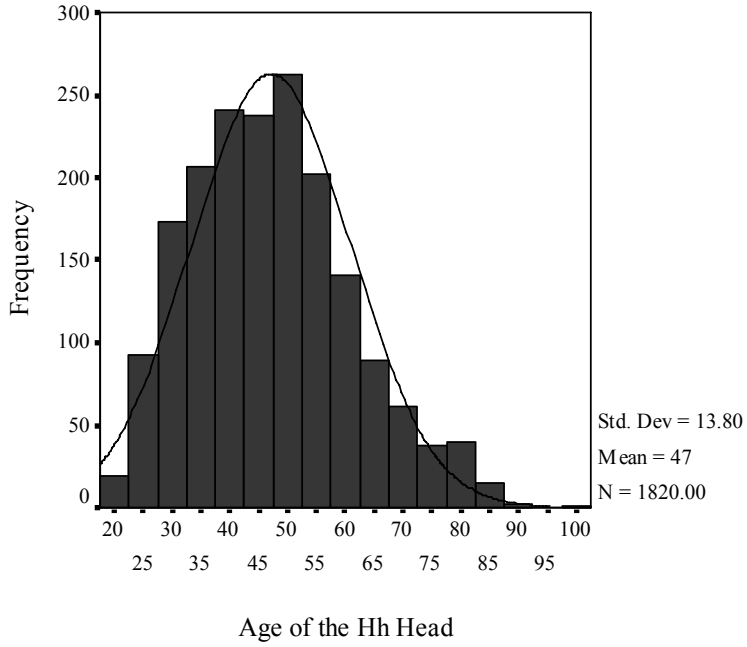


Figure 6.2: Age of the Hh Head

Source: Balamir, M., *Ankara Survey 2007-08 Raw Data.*

According to Table 6.18, the lowest ratio of repairers is observed among 25-34 age cohort. The youngest cohort (18-24) displays higher ratio of repairers than expected, though they have the lowest average RM expenditures in the sample. The youngest cohort is predominantly composed of tenants (Table 6.18) who display shorter duration of occupancy and lower average income levels compared to other Hhs (Table 6.19). Furthermore, the stock they occupy is the smallest part of the stock which is relatively older. Elderly Hhs, on the other hand, have higher ratios of repairers and average RM expenditures compared to middle aged and young Hh heads. They are less mobile compared to other Hhs and predominantly owner-occupiers, and they occupy relatively older dwellings which have higher land values (Table 6.19). Although average RM expenditures display a consistent increase with increasing Hh head age (excluding the eldest Hhs), significance test provided in Table 6.18 (F statistic) indicates that average RM expenditures do not significantly differentiate among Hh age cohorts ($p > .05$). In line with the HBS findings, the relationship between age of the Hh head and incidence of RM works proved to be significant (chi square, $p < .05$).

Table 6.18 Summary Statistics: 'Age of the HhH'

Age Cohorts	All Hhs		Repairer Hhs		Repairers / All Hhs[1] (%)	Average RME[2] (Euro)	% of Owner-occupiers
	Frequency	%	Frequency	%			
18-24	42	2.3	15	2.6	35.7	700	12
25-34	314	17.3	71	12.2	22.6	1101	53
35-44	455	25.0	120	20.6	26.4	1361	64
45-54	510	28.0	164	28.2	32.2	1368	67
55-64	284	15.6	115	19.8	40.5	1424	82
65-74	140	7.7	55	9.5	39.3	1760	87
75+	75	4.1	42	7.2	56.0	1524	92
Total	1820	100	582	100	32.0	1376	67

[1] $\chi^2(6, 1820) = 52.31$, $p < .05$
[2] $F(6, 554) = 2.09$, $p > .05$ ($p = .052$)
Source: Balamir, M., *Ankara Survey 2007-08 Raw Data.*

Similar to HBS findings, average Hh income (excluding the eldest Hhs), Hh size, and size of the dwelling displays an inverted u-shape with increasing Hh head age. Moreover, duration of occupancy consistently increases as the age increases. Age of the dwelling, different from HBS findings, displays an u-shape with increasing Hh head age.

Table 6.19 Household and Stock Characteristics with respect to 'Age of the HhH'

Age Cohorts	Hh Characteristics			Stock Characteristics			
	Mean			Mean			
	Hh Income (Euro)	Occupancy (Years)	Hh Size (Person)	Age (Years)	Rooms (Number)	Floor Area (Sq Meter)	Land Value (Euro / Sq Meter)
18-24	1006	2.4	2.7	31.8	3.4	98	125
25-34	1312	4.8	2.7	29.3	3.7	106	117
35-44	1393	8.2	3.6	27.6	3.8	111	112
45-54	1387	11.2	3.7	26.2	3.7	110	113
55-64	1266	15.5	3.1	27.7	3.6	108	115
65-74	1200	21.5	2.5	29.8	3.5	105	134
75+	1392	28.3	2.2	33.1	3.6	103	131
Total	1334	11.3	3.2	28.0	3.7	108	116

N = 1846
Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

In Table 6.20, moving from the youngest cohort to the oldest, the share of RM expenditures below 500 Euro decreases almost consistently. Contrary to the F statistic provided in Table 6.18, chi square statistic in Table 6.20 displays that there is a significant relationship between age of the Hh head and RM expenditures[106].

[106] Correlation coefficient between Hh head age and RM expenditures ($r = 0.13$) is also significant ($p < .01$).

Table 6.20 'RM Expenditures' with respect to 'Age of the HhH'

Age Cohorts	RM Expenditure Categories (Euro)						Total	
	< 500		500-1500		1500 +			
	Hhs	%	Hhs	%	Hhs	%	Hhs	%
18-24	13	87	1	7	1	7	15	100
25-34	36	54	17	25	14	21	67	100
35-44	59	50	28	24	30	26	117	100
45-54	72	46	45	29	40	25	157	100
55-64	40	36	40	36	32	29	112	100
65-74	19	37	16	31	17	33	52	100
75+	10	24	15	37	16	39	41	100
Total	249	44	162	29	150	27	561	100

$\chi^2(12, 561) = 27.68, p < .05$

Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

Duration of Occupancy

The sample has a left-skewed distribution with respect to duration of occupancy in the dwelling with a mean of 10.2 years (Figure 6.3).

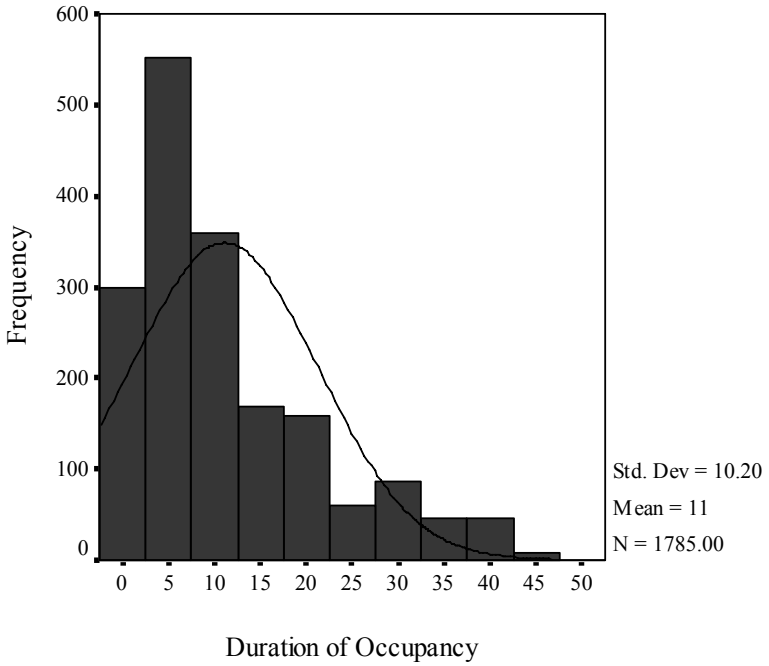


Figure 6.3: Duration of Occupancy

Source: Balamir, M., *Ankara Survey 2007-08 Raw Data.*

About 9 per cent of all Hhs have one year or less length of stay in the dwelling (Table 6.21). These Hhs are referred as **'recent movers'** hereafter. For tenant Hhs, ratio of recent movers is

24 per cent. For owner-occupiers and privileged tenants this ratio is 4 and 8 per cent respectively. As observed in Table 6.21, the highest ratio of repairers is displayed by recent mover Hhs, yet their average RM expenditure levels are the lowest. The RM works undertaken by recent movers are usually assumed to have adjustment purposes. In line with the HBS findings, ratio of repairer Hhs increases (excluding recent movers) as duration of occupancy in the dwelling is extended. Average RM expenditures also consistently increases in the same direction; a contradictory finding with HBS results which displays an inverted u-shape like relationship between duration of occupancy and average RM expenditures.

Table 6.21 Summary Statistics: 'Duration of Occupancy'

Duration of Occupancy	All Hhs		Repairer Hhs		Repairers / All Hhs[1] (%)	Average RME[2] (Euro)	% of Owner-occupiers
	Frequency	%	Frequency	%			
1 year or less	167	9.4	72	12.4	43.1	1200	31
2-5 years	515	28.9	137	23.6	26.6	1216	53
6-10 years	433	24.3	123	21.2	28.4	1316	74
11-20 years	381	21.3	132	22.7	34.6	1538	84
21-40 years	269	15.1	109	18.8	40.5	1586	92
40+ years	20	1.1	8	1.4	40.0	1714	90
Total	1785	100	581	100	32.5	1384	69

[1] $\chi^2(5, 1785) = 29.23$, $p < .05$
[2] $F(5, 552) = 2.32$, $p < .05$
Source: Balamir, M., *Ankara Survey 2007-08 Raw Data.*

In Table 6.22, RM expenditures of Hhs are further disaggregated with respect to 'mode of tenure' and 'duration of occupancy. Owner-occupiers display the highest ratio of repairers and average RM expenditures in the recent mover category. These Hhs have higher average income levels and younger Hh heads compared to other owner-occupiers (Table 6.23), and 70 per cent of them are known to be first time home-owners[107]. Owner-occupiers who occupy the dwelling more than 20 years also display high ratio of repairers though their average expenditures are not as high as recent movers. Contrary to the expectations, in owner-occupied sector value of dwelling services does not decline with increasing length of stay in the dwelling (Table 6.23). Rather, in the oldest part of the stock owner-occupiers with more than 40 years of occupancy value their dwellings relatively higher compared to other owners (Table 6.23). For tenants, highest ratio of repairers is also observed among recent movers.

[107] In the Hh questionnaire of the Ankara Survey owner-occupiers were asked to state the year when they occupy a dwelling of their own for the first time. First time home-owners are identified employing this information together with 'duration of occupancy'.

These Hhs display relatively high income levels and their Hh heads are younger compared to other tenants. Ratio of repairers for tenants displays an u-shape distribution whereas average RM expenditures have an inverted u-shape. Tenants with 6-10 years length of stay in the dwelling display the lowest ratio of repairers and the highest RM expenditures. These Hhs are the ones who pay lowest monthly rents for the dwelling services. Similar to owner-occupiers, tenants who occupy the dwelling more than 20 years reside in the oldest part of the stock where relatively high rental and land values prevail.

Table 6.22 RM Expenditures with respect to 'Duration of Occupancy' and 'Mode of Tenure'

Duration of Occupancy	Owner-occupiers			Tenants		
	All Owner-occupiers (Frequency)	Repairers / All Owners (%)	Average RME (Euro)	All Tenants (Frequency)	Repairers / All Tenants (%)	Average RME (Euro)
1 year or less	51	43.1	2429	107	40.2	363
2-5 years	271	24.4	1925	213	26.8	377
6-10 years	322	29.5	1398	90	20.0	516
11-20 years	319	34.2	1719	31	32.3	333
21-40 years	247	41.3	1589	6	33.3	250
40+ years	18	38.9	1667	-	-	-
Total	1228	32.7	1680	447	29.1	385

Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

Table 6.23 Household and Stock Characteristics for 'Duration of Occupancy' and 'Mode of Tenure'

Duration of Occupancy	Hh Characteristics			Stock Characteristics			
	Mean			Mean			
	Hh Income (Euro)	Age of Head (Years)	Hh Size (Person)	Age (Years)	Floor Area (Sq Meter)	Monthly Rent[1] (Euro)	Land Value (Euro / Sq Meter)
Owner-occupier							
≤ 1 year	1578	40.0	2.8	28.9	106	261	142
2-5 years	1481	41.8	3.0	27.8	112	265	117
6-10 years	1358	46.4	3.6	25.3	113	273	114
11-20 years	1393	51.5	3.4	26.1	109	273	115
21-40 years	1329	60.8	2.8	33.0	105	266	116
40+ years	1000	73.9	2.6	37.8	109	283	156
Tenant							
≤ 1 year	1547	37.3	3.1	27.3	107	275	112
2-5 years	1010	38.3	3.2	29.3	104	256	119
6-10 years	1099	45.6	3.3	27.1	103	242	115
11-20 years	1476	49.3	3.6	28.6	110	270	127
20+ years	1833	60.3	3.2	34.5	125	271	134

N = 1846

[1] For owner-occupiers 'monthly rent' represents 'imputed rents'.

Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

With the Ankara Survey data it is also possible to explore adjustment strategies adopted by Hhs. According to Table 6.24, Hhs who are neither movers nor repairers in the year preceding the survey constitute the largest group in the sample (62 per cent of all Hhs), whereas mover-repairers are the smallest group (4 per cent of all Hhs). Stay-reinvest strategy is more common among Hhs compared to move strategy. It must also be noted that mobility decisions here may also cover forced decisions as well as voluntary ones. Therefore, moving alone may be a less significant adjustment option then observed. Move-reinvest strategy is a more significant adjustment option among tenants (9.6 per cent of all tenants) compared to owner-occupiers (1.8 per cent of all owner-occupiers). Whereas, stay-reinvest strategy is more common for owner-occupiers (31 per cent of all owner-occupiers) compared to tenants (19.5 per cent of all tenants).

Table 6.24 Distribution of Hhs with respect to Adjustment Options

	Non-Repairers		Repairers		Total
	Frequency	% of N	Frequency	% of N	%
All Hhs					
Recent Movers	95	5.3	72	4.0	9.4
Non Movers	1109	62.1	509	28.5	90.6
Total	1204	67.5	581	32.5	100
N = 1785					
Owner-occupiers					
Recent Movers	29	2.4	22	1.8	4.2
Non Movers	798	65.0	379	30.9	95.8
Total	827	67.3	401	32.7	100
N = 1228					
Tenants					
Recent Movers	64	14.3	43	9.6	23.9
Non Movers	253	56.6	87	19.5	76.1
Total	317	70.9	130	29.1	100
N = 447					

Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

Table 6.25 presents a comparison of recent mover and non-mover Hhs in terms of undertaking RM activities with respect to mode of tenure. Accordingly, for all tenure types, ratio of repairer Hhs is higher among recent movers. For owner-occupiers, average RM expenditures of recent movers are 1.5 times of the non-movers. This ratio reaches to 1.8 for privileged tenants. For tenants average RM expenditures are slightly higher for non-movers. These findings indicate that at least for a sub-group of recent movers (47 per cent of all recent movers, 4 per cent of all Hhs) moving alone is not sufficient to attain a desired consumption level.

Table 6.25 RM Expenditures of Recent Mover and Non-Mover Hhs with respect to 'Mode of Tenure'

	Recent Movers	Non-Movers
Number of Owner-occupiers	51	1177
Repairers / All Owners (%)	43.1	32.2
Average RME (Euro)	2429	1637
Number of Privileged-Tenants	9	101
Repairers / All P-Tenants (%)	77.7	42.6
Average RME (Euro)	2536	1415
Number of Tenants	107	340
Repairers / All Tenants (%)	40.2	25.6
Average RME (Euro)	363	396

Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

Mobility Expectation

In the Ankara Survey, it is possible to explore the effects of expected mobility in five years time on reinvestment decisions (Table 6.26). Contrary to the expectations, Hhs with shorter expected tenure are more likely to engage in reinvestments. Though, their average RM expenditures are lower compared to Hhs with longer expected tenure. Significance tests in Table 6.26 display that the relationship between the incidence of RM works and mobility expectation is insignificant for all tenures. The relationship between size of the RM and expected mobility, on the other hand, is statistically significant only for tenant Hhs[108].

Table 6.26 Summary Statistics: 'Mobility Expectation' with respect to 'Mode of Tenure'

Mode of Tenure	Expected Mobility	All Hhs		Repairer Hhs		Repairers / All Hhs[1] (%)	Average RME[2] (Euro)
		Frequency	%	Frequency	%		
Owner-occupier	Yes	108	9	43	11	39.8	1488
	No	1097	91	351	89	32.0	1694
	Total	1205	100	394	100	32.7	1671
[1] $\chi^2(1, 1205) = 2.73$, $p > .05$ [2] $F(1, 381) = 1.05$, $p > .05$							
Privileged-tenant	Yes	25	23	13	26	52.0	1231
	No	83	77	37	74	44.6	1707
	Total	108	100	50	100	46.3	1578
[1] $\chi^2(1, 108) = .43$, $p > .05$ [2] $F(1, 46) = .87$, $p > .05$							
Tenant	Yes	264	57	75	57	28.4	302
	No	202	43	56	43	27.7	462
	Total	466	100	131	100	28.1	370
[1] $\chi^2(1, 466) = .03$, $p > .05$ [2] $F(1, 123) = 5.17$, $p < .05$							

Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

[108] Nevertheless, correlation between mobility expectation and RM expenditures is significant when calculated for all repairers ($r = 0.24$, $p < .01$).

For all tenure modes, Hhs with shorter expected tenure in the dwelling have higher average income levels (excluding privileged tenants) and they are relatively younger Hh heads with shorter duration of occupancy in dwelling (Table 6.27). For owner-occupiers, mobility expectation is observed among Hhs who occupy relatively new stock where imputed rents are higher. For tenants and privileged tenants, Hhs with shorter expected tenure occupy relatively higher valued part of the stock in terms of monthly rents and land values.

Table 6.27 Household and Stock Characteristics for 'Mobility Expectation' and 'Mode of Tenure'

Expected Mobility	Hh Characteristics			Stock Characteristics			
	Mean			Mean			
	Hh Income (Euro)	Age of Head (Years)	Occupancy (Years)	Age (Years)	Floor Area (Sq Meter)	Monthly Rent[1] (Euro)	Land Value (Euro / Sq Meter)
Owner-occupier							
Yes	1552	48.7	10.0	25.2	109	286	103
No	1373	49.9	14.0	28.2	110	269	118
Privileged-tenant							
Yes	1302	42.0	6.2	28.6	101	260	121
No	1302	46.9	13.7	28.0	106	218	102
Tenant							
Yes	1289	38.8	3.9	28.3	105	263	121
No	1096	43.4	5.9	28.0	105	253	115

N = 1846

[1] For owner-occupiers and privileged tenants 'monthly rent' represents 'imputed rents'.

Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

Changes in Household Size

In the Ankara Survey, it is possible to identify changes in Hh size during the recent years. Table 6.28 displays RM expenditures of Hhs with respect to changes occurred in Hh size in the last two years. 10 per cent of owner-occupiers, 15 per cent of privileged tenants, and 17 per cent of tenants have experienced changes in Hh size during the last two years. Contrary to the expectations, increased Hh size for owner-occupiers is accompanied with lowest ratio of repairers and lowest average RM expenditures. For privileged tenants and tenants, highest ratios of repairers are observed among the Hhs with increased Hh size. Though, highest average RM expenditures are observed for Hhs experiencing no change in Hh size for both tenure types. As Table 6.29 displays all tenure modes with increased Hh size already occupy the largest part of the stock where the need for additional housing space can be met. Furthermore, these Hhs have younger Hh heads, higher Hh incomes, and shorter duration of occupancy in the dwelling compared to other Hhs. Probably, most of these Hhs moved to a

dwelling which better suits their needs prior to Hh size increase. As Table 6.28 displays, neither the likelihood nor size of the RM expenditures are significantly related with changes in Hh size.

Table 6.28 Summary Statistics: 'Changes in Hh Size' with respect to 'Mode of Tenure'

Tenure Mode	Changes in Hh Size	All Hhs		Repairer Hhs		Repairers / All Hhs[1] (%)	Average RME[2] (Euro)
		Frequency	%	Frequency	%		
Owner-occupier	Any decrease in size	59	6	24	7	40.7	1948
	No Change	910	90	292	89	32.1	1651
	Any increase in size	45	4	14	4	31.1	1423
	Total	1014	100	330	100	32.5	1664
[1] $\chi^2(2, 1014) = 1.91$, $p > .05$ [2] $F(2, 316) = .42$, $p > .05$							
Tenant-Privil.	Any decrease in size	7	7	2	5	28.6	250
	No Change	86	85	37	84	43.0	1562
	Any increase in size	8	8	5	11	62.5	1100
	Total	101	100	44	100	43.6	1476
[1] $\chi^2(2, 101) = 1.82$, $p > .05$ [2] $F(2, 39) = .33$, $p > .05$							
Tenant	Any decrease in size	21	5	6	5	28.6	250
	No Change	364	83	99	79	27.2	410
	Any increase in size	53	12	21	17	39.6	362
	Total	438	100	126	100	28.8	395
[1] $\chi^2(2, 438) = 3.49$, $p > .05$ [2] $F(2, 118) = .43$, $p > .05$							

Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

Table 6.29 Household and Dwelling Characteristics for 'Changes in Hh Size' and 'Mode of Tenure'

Mode of Tenure & Changes in Hh Size	Hh Characteristics				Dwelling Characteristics		
	Mean				Mean		
	Hh Income (Euro)	Age of Head (Years)	Occupancy (Years)	Hh Size (Person)	Age (Years)	Rooms (Number)	Floor Area (Sq m)
Owner-occupier							
Hh size decreased	1224	55.1	12.1	2.9	26.4	3.6	108
No Change	1428	48.9	12.9	3.2	28.0	3.8	111
Hh size increased	1567	37.3	5.4	3.8	27.3	3.9	116
Privileged-tenant							
Hh size decreased	1214	44.7	13.9	2.7	32.0	2.8	95
No Change	1259	46.2	12.1	3.2	28.7	3.5	103
Hh size increased	2031	38.8	8.4	3.5	17.1	3.9	102
Tenant							
Hh size decreased	688	46.4	5.5	3.0	29.6	3.6	98
No Change	1230	41.1	4.8	3.2	28.0	3.6	105
Hh size increased	1255	34.4	2.7	3.5	27.4	3.7	106

N = 1846

Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

Occupation Density

'Occupation density' is computed for each Hh from the variables 'Hh size' and 'number of rooms in the dwelling'. Similar to procedures done in HBS, three zones of occupation density are identified from the Ankara data as comfort zone, underoccupation, and overcrowding (Table 6.30). The grey cells in the table indicate the comfort zone. The cells below the comfort zone show the overcrowding zone, whereas the cells above display underoccupancy. Findings of the Ankara Survey display that underoccupation (50 per cent) is the dominant feature of housing use in the apartment stock of central districts of Ankara. Overcrowding, on the other hand, display very low rates (6 per cent) compared to overall country conditions (23 per cent)[109].

Table 6.30 Distribution of Hhs with respect to 'Hh Size' and 'Number of Rooms' (%)

Hhs (persons)	Dwellings (rooms)					Total
	1	2	3	4	5+	
1	---	.45	1.84	3.73	.17	6.19
2	.06	1.73	5.91	13.55	.50	21.74
3	.06	1.11	7.53	22.07	.89	31.66
4	---	1.00	8.08	18.17	1.39	28.65
5	---	.22	2.40	5.35	.78	8.75
6+	---	---	.72	1.90	.39	3.01
Total	.11	4.52	26.48	64.77	4.12	100
Zones	*Overcrowding*: 6.30		*Comfort*: 43.20		*Underoccupation*: 50.50	

Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

Contrary to HBS findings for overall urban Turkey, Hhs living in overcrowded dwellings in urban Ankara are more likely to undertake RM compared to Hhs in other occupation density categories (Table 6.31). However, average RM expenditure in overcrowded dwellings is lower compared to other dwellings. Chi-square test displays a significant relationship between likelihood of RM works and occupation density in the Ankara Survey. F statistics, on the other hand, display that average RM expenditures are not differentiated significantly with respect to occupation density categories.

[109] Refer to Table 5.19 in Chapter 5.

Table 6.31 Summary Statistics: 'Occupation Density'

Occupation Density	All Hhs		Repairer Hhs		Repairers / All Hhs[1] (%)	Average RME[2] (Euro)	Share in Total RME (%)
	Frequency	%	Frequency	%			
Underoccupation	909	50.7	266	45.9	29.3	1455	49
Comfort	770	42.9	270	46.6	35.1	1322	46
Overcrowding	115	6.4	44	7.6	38.3	1000	5
Total	1794	100	580	100	32.3	1359	100

[1] $\chi^2(2, 1794) = 8.39, p < .05$
[2] $F(2, 557) = 1.37, p > .05$
Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

In owner-occupied stock, ratio of repairer Hhs is higher for overcrowding and comfort conditions (Table 6.32). However, overcrowded dwellings receive relatively low average RM expenditures. Similarly in rental sector, overcrowded dwellings display the highest ratio of repairers, though low average RM expenditures prevails.

Table 6.32 RM Expenditures with respect to 'Occupation Density' and 'Mode of Tenure'

Occupation Density	Owner-occupiers				Tenants			
	All Owner-occupiers		Repairers / All Owners (%)	Average RME (Euro)	All Tenants (Frequency)		Repairers / All Tenants (%)	Average RME (Euro)
	Freq.	%			Freq.	%		
Underoccupation	639	53	29.4	1728	223	47	26.9	417
Comfort	497	41	36.0	1663	217	46	29.5	355
Overcrowding	72	6	36.1	1280	35	7	37.1	375
Total	1208	100	32.5	1669	475	100	28.8	384

Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

Owner-occupiers living in overcrowded conditions display relatively high income levels, though value of housing services in this part of the stock is comparatively low (Table 6.33). In rental sector, overcrowded part of the stock is occupied by lowest income tenants, and displays the lowest land values and monthly rents. In other words, rental stock occupied by lowest income Hhs under overcrowded conditions requires special policies to improve the living conditions and housing standards.

Table 6.33 Household and Stock Characteristics for 'Occupation Density' and 'Mode of Tenure'

Occupation Density	Hh Characteristics			Stock Characteristics			
	Mean			Mean			
	Hh Income (Euro)	Occupancy (Years)	Hh Size (Person)	Age (Yrs)	Rooms (Num.)	Monthly Rent[1] (Euro)	Land Value (Euro / Sq Meter)
Owner-occupier							
Underoccupation	1310	14.0	2.4	28.4	3.9	279	119
Comfort	1444	13.1	3.9	27.4	3.6	261	114
Overcrowding	1687	12.9	5.5	27.3	3.3	242	117
Tenant							
Underoccupation	1344	4.1	2.4	29.3	3.8	275	130
Comfort	1141	5.2	3.9	27.4	3.5	249	111
Overcrowding	617	5.4	5.5	25.4	2.9	216	86

N = 1846

[1] For owner-occupiers 'monthly rent' represents 'imputed rents'.

Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

6.4.2. Dwelling Characteristics

Age of the Dwelling

The oldest apartment block in the Ankara Survey is constructed in year 1962 whereas the newest one in 1999 (Figure 6.4). Age of the dwelling is recoded into five categories.

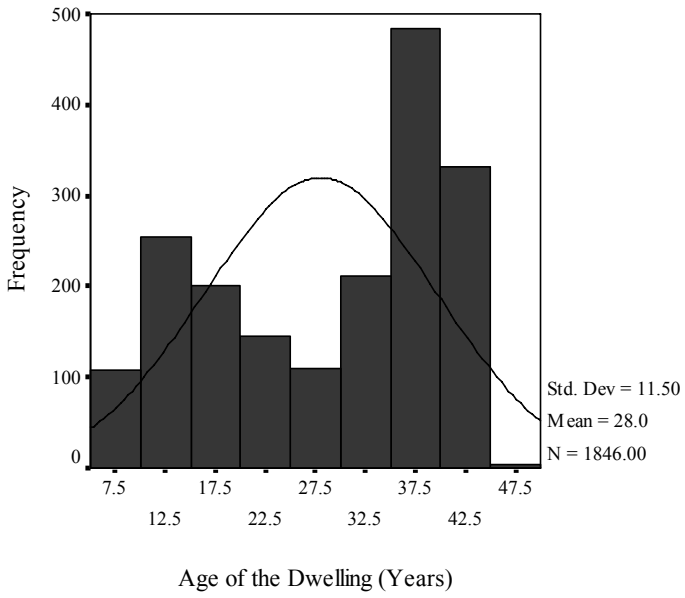


Figure 6.4: Age of the Dwelling

Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

According to Table 6.34, almost 46 per cent of the surveyed Hhs are living in the dwellings built before 1975. Contrary to HBS findings, the ratio of repairers in this stock is relatively low compared to dwellings built after 1975. The lowest average RM expenditure is observed in the newest part of the stock whereas the highest average is revealed in the 1970-1974 stock. The rest of the stock displays similar RM expenditure averages. Age of the dwelling displays a statistically significant relationship with likelihood of RM works. Whereas, mean RM differences among different dwelling age categories are not proved to be significant by F statistics.

Table 6.34 Summary Statistics: 'Age of the Dwelling'

Age of the Dwelling	All Hhs		Repairer Hhs		Repairers / All Hhs[1] (%)	Average RME[2] (Euro)	Average RME per Sq Meter (Euro)
	Frequency	%	Frequency	%			
Pre-1969	481	26	140	24	29.1	1306	13
1970-1974	366	20	107	18	29.2	1476	15
1975-1984	291	16	110	19	37.8	1381	15
1985-1994	417	23	146	25	35.0	1398	14
1995-1999	291	16	90	15	30.9	1230	10
Total	1846	100	593	100	32.1	1362	13

[1] $\chi^2(4, 1846) = 9.50, p < .05$
[2] $F(4, 565) = .27, p > .05$
Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

Table 6.35 Household and Stock Characteristics with respect to 'Age of the Dwelling'

Age of the Dwelling	Hh Characteristics				Stock Characteristics		
	Mean				Mean		
	Hh Income (Euro)	Age of Head (Years)	Occupancy (Years)	Hh Size (Person)	Floor Area (Sq Meter)	Monthly Rent (Euro)	Land Value (Euro / Sq Meter)
Pre-1969	1362	47.0	12.4	3.0	107	261	145
1970-1974	1314	47.4	13.0	3.1	106	265	128
1975-1984	1251	48.8	12.8	3.3	105	267	113
1985-1994	1298	46.3	9.5	3.3	109	254	93
1995-1999	1455	46.6	8.6	3.5	116	277	90
Total	1336	47.1	11.3	3.2	108	264	116

N = 1846
Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

Contrary to HBS findings, social conditions for Hhs (i.e. Hh income, age of Hh head) with respect to age of the dwelling they occupy resemble to each other in the Ankara Survey (Table 6.35, Table 6.36). Yet, it must be underlined that the age difference between the oldest and newest dwellings in the HBS is 104 years whereas it is 38 years in the Ankara Survey. In terms of physical conditions, moving from the oldest to the newest part of the stock, land

values consistently decrease. Higher land values in the older part of the stock indicate that these dwellings have locational advantages in terms of accessibility, proximity to district / city centres, etc. Monthly rents, however, do not vary much with respect to dwelling age. Table 6.36 reveals that ratio of owner-occupiers are relatively less in pre-1969 and 1985-1994 stock. Therefore, those part of the stock displays comparatively higher rates of recent movers. Contrary to the HBS findings, there is no indication of a match between older dwellings and lowest end of the income brackets in the Ankara Survey.

Table 6.36 Distribution of Owner-occupiers, Low and Lowest Income Hhs, Recent Movers, and Overcrowded Dwellings with respect to 'Age of the Dwelling'

Age of the Dwelling	Owner-occupiers (%)	Low - Lowest Income Hhs (<1000 Euro) (%)	Recent Movers (%)	Overcrowded Dwellings (%)
Pre-1969	63	57	10	6
1970-1974	70	57	8	4
1975-1984	72	59	6	9
1985-1994	64	58	12	7
1995-1999	68	54	8	8
Total	67	57	9	6

Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

Size of the Dwelling

'Floor area of the dwelling' is provided as a continuous variable in the Ankara Survey the mean value of which is 108 sq meters (Figure 6.5).

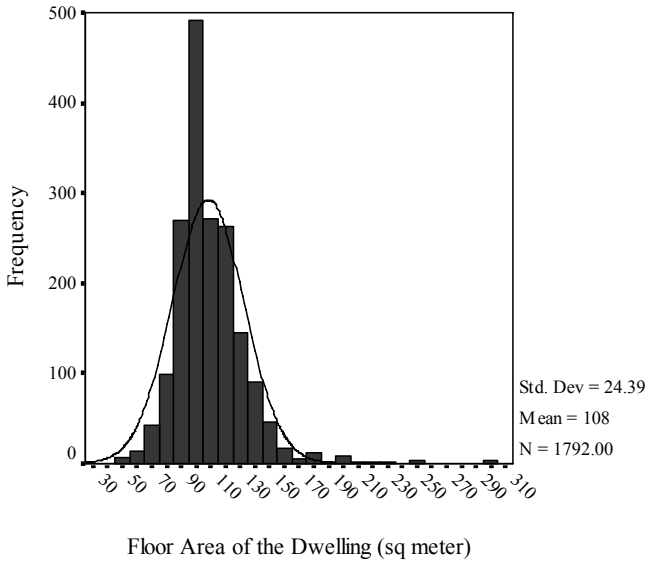


Figure 6.5: Size of the Dwelling

Source: Balamir, M., *Ankara Survey 2007-08 Raw Data.*

The smallest dwelling in the sample has 45 sq meters floor area whereas the largest one has 300 sq meters. According to Table 6.37, increasing dwelling size is accompanied with decreasing ratio of repairers (excluding the 111-140 sq meter category) and decreasing average RM expenditures per sq meter. As the size of the dwelling increases dwelling age slightly decreases (Table 6.38). In line with the prior expectations for the Turkish case, low levels of RM are observed in relatively new dwellings. Contrary to HBS results, likelihood of RM and floor area of the dwelling reveal a statistically significant relationship (chi square $p < .05$) whereas mean RM expenditures are not significantly differentiated with respect to floor area of the dwelling (F statistics $p > .05$)[110].

Table 6.37 Summary Statistics: 'Size of the Dwelling'

Size of the Dwelling (sq meter)	All Hhs		Repairer Hhs		Repairers / All Hhs[1] (%)	Average RME[2] (Euro)	Average RME per Sq Meter (Euro)
	Frequency	%	Frequency	%			
45-70	61	3.4	26	4.6	42.6	1020	16
71-90	359	20.0	138	24.2	38.4	1291	15
91-110	771	43.0	224	39.3	29.1	1369	13
111-140	498	27.8	153	26.8	30.7	1575	12
141+	103	5.7	29	5.1	28.2	1556	9
Total	1792	100	570	100	31.8	1399	13

[1] $\chi^2(4, 1792) = 14.17$, $p < .05$
[2] $F(4, 544) = 1.11$, $p > .05$
Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

Table 6.38 Household and Stock Characteristics with respect to 'Size of the Dwelling'

Size of the Dwelling (sq meter)	Hh Characteristics				Stock Characteristics			
	Mean				Mean			
	Hh Income (Euro)	Age of Head (Years)	Occupancy (Years)	Hh Size (Person)	Age (Yrs)	Rooms (Num.)	Monthly Rent (Euro)	Land Value (Euro / Sq Meter)
45-70	1025	50.2	9.5	2.8	32.0	2.8	199	102
71-90	1212	47.5	12.4	3.1	28.4	3.3	237	105
91-110	1280	46.9	11.3	3.2	28.3	3.7	254	117
111-140	1458	46.4	11.6	3.3	27.6	3.9	290	126
141+	1922	49.7	9.8	3.5	23.3	4.4	346	109
Total	1344	47.2	11.4	3.2	28.0	3.7	264	116

N = 1846
Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

[110] Even so, floor area of the dwelling and RM expenditures display a significant correlation ($r = 0.11$, $p < .05$). When 'number of rooms' is employed as an indicator of the dwelling size, neither 'the likelihood of RM works' nor 'size of the RM expenditures' display a statistically significant relationship with 'size of the dwelling' ($\chi^2(5, 1817) = 10.89$, $p > .05$; $F(4, 562) = 1.17$, $p > .05$).

Similar to HBS results, the smallest end of the stock in the Ankara Survey is predominantly occupied by lowest and low income Hhs (78 per cent). This part of the stock is the oldest, most overcrowded part where monthly rents and land values display their lowest values (Table 6.38, 6.39). Highest ratio of repairers and high average RM expenditures per sq meter observed in this part of the stock display that Hhs in the smaller part of the stock are responsive to the RM needs of the dwellings they occupy. Moving from the smallest part of the stock to the largest, average Hh income, Hh size, number of rooms, monthly rent, land values (excluding the largest stock), and rate of owner-occupancy consistently increases. Whereas, age of Hh head (excluding the largest stock), age of the dwelling, share of lowest and low income Hhs, and rate of overcrowded dwellings decrease in the same direction.

Table 6.39 Distribution of Owner-occupiers, Low and Lowest Income Hhs, Recent Movers, and Overcrowded Dwellings with respect to 'Size of the Dwelling'

Size of the Dwelling (sq meter)	Owner-occupiers (%)	Low - Lowest Income Hhs (<1000 Euro) (%)	Recent Movers (%)	Overcrowded Dwellings (%)
45-70	57	78	12	17
71-90	63	71	9	9
91-110	67	61	10	6
111-140	74	42	6	4
141+	78	33	11	2
Total	68	57	9	6

Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

Monthly Rent

'Monthly rent' represents the actual rent paid by tenants and imputed rents reported by owner-occupiers and privileged-tenants. As Table 6.40 displays, both ratio of repairers and average RM expenditures increase consistently with increasing rental value of the dwelling.

Table 6.40 Summary Statistics: 'Monthly Rent'

Monthly Rent (Euro)	All Hhs		Repairer Hhs		Repairers / All Hhs[1] (%)	Average RME[2] (Euro)
	Frequency	%	Frequency	%		
< 175	191	11.7	47	9.5	24.6	898
175-275	836	51.2	239	48.1	28.6	1293
276-400	518	31.7	180	36.2	34.7	1415
400+	88	5.4	31	6.2	35.2	2048
Total	1633	100	497	100	30.4	1350

[1] $\chi^2(3, 1633) = 9.92, p < .05$
[2] $F(3, 479) = 3.21, p < .05$

Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

In the Ankara Survey data, Hhs in the lowest end of the rent scale are less likely to undertake RM works compared to other Hhs and they display the lowest average RM expenditures (Table 6.40). On the other hand, the stock occupied by these Hhs is the smallest part of the stock with lowest land values (Table 6.41), where the share of overcrowded dwellings is higher compared to dwellings in other rent categories (14 per cent, Table 6.42). Furthermore, these dwellings are predominantly occupied by Hhs in the lowest end of the income brackets (77 per cent). Also, 41.4 per cent of the dwellings in the lowest end of the rent scale are rented. In other words, low standards of housing and high rates of depreciation are more likely in the dwellings where value of housing services is low. This part of the stock needs attention in policy designs.

Table 6.41 Hh and Stock Characteristics with respect to 'Monthly Rent'

Monthly Rent (Euro)	Hh Characteristics				Stock Characteristics			
	Mean				Mean			
	Hh Income (Euro)	Age of Head (Years)	Occupancy (Years)	Hh Size (Person)	Age (Yrs)	Rooms (Num.)	Floor Area (Sq Meter)	Land Value (Euro / Sq Meter)
< 175	1048	47.7	11.1	3.3	28.3	3.3	95	83
175-275	1231	44.9	10.7	3.3	28.0	3.7	105	107
276-400	1442	49.4	12.4	3.0	28.7	3.8	113	145
400+	2098	47.3	9.0	3.3	26.1	4.2	132	142
Total	1324	46.8	11.2	3.2	28.2	3.7	108	118

N = 1846

Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

Table 6.42 Distribution of Owner-occupiers, Low and Lowest Income Hhs, Recent Movers, and Overcrowded Dwellings with respect to 'Monthly Rent'

Monthly Rent (Euro)	Owner-occupiers (%)	Low and Lowest Income Hhs (<1000 Euro) (%)	Recent Movers (%)	Overcrowded Dwellings (%)
< 175	47	77	12	14
175-275	69	62	9	7
276-400	68	48	11	3
400+	69	19	14	5
Total	66	57	10	6

Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

Reinvestments in Common Parts of the Apartment Block

In the Ankara Survey, it is possible to identify reinvestments undertaken in common parts of the apartment block in the last 12 months. Hhs are expected to be more likely to undertake

reinvestment expenditures in their independent parts if commonly owned parts of the apartment is maintained in good order. Reinvestments undertaken in common parts can be categorized under four broad headings in order to examine their effects on Hhs' reinvestment decisions:

(1) exterior / interior painting,

(2) insulation, roof / elevator repairing,

(3) landscaping,

(4) installations / infrastructure repairing.

Table 6.43 clearly demonstrates that all types of reinvestments in common parts of the apartment blocks are accompanied with high ratio of repairers and high average RM expenditures. In other words, existing reinvestments in common parts of the apartment block trigger Hhs' reinvestments decisions in their dwelling units. It must be noted that among the activities identified in Table 6.43, only landscaping does not provide a statistically significant relationship with the likelihood and size of reinvestments.

Table 6.43 Summary Statistics: 'Reinvestments in Common Parts of the Apartment Block'

Reinvestments in Common Parts of the Apartment Block	All Hhs		Repairer Hhs		Repairers / All Hhs[1] (%)	Average RME[2] (Euro)
	Frequency	%	Frequency	%		
Exterior / Interior Painting						
No	1209	74.5	383	68.1	31.7	1246
Yes	413	25.5	179	31.9	43.3	1664
Total	1622	100	562	100	34.6	1376
[1] $\chi^2(1, 1622) = 18.49, p < .05$ [2] $F(1, 539) = 10.69, p < .05$						
Insulation, Roof / Elevator Repairing						
No	1268	78.2	416	74.0	32.8	1236
Yes	354	21.8	146	26.0	41.2	1768
Total	1622	100	562	100	34.6	1376
[1] $\chi^2(1, 1622) = 8.70, p < .05$ [2] $F(1, 539) = 14.24, p < .05$						
Landscaping						
No	1417	87.4	481	85.6	33.9	1326
Yes	205	12.6	81	14.4	39.5	1660
Total	1622	100	562	100	34.6	1376
[1] $\chi^2(1, 1622) = 2.45, p > .05$ [2] $F(1, 539) = 2.65, p > .05$						
Installations / Infrastructure Repairing						
No	1088	67.1	309	55.0	28.4	1199
Yes	534	32.9	253	45.0	47.4	1589
Total	1622	100	562	100	34.6	1376
[1] $\chi^2(1, 1622) = 56.97, p < .05$ [2] $F(1, 539) = 11.46, p < .05$						

Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

Evaluation of Dwelling by Household

In the Ankara Survey, Hhs were asked to report the most significant problems they observe in their dwellings. Among these problems existence of burglary, size and physical condition of the dwelling may be more influential on Hhs' reinvestment decisions. Table 6.44 displays that, ratio of repairers does not display differences in dwellings with respect to existence of burglary. Yet, Hhs who identify burglary as a problem have relatively higher RM expenditure averages than other Hhs. On the other hand, Hhs who identify their dwellings as small are more likely to be repairers but their average RM spending remains low compared to other Hhs. Similarly, Hhs who reported their dwellings to be in disrepair are more likely to undertake RM works but they display very low RM expenditure levels. Among these problems identified by Hhs, size of the dwelling displays a significant relationship with likelihood of RM works whereas condition of the dwelling displays a significant relationship with size of the RM expenditures.

Table 6.44 Summary Statistics: 'Evaluation of Dwelling by Household'

Hh Evaluation of Dwelling	All Hhs		Repairer Hhs		Repairers / All Hhs[1] (%)	Average RME[2] (Euro)
	Frequency	%	Frequency	%		
Existence of Burglary						
No	1547	87.5	501	87.6	32.4	1335
Yes	220	12.5	71	12.4	32.3	1471
Total	1767	100	572	100	32.4	1353
[1] $\chi^2(1, 1767) = 0.00, p > .05$ [2] $F(1, 549) = 1.21, p > .05$						
Size of the Dwelling is Small						
No	1543	87.3	458	80.1	29.7	1405
Yes	224	12.7	114	19.9	50.9	1137
Total	1767	100	572	100	32.4	1353
[1] $\chi^2(1, 1767) = 40.20, p < .05$ [2] $F(1, 549) = 1.52, p > .05$						
Dwelling is in Disrepair						
No	1578	89.3	501	87.6	31.7	1424
Yes	189	10.7	71	12.4	37.6	842
Total	1767	100	572	100	32.4	1353
[1] $\chi^2(1, 1767) = 2.61, p > .05$ [2] $F(1, 549) = 9.00, p < .05$						

Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

6.4.3. Neighbourhood Attributes

Evaluation of Neighbourhood by Household

In the Ankara Survey, the effects of Hhs' subjective evaluation of their neighbourhoods on their reinvestment decisions can also be investigated (Table 6.45). Neighbourhood evaluation

in terms of services, accessibility, safety, and environment are measured on a 1 to 5 scale (1. 'extremely poor', 5. 'excellent').

Table 6.45 Summary Statistics: 'Evaluation of Neighbourhood by Household'

Hh Evaluation of Neighbourhood	All Hhs		Repairer Hhs		Repairers / All Hhs[1] (%)	Average RME[2] (Euro)
	Frequency	%	Frequency	%		
Services						
Extremely Poor	135	7.8	44	8.2	32.6	1823
Below Average	313	18.1	91	16.9	29.1	1355
Average	747	43.3	237	44.1	31.7	1233
Above Average	473	27.4	148	27.6	31.3	1240
Excellent	57	3.3	17	3.2	29.8	1417
Total	1725	100	537	100	31.1	1307
[1] $\chi^2(4, 1725) = 0.93$, $p > .05$ [2] $F(4, 511) = 1.71$, $p > .05$						
Accessibility						
Extremely Poor	33	1.9	15	2.8	45.5	1518
Below Average	121	7.0	41	7.5	33.9	1436
Average	599	34.5	160	29.4	26.7	1418
Above Average	724	41.8	224	41.1	30.9	1338
Excellent	257	14.8	105	19.3	40.9	1042
Total	1734	100	545	100	31.4	1316
[1] $\chi^2(4, 1734) = 20.21$, $p < .05$ [2] $F(4, 523) = 1.39$, $p > .05$						
Safety						
Extremely Poor	95	5.5	30	5.4	31.6	1259
Below Average	441	25.3	147	26.7	33.3	1227
Average	852	48.9	269	48.8	31.6	1352
Above Average	292	16.8	82	14.9	28.1	1361
Excellent	62	3.6	23	4.2	37.1	1284
Total	1742	100	551	100	31.6	1312
[1] $\chi^2(4, 1742) = 3.15$, $p > .05$ [2] $F(4, 527) = 0.64$, $p > .05$						
Environment						
Extremely Poor	58	3.3	21	3.8	36.2	1679
Below Average	248	14.3	59	10.7	23.8	1848
Average	768	44.1	270	48.9	35.2	1188
Above Average	568	32.6	181	32.8	31.9	1204
Excellent	98	5.6	21	3.8	21.4	1667
Total	1740	100	552	100	31.7	1301
[1] $\chi^2(4, 1740) = 16.72$, $p < .05$ [2] $F(4, 528) = 2.71$, $p < .05$						

Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

Initial expectation was to observe more reinvestment activities among Hhs who were satisfied with the neighbourhood attributes. Yet, as Table 6.45 displays, effects of Hhs' subjective evaluation of the neighbourhood attributes on RM decisions are difficult to interpret. Likelihood of RM works is significantly associated with Hhs' evaluation of neighbourhood accessibility and environment. Contrary to expectations, Hhs' who rated these neighbourhood

attributes as 'extremely poor' are more likely to undertake RM works. Hhs' evaluation of neighbourhood environment, on the other hand, is the only factor (with respect to F statistics) affecting size of the reinvestment expenditures significantly[111]. In this case, Hhs who rated the neighbourhood environment as 'extremely poor' and 'below average' reveal the highest average expenditure levels.

Land Value

As an objective measure of neighbourhood attributes 'land values' are also integrated to the Ankara Survey data. These are the minimum land values assessed by Tax Assessment Committees to establish property tax. Higher land values reflect the locational advantages in terms of accessibility, proximity to district / city centres, etc. According to Table 6.46, lowest and highest end of the stock in terms of land values display similar rates of repairers, though average RM expenditures realized in the dwellings with higher land values are relatively high. Significance tests in Table 6.46 display that land values are neither associated neither with likelihood of RM works nor with the size of RM expenditures[112].

Table 6.46 Summary Statistics: 'Land Values'

Land Values (Euro / Sq Meter)	All Hhs		Repairer Hhs		Repairers / All Hhs[1] (%)	Average RME[2] (Euro)
	Frequency	%	Frequency	%		
< 50	438	23.7	147	24.8	33.6	1168
50-100	559	30.3	161	27.2	28.8	1307
101-150	427	23.1	152	25.6	35.6	1288
151-200	247	13.4	79	13.3	32.0	1651
201-250	89	4.8	25	4.2	28.1	1880
250+	86	4.7	29	4.9	33.7	1843
Total	1846	100	593	100	32.1	1362

[1] $\chi^2(5, 1846) = 6.37$, $p > .05$
[2] $F(5, 564) = 1.83$, $p > .05$
Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

According to Table 6.47, increasing land values are accompanied by increasing dwelling age and duration of occupancy (excluding 201-250 Euro / sq meter category). Moreover, the share of low and lowest income Hhs decreases in the same direction (Table 6.48). In other words, Hhs who have relatively higher Hh incomes in Ankara occupy the older part of the stock which have locational advantages. This part of the stock receives comparatively high RM

[111] Yet, correlations between RM expenditures – neighbourhood services, and RM expenditures – neighbourhood accessibility are statistically significant ($r = -0.9$, $p < .05$ for both neighbourhood variables).
[112] Yet again, correlation coefficient is significant between land values and RM expenditures ($r = .11$, $p < .01$).

expenditures. Low and lowest income Hhs, on the other hand, occupy relatively new dwellings where land and rental values are comparatively low due to locational disadvantages. The lowest average RM expenditures are displayed in this part of the stock.

Table 6.47 Hh and Dwelling Characteristics with respect to 'Land Values'

Land Value (Euro / Sq Meter)	Hh Characteristics				Stock Characteristics			
	Hh Income (Euro)	Age of Head (Years)	Occupancy (Years)	Hh Size (Person)	Age (Yrs)	Rooms (Num.)	Floor Area (Sq Meter)	Monthly Rent (Euro)
< 50	1120	46.1	10.7	3.5	22.1	3.8	108	223
50-100	1268	46.7	11.0	3.2	28.5	3.7	107	251
101-150	1457	48.0	12.0	3.1	30.1	3.7	108	297
151-200	1571	48.8	12.3	3.1	32.2	3.7	110	282
201-250	1354	46.3	9.2	3.3	23.8	3.8	112	300
250+	1560	47.1	12.5	2.9	37.2	3.7	111	284
Total	1336	47.1	11.3	3.2	28.0	3.7	108	264

N = 1846

Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

Table 6.48 Distribution of Owner-occupiers, Low and Lowest Income Hhs, Recent Movers, and Overcrowded Dwellings with respect to 'Land Values'

Land Value (Euro / Sq Meter)	Owner-occupiers (%)	Lowest - Low Income Hhs (<1000 Euro) (%)	Recent Movers (%)	Overcrowded Dwellings (%)
< 50	65	67	8	8
50-100	65	58	12	7
101-150	72	53	7	5
151-200	69	51	8	7
201-250	67	50	13	9
250+	64	48	11	2
Total	67	57	9	6

Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

6.4.4. Summary of the Findings

Major findings derived from the analysis of Ankara Survey data on the effects of Hh, dwelling, and neighbourhood characteristics on Hhs' reinvestment decisions are summarized below (Table 6.49).

Table 6.49 Summary of the Findings

	Major Findings
Mode of Tenure	• Mode of tenure affects both the likelihood of RM decisions and size of the RM expenditures. • Privileged tenants are more likely to be repairers compared to other tenures. Both owner-occupiers and privileged tenants display large scale RM expenditures. • Tenants are less likely to undertake RM works and they display low RM expenditure levels relative to other tenures. • Tenure modes differ fundamentally in terms of their Hh characteristics (income, Hh head age, duration of occupancy). • Dwelling conditions (age, size, land value) for tenants and owner-occupiers are very similar to each other. Owner-occupiers consume slightly more dwelling space compared to other tenures.
Hh Income	• Hh income affects both the likelihood of RM decisions and size of the RM expenditures. • Hhs in the lowest income bracket display relatively high ratio of repairers yet they are less likely to undertake large scale RM expenditures. Furthermore, they occupy relatively smaller part of the stock where rents and land values are low. Therefore these Hhs' reinvestment behaviour may be considered as problematic.
Hh Head Age	• Hh Head age affects both the likelihood of RM decisions and size of the RM expenditures. • The 25-34 age cohort is less likely to carry out RM works whereas youngest cohort (18-24) displays the lowest RM expenditures averages. • Contrary to the findings in the literature, elderly Hh heads in urban Ankara are inclined to carry out RM works. These Hhs' average RM expenditures are high compared to other Hhs. • Average Hh income, Hh size, and dwelling size displays an inverted u-shape with increasing Hh head age. Rate of owner-occupancy and duration of occupancy increases as the age increases. Whereas dwelling age displays an u-shape with increasing Hh head age.
Duration of Occupancy	• Duration of occupancy affects both the likelihood of RM decisions and size of the RM expenditures. • As duration of occupancy in the dwelling extended likelihood of doing RM works (excluding recent movers) and average RM expenditures increases. • For all tenure modes, highest ratio of repairers is observed among recent movers. • For owner-occupiers 65% of the recent movers are first time home owners and they display the highest average RM expenditures. • In the year preceding the survey, most of the Hhs (62%) were neither movers nor repairers. Among the remaining Hhs the dominant adjustment strategy was stay-reinvest (28.5% of all Hhs), and this was followed by move (5.3% of all Hhs) and move-reinvest (4% of all Hhs) strategies.

Table 6.49 (cont.): Summary of the Findings

Mobility Expectation	• Mobility expectation affects the size of RM expenditures significantly. • Hhs with shorter expected tenure are more likely to undertake RM works though the average RM expenditures they display are lower compared to Hhs' with longer expected tenure.
Changes in Hh Size	• Changes in Hh size do not significantly contribute to explain Hhs' reinvestment decisions in the case of Ankara.
Occupation Density	• Occupation density affects only the likelihood of RM decisions. • Overcrowded dwellings are more likely to receive RM works though the size of RM expenditures is comparatively low in this part of the stock. • Particularly overcrowded dwellings in rental stock may be considered problematic since it is the lowest end of the stock in terms of dwelling size, monthly rents, and land values which accommodates lowest income Hhs.
Dwelling Age	• Age of the dwelling affects only the likelihood of RM decisions. • The ratio of repairers in pre-1974 stock is relatively low compared to other dwellings. • Hh and dwelling characteristics are very similar for dwellings in different dwelling age categories. Yet, land values consistently decrease as age of the dwelling decreases. • There is no indication of a match between older dwellings and lowest end of the income brackets in the Ankara Survey.
Dwelling Size	• Dwelling size affects both the likelihood of RM decisions and size of the RM expenditures. • Increasing dwelling size is accompanied with decreasing ratio of repairers and average RM expenditures per sq meter. • The smallest part of the stock is predominantly occupied by lowest and low income Hhs and it is the oldest part of the stock with low rental and land values. Though, highest ratio of repairers and highest average RM expenditures per sq meter are observed in this part of the stock. • Largest part of the stock is predominantly occupied by owner-occupiers with high average income levels. This part of the stock is composed of younger dwellings with higher rental values.
Monthly Rent	• Monthly rent affects both the likelihood of RM decisions and size of the RM expenditures. • Ratio of repairer Hhs and average RM expenditures increase consistently with increasing rental value of the dwelling. • The most problematic part of the stock in terms of RM can be considered as the dwellings in the lowest end of the rent scale. This is the smallest part of the stock with lowest land values and occupied predominantly by lowest and low income Hhs. Furthermore, 41 per cent of this stock is rented and ratio of overcrowded dwellings is relatively high.
Reinvestments in Common Parts	• Reinvestments in common parts of the apartment block such as exterior / interior painting, insulation, roof / elevator repairing, installations / infrastructure repairing affect both the likelihood of RM decisions and size of the RM expenditures. • Existing reinvestments in common parts of the apartment block trigger Hhs' reinvestments decisions in their dwelling units.

Table 6.49 (cont.): Summary of the Findings

Hhs' Evaluation of Neighbourhood	• Hhs' evaluation of neighbourhood services affects size of the RM expenditures. • Hhs' evaluation of neighbourhood accessibility and environment affects both the likelihood of RM decisions and size of the RM expenditures. • Contrary to expectations, Hhs with poor neighbourhood ratings are more likely to undertake RM works.
Land Value	• Land value affects only size of the reinvestment expenditures. • Increasing land values are associated with increasing dwelling age. • Dwellings in the lowest end of the land value scale are predominantly occupied by low and lowest income Hhs. This part of the stock receives relatively low levels of RM expenditures but it is composed of relatively new dwellings.

6.5. Multivariate Analyses of the Factors Affecting Household's Reinvestment Decisions and Findings

Analysis in the previous section displays that there are a number of factors (Hh characteristics, dwelling attributes, and neighbourhood features) which significantly influence the likelihood of Hhs' reinvestment decisions and size of their reinvestment expenditures (Table 6.50)[113]. In this part of the study, these individual factors are employed in multivariate models to explain Hhs' reinvestment decisions in urban Ankara.

Table 6.50 Independent Factors Affecting Hhs' RM Decisions Significantly

Independent Variables	Likelihood of RM Decision	Size of the RM Expenditures
Hh Characteristics		
Mode of Tenure	✓	✓
Hh Income	✓	✓
Hh Head Age	✓	✓
Duration of Occupancy	✓	✓
Mobility Expectation	×	✓
Occupation Density	✓	×
Dwelling Characteristics		
Age of the Dwelling	✓	×
Floor Area	✓	✓
Monthly Rent	✓	✓
Reinvestments in Common Parts of the Apartment Block		
-Exterior / Interior Painting	✓	✓
-Insulation, Roof / Elevator Repairing	✓	✓
-Installations / Infrastructure Repairing	✓	✓
Neighbourhood Attributes		
Land Value	×	✓
Perceptions of Dwelling and Neighbourhood		
Evaluation of Dwelling by Hh		
-Size of the dwelling is small	✓	×
-Dwelling is in disrepair	×	✓
Hhs' Evaluation of Neighbourhood		
-Services	×	✓
-Accessibility	✓	✓
-Environment	✓	✓

✓ Statistically significant relationship
× Statistically insignificant relationship

[113] It must be recalled that both significance tests in bivariate analysis (chi square and F statistics) and correlations are employed to identify the factors affecting Hhs' RM decisions significantly.

Similar to the multivariate analyses in Chapter 5, RM decisions are considered as a sequential event, thus two separate models are employed to investigate the factors underlying the likelihood and size of the RM expenditures.

- **The first model** (likelihood of RM decisions) attempts to identify repairer / non-repairer Hhs in relation to:

(1) mode of tenure,
(2) Hh income,
(3) Hh head age,
(4) duration of occupancy,
(5) occupation density,
(6) age of the dwelling,
(7) floor area of the dwelling,
(8) monthly rent,
(9) RM in common parts of the apartment,
(10) Hh's evaluation of the dwelling,
(11) Hh's evaluation of the neighbourhood.

As discussed earlier in Section 5.5 of this study, there are three basic multivariate analysis methods (discriminant analysis, logit analysis, and logistic regression) to identify factors which discriminate between repairers and non-repairers. Similar to the analysis in Chapter 5, logistic regression is preferred in this part of the study as a multivariate analysis method to investigate the likelihood of Hhs' RM decisions. This model is chosen because it enables an easier comparison between the results of the HBS and the Ankara Survey, and it allows any mix of continuous, discrete, and dichotomous variables to be independent variables in analysis. Since the dependent variable in the first model is dichotomous (non-repairers / repairers) **binary logistic regression method** is applied.

- **The second model** (size of the RM expenditures) seeks to identify repairers having different ranges of RM expenditures (i.e. below 500 Euro, 500-1500 Euro RM expenditures) based on:

(1) mode of tenure,
(2) Hh Income,
(3) Hh head age,
(4) duration of occupancy,
(5) mobility expectation,
(6) floor area of the dwelling,
(7) monthly rent,
(8) RM in common parts of the apartment,
(9) Hh's evaluation of the dwelling,
(10) Hh's evaluation of the neighbourhood,
(11) land values.

As mentioned earlier in Section 5.5 of this study, there are two major multivariate analysis methods (multiple regression, ordinal logistic regression) to identify the factors affecting the size of Hhs' reinvestment expenditures. In the Ankara Survey, RM expenditures are provided in five intervals. As displayed previously in Table 6.2, 86 per cent of the responses are concentrated in the first three intervals. In such cases, employing multiple regression as a method of analysis results in the violation of regression assumptions and misleading outcomes. Therefore, similar to the analysis in Section 5.5, **ordinal logistic regression method** is applied as the second model to identify the factors influencing the size of RM expenditures. In order to facilitate the multivariate analysis, RM expenditures are recoded into three categories as expenditures (a) below 500 Euro, (b) 500-1500 Euro, and (c) more than 1500 Euro.

Table 6.51 presents correlations among the variables[114]. No sings of multicollinearity detected among the variables employed in the models. Results of the binary logistic regression (the first model) and ordinal regression (the second model) are presented in Table 6.52 and 6.53 respectively. The first model is run separately for all Hhs, owner-occupiers, and tenants whereas the second model is applied to all repairers, and repairer owner-occupiers[115]. In the second model, it is not possible to investigate repairer tenants' RM expenditures since 87 per cent of them fall in the same RM expenditure category – below 500 Euro (refer to Table 6.2).

In both tables (Table 6.52 and 6.53), logistic coefficients (B), 'odds ratios' (Exp(B)), and the significance level (*) of the coefficients are presented[116]. Similar to the analysis in Section 5.5, **'odds ratios'** of the ***significant coefficients*** are employed in order to explain the impacts of independent variables on the probability of the event of interest. For continuous variables, 'odds ratios' less than 1 correspond to decreases in probability of the event with a unit change in the independent variable. Similarly 'odds ratios' more than 1 correspond to increases. Values very close to 1 indicate that unit changes in that independent variable do not affect the dependent variable. For categorical independent variables evaluation of odds ratio is done compared to the reference category (REF).

[114] Correlations for rest of the variables employed in the first and second models are presented in Appendix I.
[115] None of the models is applied separately for privileged tenants due to small sample size. Rather, privileged tenants are covered in the analysis applied for all Hhs (1st model) and all repairers (2nd model).
[116] Complete SPSS outputs of the binary and ordinal logistic regression analyses are presented in Appendix E.

Table 6.51 Measures of Association: Pearson and Eta Correlations[117]

	RM Exp.	Income	HhH Age	Occupancy	Dw. Age	Floor Area	Rent	Land Value	Tenure	Mobility	Density
RM Exp.	1	.13**	.13**	.13**	.01	.11*	.10*	.11**	.39**	.24**	.07
Income	.13**	1	-.04	-.07**	-.02	.25**	.24**	.12**	.09**	.00	.05
HhH Age	.13**	-.04	1	.58**	.01	-.01	.07**	.04	.28**	.21**	.01
Occupancy	.13**	-.07**	.58**	1	.16**	-.05	.02	.03	.37**	.28**	.03
Dw. Age	.01	-.02	.01	.16**	1	-.13**	-.01	.27**	.01	.02	.06*
Floor Area	.11*	.25**	-.01	-.05	-.13**	1	.33**	.04	.10**	.06**	.13**
Rent	.10*	.24**	.07**	.02	-.01	.33**	1	.25**	.14**	.02	.18**
Land Value	.11**	.12**	.04	.03	.27**	.04	.25**	1	.03**	.00	.07**
Tenure	.39**	.09**	.28**	.37**	.01	.10**	.14**	.03**	1	.50**	.05
Mobility	.24**	.00	.21**	.28**	.02	.06**	.02	.00	.50**	1	.06*
Density	.07	.05	.01	.03	.06*	.13**	.18**	.07**	.05	.06*	1

* p < .05
** p < .01
Source: Balamir, M., *Ankara Survey 2007-08 Raw Data*.

[117] Associations among continuous variables are investigated through Pearson correlations whereas nominal by interval or ratio associations are examined by Eta coefficients. Crammer's *V* is employed as a measure of association among nominal variables. Eta and Crammer's *V* values range from 0 to 1, whereas Pearson correlation coefficient varies from -1 to 1. Nominal variables are 'mode of tenure', 'mobility expectation', and 'occupation density'.

Table 6.52 Binary Logistic Regression Model: Likelihood of RM Decisions

Dependent Variable: Probability of having done RM (0: non-repairers, 1: repairers)						
	All Hhs		**Owner-occupiers**		**Tenants**	
Independent Variables	B	Odds Ratio	B	Odds Ratio	B	Odds Ratio
Constant	-1.79	0.17**	-2.51	0.08**	-0.13	0.87
Hh Characteristics						
Mode of Tenure						
Owner-Occupier	0.03	1.03	NA	NA	NA	NA
Privileged Tenant	0.27	1.31	NA	NA	NA	NA
Tenant (REF)	0.00	1.00	NA	NA	NA	NA
Hh Income						
500 Euro or Less (REF)	0.00	1.00	0.00	1.00	0.00	1.00
500-1000 Euro	-0.22	0.80	-0.11	0.89	-0.48	0.62
1000-1500 Euro	-0.08	0.92	0.14	1.15	-0.27	0.77
1500-2500 Euro	-0.38	0.69	-0.36	0.70	-0.12	0.88
More than 2500 Euro	-0.11	0.90	-0.22	0.81	0.67	1.96
Age of the Hh Head						
Hh Head Age (in 10 Years)	0.23	1.26***	0.35	1.41***	0.01	1.01
Duration of Occupancy						
1 Year or Less (REF)	0.00	1.00	0.00	1.00	0.00	1.00
2-10 Years	-1.38	0.25***	-1.56	0.21***	-1.18	0.31***
11-40 Years	-1.44	0.24***	-1.62	0.20***	-1.36	0.26*
More than 40 Years	-1.81	0.16**	-2.12	0.12**	---	---
Occupation Density						
Underoccupation (REF)	0.00	1.00	0.00	1.00	0.00	1.00
Comfort	0.18	1.20	0.30	1.35	0.15	1.16
Overcrowding	0.24	1.27	0.05	1.05	0.81	2.25
Dwelling Characteristics						
Dwelling Age						
Dwelling Age (in 10 Years)	-0.03	0.97	-0.07	0.93	0.09	1.09
Dwelling Size						
Floor Area (in 25 Sq Meters)	0.03	1.03	0.01	1.01	0.05	1.06
Monthly Rent						
Less than 175 Euro (REF)	0.00	1.00	0.00	1.00	0.00	1.00
175-275 Euro	0.24	1.27	0.58	1.79	-0.26	0.77
276-400 Euro	0.56	1.75*	0.75	2.11*	0.44	1.56
More than 400 Euro	0.66	1.93	0.81	2.24	0.13	1.14
RM in Common Parts						
No Investment (REF)	0.00	1.00	0.00	1.00	0.00	1.00
Some Investments	0.73	2.09***	0.64	1.89***	1.02	2.78***
Perceptions of Dwelling and Neighbourhood						
Size of the Dwelling is Small						
No (REF)	0.00	1.00	0.00	1.00	0.00	1.00
Yes	0.99	2.68***	0.96	2.60***	1.20	3.32**
Neighbourhood Accessibility						
Extremely Poor / Below Ave. (REF)	0.00	1.00	0.00	1.00	0.00	1.00
Average	-0.64	0.53*	-0.45	0.64	-1.21	0.30
Above Ave. / Excellent	-0.18	0.84	0.12	1.12	-1.13	0.32
Neighbourhood Environment						
Extremely Poor / Below Ave. (REF)	0.00	1.00	0.00	1.00	0.00	1.00
Average	0.70	2.00**	0.62	1.86**	0.35	1.42
Above Ave. / Excellent	0.51	1.66*	0.50	1.64	0.24	1.27
Log Likelihood	1328.19		898.89		322.85	
χ^2	150.14*** (23df)		118.56*** (21df)		52.51*** (20df)	
Nagelkerke R^2	0.17		0.19		0.22	
N	1174		809		301	

REF = Reference Category NA = Not Applicable *p < .05, ** p < .01, ***p < .001

Table 6.53 Ordinal Logistic Regression Model: Size of the RM Expenditures[118]

Dependent Variable: RM Expenditures: (1) Less than 500 Euro, (2) 500-1500 Euro, (3) More than 1500 Euro				
Independent Variables	**All Repairers**		**Repairer Owner-Occupiers**	
	B	Odds Ratio	B	Odds Ratio
Household Characteristics				
Mode of Tenure				
Owner-Occupier (REF)	---	---	NA	NA
Privileged Tenant	0.01	1.01	NA	NA
Tenant	-2.80	0.06***	NA	NA
Hh Income				
500 Euro or Less (REF)	---	---	---	---
500-1000 Euro	0.88	2.41*	0.81	2.26*
1000-1500 Euro	1.22	3.37**	1.35	3.85**
1500-2500 Euro	0.85	2.35	0.62	1.85
More than 2500 Euro	0.77	2.16	0.58	1.79
Age of the Hh Head				
Hh Head Age (in 10 Years)	0.00	1.00	0.05	1.05
Duration of Occupancy				
Occupancy (in 5 Years)	0.08	1.08	0.06	1.06
Mobility Expectation				
No	0.32	1.37	-0.30	0.74
Yes (REF)	---	---	---	---
Dwelling Characteristics				
Dwelling Size				
Floor Area (in 25 sq meters)	0.11	1.12	0.08	1.09
Monthly Rent				
Less than 175 Euro (REF)	---	---	---	---
175-275 Euro	1.01	2.74	0.99	2.70
276-400 Euro	0.37	1.45	0.25	1.28
More than 400 Euro	1.38	3.97	0.87	2.38
RM in Common Parts				
No Investment (REF)	---	---		
Some Investments	0.65	1.91**	0.63	1.88*
Neighbourhood Attributes				
Land Values				
Land Value (in 50 Euros per Sq Meter)	0.17	1.18	0.26	1.30*

[118] Ordinal logistic regression procedure does not produce 'odds ratio' as an output. Employing B coefficients odds ratios (Exp (B)) are calculated in Microsoft Excel.

Table 6.53 (cont.): Ordinal Logistic Regression Model: Size of the RM Expenditures

Dependent Variable: RM Expenditures: (1) Less than 500 Euro, (2) 500-1500 Euro, (3) More than 1500 Euro				
Independent Variables	**All Repairers**		**Repairer Owner-Occupiers**	
	B	Odds Ratio	B	Odds Ratio
Perceptions of Dwelling and Neighbourhood				
Dwelling is in Disrepair				
No	-0.29	0.75	0.16	1.18
Yes (REF)	---	---	---	---
Neighbourhood Services				
Extremely Poor / Below Ave. (REF)	---	---	---	---
Average	-0.16	0.86	-0.07	0.93
Above Ave. / Excellent	-0.25	0.78	-0.45	0.64
Neighbourhood Accessibility				
Extremely Poor / Below Ave. (REF)	---	---	---	---
Average	0.55	1.73	0.53	1.69
Above Ave. / Excellent	0.13	1.14	0.24	1.27
Neighbourhood Environment				
Extremely Poor / Below Ave. (REF)	---	---	---	---
Average	-0.64	0.53	-0.71	0.49
Above Ave. / Excellent	-0.57	0.57	-0.44	0.64
Log Likelihood	608.50		501.13	
χ^2	160.56*** (22df)		45.76** (20df)	
Nagelkerke R^2	0.41		0.19	
N	359		250	

REF = Reference Category NA = Not Applicable * p < .05, ** p < .01, ***p < .001

Table 6.54 summarizes the results of the two models in explaining the likelihood of RM decisions and size of the RM expenditures.

Table 6.54 Results of the Empirical Models: Factors Affecting Hhs' RM Decisions

Independent Variables	Likelihood of RM Decision (1st Model)			Size of the RM Expenditures (2nd Model)	
	All Hhs	Owner-occupiers	Tenants	All Repairers	Repairer Owners
Hh Characteristics					
Mode of Tenure	×	NA	NA	✓	NA
Hh Income	×	×	×	✓	✓
Hh Head Age	✓	✓	×	×	×
Duration of Occupancy	✓	✓	✓	×	×
Mobility Expectation	NA	NA	NA	×	×
Occupation Density	×	×	×	NA	NA
Dwelling Characteristics					
Dwelling Age	×	×	×	NA	NA
Dwelling Size	×	×	×	×	×
Monthly Rent[119]	×	×	×	×	×
RM in Common Parts of the Apartment	✓	✓	✓	✓	✓
Neighbourhood Attributes					
Land Value	NA	NA	NA	×	✓
Perceptions of Dwelling and Neighbourhood					
Dwelling Size	✓	✓	✓	NA	NA
Disrepair	NA	NA	NA	×	×
Neighbourhood Services	NA	NA	NA	×	×
Neighbourhood Accessibility	✓	×	×	×	×
Neighbourhood Environment	✓	✓	×	×	×

✓ Variable with a significant coefficient
× Variable with an insignificant coefficient
NA: Not Applicable

The most significant findings derived from the multivariate analyses (Table 6.52, 6.53) of the Ankara Survey data are summarized below in comparison to the findings of HBS data:

For all Hhs;

- Similar to the findings derived from the analysis of HBS data, **'mode of tenure'** does not significantly contribute to explain likelihood of Hhs' RM decisions, but it affects

[119] Only one category of 'monthly rent' displays significant coefficients in the first model both for all Hhs and owner-occupiers. Yet, the overall significance level of the variable is greater than .05 (refer to complete SPSS output in Appendix E).

size of the RM expenditures for repairer Hhs. Clearly, tenants' RM expenditures are less likely to be large scale expenditures compared to owner-occupiers' RM expenditures (odds ratio = 0.06).

- Contrary to the findings of HBS, **'Hh income'** does not significantly affect the likelihood of a Hh's RM decisions in the Ankara case. However, it influences size of the RM expenditures. Hhs in the 500-1000 Euro and 1000-1500 Euro income brackets are clearly more likely to undertake voluminous RM expenditures compared to the lowest income Hhs.
- Different from the HBS findings, **'age of the Hh head'** significantly contributes to the explanation of likelihood of RM decisions in the Ankara Survey. Theoretically, elderly Hh heads are expected to be less likely to carry out RM works compared to middle-aged Hh heads. Yet, as Table 6.52 displays a 10 years increase in the Hh head age increases the probability of being a repairer by a factor of 1.26. In other words, elderly Hh heads in urban Ankara are more inclined to carry out RM works compared to middle-aged and younger Hh heads.
- In line with the HBS findings, **'duration of occupancy'** in the dwelling affects the likelihood of RM decisions but not the size of RM expenditures. Yet, different from HBS findings, as the duration of occupancy in the dwelling lengthens, the probability of being a repairer decreases (odds ratios decreasing from 1 to 0.16). In other words, recent movers are more likely to be repairers compared to the rest of Hhs. As mentioned before, RM expenditures observed in the HBS are monthly expenditures and this hinders to observe adjustment investments realized by recent mover Hhs.
- Contrary to the HBS findings, **'dwelling size'** displays insignificant coefficients in both models in the Ankara Survey. The survey also offers Hhs' evaluation of the dwelling size as a variable. Accordingly, Hhs who reported the size of their dwellings as small are 2.7 times more likely to be repairers compared to the rest of Hhs. It must be noted that, only 8 per cent of these Hhs live in overcrowding conditions with respect to international occupancy standards. Whereas, 58 per cent of them live under comfort conditions, and 34 per cent of them experience underoccupancy. In other words, Hh's perception of the dwelling size with respect to the Hh needs is more influential on Hh's RM decisions rather then the actual size of the dwelling.
- Different from the findings of HBS, **'monthly rent'** does not significantly contribute to the explanation of Hhs' RM decisions. Only one of the rent categories displays

significant coefficients, though the overall significance level of the 'monthly rent' variable fails ($p > .05$, refer to complete SPSS output in Appendix E).

- Different from the HBS data, in the Ankara Survey effects of **'RM expenditures in common parts of the apartment'** on the individual RM decisions can be observed. Accordingly, existing RM activities in the apartments (such as interior / exterior painting, insulation, roof / elevator repairing, and installations / infrastructure repairing) significantly affects both the likelihood and size of the RM expenditures. Hhs are 2.1 times more likely to undertake RM in their independent parts when commonly owned parts of the apartment are maintained. Furthermore, these Hhs' RM expenditures are 1.9 times more likely to be voluminous expenditures compared to Hhs living in apartments where no RM activity is observed.
- With the Ankara Survey data, it is also possible to observe how individual RM decisions are affected by Hh's **'perception of the neighbourhood'**. Initial expectation was to observe more reinvestment works among Hhs who are satisfied with their neighbourhoods. This expectation holds valid for perception of neighbourhood environment. Hhs who assigned high ratings to their neighbourhood environment ('average', 'above average / excellent' categories) are more likely to be repairers compared to Hhs who reported their neighbourhood environment as extremely poor or below average. On the contrary, Hhs who rated the accessibility of their neighbourhoods as 'average' are less likely to be repairers compared to the Hhs whose ratings for accessibility are extremely poor / below average. None of the variables related to Hh's perception of the neighbourhood display significant coefficients in the second model (size of the RM expenditures).

Most of the findings stated above for all Hhs are also valid for owner-occupiers. Yet, **in the owner-occupied sector;**

- As the '**land values'** increases the likelihood of large scale RM expenditures are also increases by a factor of 1.30. As bivariate analysis in previous section display age of the dwelling also increases in the same direction. In other words, in owner-occupied sector older dwellings which have high land values due to locational advantages in terms of accessibility, proximity to district / city centres, etc. receive larger RM expenditures.

- Different from the rest of the Hhs, in owner-occupied sector, Hhs' perception of neighbourhood accessibility does not contribute to the explanation of likelihood of RM decisions.

In the rental sector;

- As mentioned before, it is not possible to run the second model for tenant Hhs since 87 per cent of their RM expenditures fall in the lowest expenditure category (below 500 Euro).
- Contrary to the HBS findings, in the Ankara Survey likelihood of tenants' RM decisions is affected by **'duration of occupancy'**, **'existing RM in the common parts of the apartment'**, and **'Hh's perception of the dwelling size'**. Similar to owner-occupiers, recent mover tenants are more likely to be repairers compared to other Hhs. As the duration of occupancy in the dwelling lengthens likelihood of undertaking RM works decreases. Furthermore, RM works undertaken in common parts of the apartment block trigger reinvestment decisions of tenants. Moreover, tenants who perceive the size of their dwellings as small are 3.3 times more likely to undertake RM works.

Chi square values at the bottom of Table 6.52 and 6.53 display that overall fit of the both models are significant. Clearly, explanatory power (R^2) of the models in the Ankara Survey is higher compared to HBS findings. This improvement may be attributed to the additional variables and annual reinvestment expenditures provided by the Ankara Survey data. R^2 values in the first model (17 to 26 per cent) are within the range of previous studies (7 to 20 per cent), whereas the second model for all repairer Hhs displays higher R^2 values (0.41) compared to previous studies in the field[120].

The empirical part of this study conducted with HBS and the Ankara Survey data could be considered as a preliminary step in understanding Hhs' reinvestment behaviour in the Turkish case. It is not possible to argue that all opportunities provided by these data sources are fully exploited throughout this study. The findings and conclusions arrived at in this research could be elaborated and supported, or even some dimensions of it can be falsified by incorporation of additional information based on further investigation of these data sources and exploration

[120] It must be underlined again that R^2 values provided in logistic regression are approximations to R^2 in linear regression, and Nagelkerke R^2 usually tends to be lower than the corresponding OLS R^2.

of different samples representing distinct housing environments in Turkey. Comprehensive information about internal dynamics and macro implications of Hhs' reinvestment behaviour are essential for structuring complementary policies in the housing system.

CHAPTER 7

CONCLUSION

7.1. Reinvestment Behaviour of Households in the Turkish Case: Overview of Findings

Considering the fact that almost all of the housing stock (both owner-occupied and rented) in Turkey is privately owned, and all types of reinvestments are totally dependent on Hhs' decisions in the free market, this study argues that ***Hhs' reinvestment decisions have a crucial role in trajectory of nation's housing stock and neighbourhoods.*** Therefore, developing an understanding of Hhs' reinvestment decisions could contribute urban decision-makers and planners in designing finer policies and interventions to tackle problems in existing housing stock and neighbourhoods. Consequently, this study is aimed at identifying the factors affecting Hhs' reinvestment decisions, adjustment strategies adopted by Hhs, scale and types of reinvestment work, and the motivation underlying these investments to explore macro implications of Hh reinvestment behaviour. For this investigation HBS (2004) data at national level and the Ankara Survey data (2007-08) at metropolitan Ankara level are employed. In this final chapter of the study, key findings derived from the analysis of the HBS and the Ankara Survey data on the nature of reinvestment expenditures, and determinants of Hhs' reinvestment decisions are summarized in order to highlight macro implications of the Hhs' reinvestment behaviour in housing and to discuss scope for reinvestment policies. Finally, a number of recommendations are presented for further studies aiming to explore reinvestment behaviour and policies in existing housing stock.

The Nature of Reinvestment Expenditures

- One of the key findings of the analysis with HBS data is related to the seasonality of reinvestment decisions. Although, reinvestments are less dependent on weather conditions compared to other construction activities, significant seasonal differences are observed in the likelihood and the size of reinvestment expenditures. Hhs are less likely to undertake reinvestment works in winter season and even if they do, these are small-scale RM works.

The incidence of reinvestments is relatively high in summer period, yet large-scale reinvestment works are more likely during spring season.

- Both the HBS and Ankara Survey displays that more than four fifth of the total reinvestment expenditures is realized in owner-occupied sector. No information however is available on reinvestment expenditures of the rental stock owners regarding units rented to tenant Hhs. As the Ankara Survey displays, almost 35 per cent of annual reinvestment expenditures in owner-occupied sector are above 1500 Euro. Whereas, voluminous expenditures are solely undertaken by 2 per cent of tenants in the rental sector.
- In the owner-occupied sector, nearly half of the repairer Hhs classified the purpose of the RM works they undertook as 'non-discretionary RM'. Yet, there are also owner-occupiers engaged in RM works with consumption motivations (i.e. to ensure ease-of-use and beautification – 33 per cent of owner-occupier repairers), as well as investment considerations (such as quality improvement and house value increase – 13 per cent of owner-occupier repairers). For tenants, 'non-discretionary RM' represents nearly two thirds of the responses. In other words, tenants are more likely to engage in RM works when it becomes inevitable.
- The major source of finance employed in reinvestments is 'Hh savings' for owner-occupiers, whereas it is 'Hh income' for tenants. Among all repairers, the share of Hhs who employ consumer loans for RM activities is rather low (4 per cent).
- The most frequently undertaken reinvestment work among all tenure modes was **painting / wall covering**, with more than half of the repairers reported work done in the last 12 months. For tenant repairers, **regular RM** had the highest incidence in the remaining categories, whereas owner-occupiers were engaged in **kitchen and bathroom remodelling**.
- In the Ankara Survey, 32 per cent of all Hhs were repairers in the year preceding the survey. Whereas, 34 per cent of all Hhs were potential repairers who plan to reinvest in their dwellings in the near future. Among these Hhs, 36 per cent were already repairers in the last 12 months. Of all Hhs, 46 per cent neither undertook reinvestments in the last 12 months nor do they plan to do so in the near future.
- Among the planned reinvestments, **painting / wall covering** is the most demanded type of reinvestment among all tenure modes. In the remaining categories, **kitchen and bathroom remodelling** has the highest incidence reported by more than one fourth of potential repairers. For all tenure modes, the major obstacle to planned reinvestments was reported as

'high costs' of the reinvestment works. For owner-occupiers, **'time constraints'** stand as the second major problem, whereas for tenants it is **'having the consent of home owner'**.

Determinants of Households' Reinvestment Decisions

This study argues that Hh's reinvestment decision is a function of Hh characteristics, qualifications of dwelling unit, neighbourhood features, and market attributes. Yet, it is not possible to explore the effects of market attributes on Hhs' reinvestment decisions with the available data sources. HBS allows investigating the effects of Hh and dwelling characteristics on the individual decisions, whereas the Ankara Survey provides additional variables including the neighbourhood attributes. This study considers Hh's reinvestment decision in a **sequential model** which allows investigating the factors underlying the likelihood of RM decisions and size of the RM expenditures separately. This model displays that the factors affecting the both decisions are not exactly the same for the Turkish case, though they are overlapping to some extent.

Analysis with HBS data reveals that:

- For the entire sample; **'Hh income'**, **'duration of occupancy'**, **'dwelling size'**, **'monthly rent'**, and **'season'** are significantly related to the likelihood of RM works. Whereas, **'mode of tenure'**, **'Hh income'**, **'dwelling size'**, **'monthly rent'**, and **'season'** are significantly associated with size of the RM expenditures.
  - $\Rightarrow$ RM works are less likely for (1) lowest income Hhs, (2) Hhs having less than 10 years length of stay in the dwelling, (3) Hhs living in small-sized dwellings, and (4) Hhs occupying dwellings where monthly rents are higher. Moreover, in the winter season the likelihood of RM activities are lesser.
  - $\Rightarrow$ (1) Tenants, and (2) lowest income Hhs are less likely to engage in large scale RM works, (3) larger dwellings, and (4) dwellings with low monthly rents are less likely to receive voluminous RM spending. Furthermore, Hhs are less likely to carry out large scale works in winter season.
- For the 'owner-occupier' sub-sample, all outcomes for the entire sample are valid excluding **'dwelling size'**. Whereas, for the 'tenant' sub-sample, **'Hh income'** is the only significant factor which affects the likelihood of RM decisions. Size of the RM expenditures undertaken by tenants, on the other hand, is associated with **'dwelling size'**, **'monthly rent'**, and **'season'**.

Analysis with the Ankara Survey data reveals that:

- For the entire sample; **'Hh head age'**, **'duration of occupancy'**, **'RM activity in common parts of the apartment'**, **'Hh's perception of the dwelling size'**, and **'Hh's perception of neighbourhood environment'** are significantly related to the likelihood of RM works. Whereas, **'mode of tenure'**, **'Hh income'**, and **'RM activity in common parts of the apartment'** are significantly associated with size of the RM expenditures.

  ⇒ RM works are less likely for (1) younger Hh heads, (2) Hhs having more than 40 years length of stay in the dwelling, (3) Hhs living in apartments where no reinvestment activity is observed in common parts, (4) Hhs who evaluated their dwellings as small-sized, (5) Hhs who rated their neighbourhood environment as extremely poor or below the average.

  ⇒ (1) Tenants, (2) lowest income Hhs and (3) Hhs living in apartments where no reinvestment activity is observed in common parts are less likely to engage in large scale RM works.

- For the 'owner-occupier' sub-sample, all outcomes for the entire sample are valid, yet an additional variable **'land value'** is significant in explaining size of the reinvestment expenditures. Accordingly, flats located in low value areas are less likely to receive larger reinvestment expenditures. For the 'tenant' sub-sample; **'duration of occupancy'**, **'RM activity in common parts of the apartment'**, **'Hh's perception of the dwelling size'** are significant factors affecting the likelihood of RM decisions.

Analyses with the HBS and Ankara Survey data provide very few common factors (duration of occupancy, mode of tenure, and Hh income) which significantly affect Hhs' reinvestment decisions. There are a number of possible explanations for this outcome. First of all, analysis with HBS data is confined to Hh and dwelling characteristics as explanatory variables. In the Ankara Survey, additional Hh and dwelling characteristics are included in the analysis as well as neighbourhood attributes and Hhs' subjective evaluations of their dwellings and neighbourhoods. Therefore, explanatory power of the empirical models applied with HBS data is quite low compared to the models applied with the Ankara Survey data. It is probable that if neighbourhood variables were available in HBS data, outcomes of the analyses would be more similar. Furthermore, housing market in metropolitan Ankara is probably more homogenous in terms of dwelling and neighbourhood characteristics compared to the distinct housing markets covered in HBS data at the national level. For instance, the age difference

between the oldest and newest dwellings in the HBS is 104 years whereas it is 38 years in the Ankara Survey. Therefore, in HBS data it is meaningful to observe 'dwelling size' and 'monthly rent' as significant factors since they are associated with dwelling age, whereas these factors are not significant in the Ankara Survey. The national data represents distinct housing markets but it does not allow identifying and examining them separately, leaving no room for comparisons even at provincial level. The third explanation for the differences observed among outcomes of the analyses is the period that expenditure data is collected. As underlined several times, reinvestment expenditures are presented as annual expenditures in the Ankara Survey, whereas they are monthly expenditures in the HBS. Observing monthly expenditures sometimes hinders significant relationships as it is clearly seen in the case of adjustment investments of 'recent movers' which are not exposed by the HBS data.

Although, the empirical part of this research has provided insights into the nature of reinvestment expenditures made on the existing housing stock, it is a preliminary step in understanding Hhs' reinvestment decisions in the Turkish case. It is evident that additional data and investigations are required to improve the explanatory power of the models in explaining the determinants of Hhs' reinvestment decisions, and to elaborate the findings of this research. Particularly, data on condition of the dwelling, previously undertaken comprehensive reinvestments, neighbourhood quality / amenities (i.e. availability of open spaces, public services, and condition of the neighbourhood dwellings), and market attributes are needed to be explored.

7.2.Implications of Household Reinvestment Behaviour at Macro Level

Hh's reinvestment decisions have broader implications at the macro level beyond Hh's individual well-being. Understanding the aggregate outcomes of individual reinvestment behaviour can provide inputs in the designation of macro objectives in housing policies and urban planning. Based on the findings of the study, a number of implications at the macro level can be identified for the Turkish cities.

Reinvestments in existing housing stock are significant components of housing investments in urban Turkey. Annual value of urban Hhs' RM expenditures in single family houses and flats is calculated to be approximately 714 million Euro in 2004 (TURKSTAT, 2004b). This

volume is actually an underestimate since it is based on monthly data where seasonal differences in reinvestments and payments done in instalments are disregarded. Even though, total volume of Hhs' RM expenditures is significant in magnitude given that it corresponds roughly to 11 per cent of the private residential investments for new construction, and 25 000 new dwelling units could have been produced with that amount in 2004. The total volume of Hhs' RM expenditures is likely to increase as the building stock expanded and new construction materials are introduced in the market. Reinvestments in the existing housing stock and new residential investments could be considered as complementary mechanisms of housing investment policies.

Hhs' reinvestment expenditures have implications in construction sector and thereby in overall economy. Of the total volume of Hhs' RM expenditures in single family houses and flats realized in 2004, 43 per cent were payments for **professional RM services**, whereas 57 per cent were for **material purchases**. In other words, Hhs' reinvestments in the existing stock create demand for services and materials in the construction sector. In 2006, reinvestment works are estimated to represent 14 per cent of the internal market of construction materials industry, and 6500 registered firms, material and service providers, are known to exist in the sector by the same year (YEM, 2007). In times of fluctuations in the economy, considering that new investments are reduced, reinvestment activities may be a tool to stimulate production activity in the construction sector, and to maintain demand for labour.

Hhs' reinvestments help to adjust housing consumption with regard to the current needs and trends, and act as supply adjustment mechanisms in existing housing stock and neighbourhoods. Analysis with the Ankara Survey data displays that, reinvesting in the existing dwelling unit is a viable adjustment strategy for 28.5 per cent of all Hhs. Whereas this rate increases to 31 per cent for owner-occupiers, and decreases to 19.5 per cent for tenants. For some Hhs move-reinvest is also an alternative way of adjustment (4 per cent of all Hhs). In the case of owner-occupiers, Hhs who employ move and reinvest strategy together are usually first time homeowners.

Furthermore, in the Ankara Survey almost 11 per cent of all owner-occupiers have annual reinvestment expenditures above 1500 Euro. This corresponds to 35 per cent of all repairer owner-occupiers. Considering that kitchen-bathroom remodelling, and replacement of floor

covering, electrical system / plumbing, door / window frames are among the most common types of reinvestment works for these Hhs, it can be argued that reinvestments act as a supply adjustment mechanism in existing housing stock at least for one tenth of all owner-occupiers in the Ankara case. As the stock ages, and opportunities favouring reinvestments in the market expand (in terms of specialized firms on turn-key projects, new materials, and new design options) comprehensive upgrading operations are more likely to be observed.

Hhs' reinvestment decisions have implications in the depreciation of housing and thereby for neighbourhood quality. Almost all of the housing stock (both owner-occupied and rented) in Turkey is privately owned, and all types of reinvestments are totally dependent on Hhs' decisions in the free market. Therefore, Hhs' reinvestment decisions have a crucial role in the future of nation's housing stock and neighbourhoods. As mentioned above, total volume of Hhs' reinvestment expenditures are not negligible in the Turkish cities. Though, empirical analyses in this study display that there are Hhs who are unable or unwilling to reinvest to their dwellings or dwellings which are unlikely to receive reinvestments. Two of such cases identified both by HBS and the Ankara Survey findings are as follows:

1. **Rental stock:** Both theory and empirical evidence in the literature supports the argument that owner-occupied housing units tend to be better maintained than rental units. In the Turkish case, empirical evidence displays that tenants' reinvestment expenditures in the rented stock are quite low compared to owner-occupiers' expenditures in owner-occupied sector. As the Ankara Survey reveals, most of these expenditures are known to be for non-discretionary RM works. Repairer tenants more frequently engage in painting, regular RM, and repairs in electrical system or plumbing which are essential works for their own consumption. Further investigation of reinvestments in rented sector by rental stock owners is required in order to understand the extent of disrepair in this part of the stock. It is a fact that rental stock owners undertake reinvestment works with investment considerations only, either to secure their initial investments or to capitalize higher rental income where possible. In other words, high rates of depreciation and loss of quality are more likely to emerge in neighbourhoods where rented dwellings dominate the housing stock.
2. **Lowest income Hhs:** Similar to previous findings in the literature Hh income affects Hhs' reinvestment decisions in the Turkish case. HBS displays that lowest income Hhs are less likely to undertake RM works and to engage in voluminous RM expenditures. Ankara

Survey only partially supports this finding revealing that lowest income Hhs spend less for reinvestments compared to other income groups. Both databases indicate a match between Hhs in the lowest end of income scale and lowest end of housing stock in terms of dwelling age (HBS), dwelling size, rental value, and land value (Ankara Survey). In other words, Hhs who are unable / unwilling to maintain their dwellings already occupy the stock where deterioration is more likely due to aging and overutilization compared to other dwellings. Therefore, high rates of depreciation and loss of quality are expected to appear in neighbourhoods where lowest income Hhs are concentrated.

Ankara Survey identifies additional circumstances where Hhs refrain from undertaking reinvestment works:

3. **Poor neighbourhood environment:** Hhs' perceptions of their neighbourhood environment clearly affect their reinvestment decisions in the case of Ankara. RM works are less likely for Hhs' who rated their neighbourhood environment as extremely poor or below the average. This is particularly true for owner-occupiers. Lack of reinvestments in neighbourhoods where the environment is already in poor quality is expected to trigger neighbourhood decline. In the long run, the rate of rental dwellings and lowest income Hhs are likely to increase in these types of neighbourhoods which can further accelerate neighbourhood decline.
4. **Lack of RM in common parts of the apartment:** Empirical results display that, RM works undertaken by joint efforts of flat owners in common parts of the apartment block (i.e. exterior / interior painting, insulation, roof / elevator repairing, and installations / infrastructure repairing) trigger individual reinvestment decisions and large scale reinvestment works. On the contrary, lack of these activities discourages Hhs' reinvestments in their independent parts. It must be noted that 70 per cent of the tenants in the Ankara Survey reside in the apartments where no RM in common parts is reported. Whereas only 43 per cent of owner-occupiers live in the same conditions. It may be concluded that, in apartment blocks where rate of owner-occupancy is lower, flat owners abstain from maintaining common parts. This in turn decreases the likelihood of individual reinvestment decisions (both for owner-occupiers and tenants), and size of the expenditures (for owner-occupiers) in these apartments. As a result, in the long run loss of quality and higher rates of depreciation are more likely in apartment blocks which are not

maintained in good order. Therefore special policy measures are required to ensure the maintenance of common parts of apartment blocks to prevent loss of quality.

As outlined above, Hhs' reinvestment decisions have aggregate outcomes in existing housing stock and neighbourhoods, as well as in overall economy. Therefore, reinvestment decisions comprise a major social policy area and a significant topic of research and implementations in urban planning. Comprehensive information about internal dynamics of Hhs' reinvestment behaviour are essential to understand implications of the individual decisions at the macro level and thereby structuring complementary policies in the housing system.

7.3.Scope for Reinvestment Policies

Policies aiming to improve housing and living conditions in existing housing stock and neighbourhoods cannot be considered independent from the major actor of reinvestments, Hhs, and their investment capacities. Reinvestment policies could be targeted especially to Hhs who are unable / unwilling to reinvest in their dwellings or dwelling units which are in urgent need of reinvestments. There may be several policy options to ensure reinvestments in existing housing stock and urban environments. It is beyond the scope of this study to evaluate all of them here, though a number of examples can be reviewed. For instance, given the low levels of reinvestment expenditures and high rates of depreciation observed in rental stock, policy proposals concerning related parties may be developed. Tenants may be granted rights to deduct essential RM costs from rental payments. Additionally, income tax exemptions may be provided to owners of the rental stock proportional to their reinvestment expenses and shadow rents. However, additional measures have to be taken to protect tenants from speculative rent increases when reinvestments are undertaken by owners of the rental stock. Tax deductions proportional to reinvestment expenditures may also be a valid strategy to trigger reinvestment capacities of owner-occupiers. Moreover, to facilitate Hhs' reinvestments, local authorities could offer aids in terms of construction materials, technical advice and procedural organizational facilities in rehabilitation work. Value added tax (VAT) exemptions (or compensations) for materials used in reinvestments could be applied in some locations specified by local authorities, in response to aged stock or in neighbourhoods with adverse characteristics. In such cases, availability of amenities improving domestic comfort at

agreeable costs may encourage Hhs' reinvestments. Private firms, specialized in reinvestment works, could also be encouraged and promoted.

Other proposals could also be advanced as alternatives to policies of large scale and expensive 'urban transformation' operations. In a set of local cases comprehensive redevelopment could represent a superior alternative to combat urban misery, unauthorized uses and construction, and to maintain improved total seismic safety, higher environmental quality, and intermediary levels of urban management (Balamir, 2002, 2005). Reinvestments in distinct housing environments may require different types of tools and mechanisms. Perception of the problem as a local one with its own constraints and potentials is necessary to develop flexible frameworks and adaptable mechanisms. Such an approach could have immediate contributions to increase the quality of life in cities.

7.4.Recommendations for Further Studies

This research could be considered as an initial step in the exploration of Hhs' reinvestment behaviour in existing housing stock in terms of its determinants and aggregate outcomes in the Turkish case. It suggests a number of directions and recommendations for future research. Accordingly, an essential task for further studies is developing new measures to obtain necessary information (e.g. condition of dwelling, previously undertaken reinvestments, neighbourhood and market attributes) to investigate Hhs' reinvestment decisions thoroughly. Designing effective reinvestment policies is dependent upon the availability of reliable databases. It is clear that HBS is not a sufficient database alone for a comprehensive understanding of reinvestment trends and requirements in Turkey. Therefore, designing and implementing sample surveys in **distinct housing environments** could be a significant contribution to provide inputs for reinvestment policies. A further area of study could be evaluating the performance of alternative estimation approaches in explaining likelihood of reinvestment decisions (i.e. discriminant analysis vs. logistic regression) and size of the reinvestment expenditures (i.e. logistic regression vs. multiple regression). Such a methodological consideration could be a valuable contribution for the future studies aiming to investigate Hhs' reinvestment decisions. Another focus for studies could be exploring reinvestment behaviour of rental stock owners in private rented dwellings. This is a necessary task to be fulfilled in order to understand the extent of disrepair in rental sector and to develop measures for maintenance of the rental stock. Similarly, investigating the determinants of

different types of reinvestments (e.g. kitchen-bathroom remodelling, regular RM), the factors affecting the choice between do-it-yourself and contractor works may also provide insights into the nature of Hhs' reinvestment behaviour.

Since, Hhs' reinvestment behaviour is a key to improve standards of living and quality in existing housing stock and neighbourhoods, a better understanding of Hhs' reinvestment decisions could lead to more effective housing policies in the Turkish cities. Comprehensive information about internal dynamics of Hhs' reinvestment behaviour based on indicators concerning characteristics of Hhs, dwellings, and neighbourhoods, and market factors are necessary. Systematic information on adjustment strategies adopted by Hhs, scale and types of reinvestment work, volume of reinvestment expenditures, and the motivation underlying these investments (consumption or investment purposes) are essential for structuring complementary policies in the housing system.

This study could be considered to achieve its aims if the internal dynamics of reinvestment decisions in the Turkish case are exposed to some extent and the role of Hhs' reinvestment decisions in the future of existing housing stock and neighbourhoods is highlighted.

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APPENDIX A: Review of Previous Studies

Author		Winger (1973) – USA	Mendelsohn (1977) – USA	Mayer (1981) – USA
Definition of Reinvestment		Upkeep: Expenditures for maintenance, repair, and replacement	Improvement: Alterations and repairs	Rehabilitation: Replacements, alterations, additions, and certain substantial repairs.
Actor		Owner-occupants	Owner-occupants	Individual Landlords
Options		Normal maintenance Do nothing	Improve Do nothing	Rehabilitate Do nothing
Data		1. Federal Housing Administration area summaries of estimates of the "yearly cost of maintaining the physical elements of the property to prevent acceleration of deterioration and to assume safe and comfortable living conditions" (1966-67). 2. The Survey of Consumer Finances, annual surveys of a probability sampling of the total population (1964-65). Includes observations on Hh estimates of actual expenditures on improvement and repairs.	A national sample of 'Residential Alterations and Repairs' collected quarterly by the Census (1971-72). Detailed descriptions on the type of repairs and alterations made, the amount of each expenditure, who did the work, whether money was borrowed, and how much money was spent on materials, value and age of the dwelling; information about the owner.	A data set in the Berkeley, California housing market, covering randomly selected structures within building size classes (5% of single-family, 10% of duplexes and triplexes, and 20% of larger buildings). The subset of those structures which contained one or more rental dwellings formed the sample for this study.
Sample Size		-------	5539 observations on individual owner-occupiers	1028 structures in Berkley
Variables	**Dependent**	Upkeep Expenditure	Probability of nonzero expenditures - size of nonzero expenditures	Likelihood of rehabilitation expenditure
	Dwelling Ch.	Size (sq m), engineering and structural adequacy (availability of septic tank, built-in garage), condition (age)	House value, age of dwelling	House value, age of house, size of house (floor area, number of rooms), relative building condition, condition of exterior, condition of porches, stairs, railings, condition of roof, condition of electrical system, condition of plumbing, condition of foundation, # of dwelling units, time since remodelled, whether remodelled
	Hh Ch.	Family income, age of HhH (25-34, 35-44, 45-54, 55-64, over 65), education status of HhH (elementary/high school-no degree, high school-degree, college-no degree, college-degree)	Income, owner's age (35-44, 45-64, 65+), duration of occupancy, race	Owner on parcel, owner elsewhere, firm ownership
	Neighbourhood Ch.	-------	Physical location in region, urban-suburban	Condition of curbs, gutters, sidewalks; noise; traffic; condition of surrounding structures; non-residential uses; density; crime; race
	Other	-------	------	Zoning
Method		Linear regression	Sequential model: logit model for the probability of nonzero expenditures and linear model with OLS estimates of the coefficients for the size of nonzero expenditures.	Conditional logit analysis with outcomes- some or no rehabilitation

Continued...

Author		Shear (1983) – USA	Boehm & Ihlanfeldt (1986) – USA	Montgomery (1992) – USA
Definition of Reinvestment		Rehabilitation: Alterations and replacements. Alterations alter the decor or add a new element to the housing unit without the use of additions.	Improvement	Improvement: Any expenditure which adds to the value of the depreciating stock is an investment in the existing stock, thus seen as improvement.
Actor		Owner-occupants	Owner-occupants	Owner-occupants
Options		Move, move-improve, improve	Improve, do nothing	Move down, move up, do nothing, improve
Data		Annual Housing Survey for the years 1974, 75, 76, 77. Observations come from a group of fifty large SMSAs for single-family, detached, owner-occupied housing units. Central city or suburban status is identified. The data covers the information whether the rehabilitation was undertaken but not the dollar expenditure.	Neighbourhood Housing Services Project data, covering a sample of homeowners reside in single-family detached housing units located in 20 neighbourhoods in different cities. 1978-80.	American Housing Survey. Covers information about the Hh, dwelling, and neighbourhood characteristics of the surveyed occupants of selected dwellings.
Sample Size		5271 non-mover Hhs in the 2 years between 1974-1976	367 improver Hhs	16126 Hhs
Variables	**Dependent**	1. Non-movers (a)alter once, (b)alter more than once, (c)replace once, (d) replace more than once; 2.Movers (a)alter once or more, (b)do not alter, (c)replace once or more, (d)do not replace	Expenditure on maintenance and improvements	Likelihood and level of improvement
	Dwelling Ch.	Age of house (built between 1940-49, 1950-59, 1960-68, 1969-74), condition of the building, number of rooms	Age of house, number of rooms, condition (good=1, fair or poor=0)	Housing stock, dwelling age, house quality, lot size, basement, 2+ floors
	Hh Ch.	Life cycle (depending on Hh head age: 30-39, 40-49, 50-59, 60+), marital status, change in Hh size, Hh income, race, mobility of Hh head (between years 70-73 and 73-74)	Age of head, predicted mobility, average real income, crowding (more than 1.0 per/rm), excess space (less than 0.4 per/rm)	Age of householder, marital status, Hh size, education level, race, Hh income, length of stay
	Neighbourhood Ch.	Neighbourhood evaluation of Hh (good, excellent, worse in 1976 than 1974, better in 1976 than 1974), property tax rate	Crime problem, adequacy of schools, % of blocks with –good sidewalks, no litter, good road surface, structures with no defect-, neighbourhood mean tax rate	Neighbourhood quality
	Other	Locational characteristics: rate of growth of the SMSA population between 1960-70, location (central city, suburb)	Price of non-housing goods, Construction cost index	Population growth, geographic location (urban-suburb), house price index, house price growth, property tax rate, building cost index, improvement subsidy, Hh labour
Method		Multinomial logit analysis	OLS estimation of magnitude of maintenance and improvement expenditure	Ordered probit models, estimation of improvement expenditure equations

Continued...

Author		Littlewood & Munro (1996) – UK	Baum & Hassan (1999) – AUSTRALIA
Definition of Reinvestment		Repairs and Improvements	Alterations and renovations
Actor		Owner-occupants	Owner-occupants
Options		Improve Do nothing	Moving, changing aspirations or preferences and staying, renovating, or some combination of a, b or c.
Data		1991 The Scottish House Condition Survey containing information such as what works owner occupiers (and landlords) did, how works were done, how they were paid for and how satisfactory they were. Owners' perception of their house and neighbourhood is also covered as well as basic Hh and dwelling characteristics.	1991 Housing and Location Preference Survey carried out in Adelaide, South Australia by the Australian Bureau of Statistics. Contains information regarding many facets of housing and location preferences. Includes a description of renovations undertaken by Hhs. Randomly selected sample of Hhs surveyed by using a structured survey questionnaire. Face to face with Hh head or partner.
Sample Size		Almost 12000 Hhs	2019 mover and non-mover improver Hhs
Variables	Dependent	Incidence of Disrepair, likelihood of doing improvement	Renovation behaviour
	Dwelling Ch.	Dwelling age (built before 1919, 1919-1945, 1945-1964, built after 1964), number of rooms (4 or less rooms, 5, 6, 7 or more rooms), size of the dwelling (69 sqm or less, 70-89, 90-110, more than 110sqm), type of the dwelling (detached, not detached, tenement flats, four in a block flats, other flats), outstanding costs to repair (less than £25, £25-£305, £305-£1026, more than £1026)	Dwelling age, purchase price,
	Hh Ch.	Age of the HhH (16-24, 25-39, 40-59, 60-64, 65-74, 75-80, over 80), Hh savings, Mobility (moved in 1989 or later, 1986-1988, 1981-1985, 1971-1980, moved in before 1971), Right to Buy owner or not, Evaluation of Dwelling Condition (good, neither good nor poor, poor), Hh size, Hh income	Hh size (1,2,3,4+), life cycle (combination of Hh type and age: singles less than 35, young couples aged less than 35, singles aged 35-64 years, singles and couples aged 65+, couples with children, and single parents), Hh income (3 categories), length of residence (less than 2 years, 3-5 years, 6-10 years, 11-20 years, 21+).
	Neighbourhood Ch.	Existence of burglary, repair and improvement activity in the neighbourhood	Metropolitan location (inner, middle, outer metropolitan)
	Other	Location (urban, rural)	-------
Method		Logit analysis, Multiple Classification Analysis for comparing different factor groups	Logistic regression

APPENDIX B: Data of the Figure 3.4 and Method of Estimating Stock Losses

DATA

Hhs: Census of Population is the basic source of data on Hhs. Yet, the latest figures available are for year 2000. Therefore, estimates of the Household Budget Surveys (HBS), which are obtained from Hh Consumption Expenditure Database (2002-06), are employed for 2005 and 2006. Both the censuses and budget surveys provide combined numbers of Hhs accommodated both in the authorised and unauthorised part of the stock.

Dwellings: Building Permit Statistics (named as Building Construction Statistics earlier) is the basic information source on authorized housing production. In this study, annual figures on 'construction permits' are employed to estimate number of urban dwellings. Number of all urban dwellings (authorized and unauthorized) is obtained from Building Censuses of 1965, 1970, 1984, and 2000. Number of existing dwellings in 2006 is an estimate based on the data of Building Census 2000 and Building Permit Statistics.

Stock Losses: In Turkey reliable loss records do not exist. Therefore, statistics provided by the Building Census of 2000 on 'uninhabitable residential buildings and buildings planned to be demolished' are employed in order to estimate losses from the stock. These statistics are provided both for authorised and unauthorized part of the stock. Moreover, for the losses of 1999 earthquakes official records are adopted.

METHOD

Number of uninhabitable buildings and buildings that are planned to be demolished are available in the Building Census of 2000 with respect to age of the residential buildings. From this statistic percentage of the expected losses for age cohorts are derived as follows:

Age of the Building	1-10 years	11-20 years	21-30 years	31-40 years	41-50 years	51-60 years
% of Losses from the Existing Inventory	0	0	1	3	6	8

Accordingly, if 100 residential buildings are constructed today, 1 of them will probably be lost in the next 30 years. In the fourth decade, another 3 per cent of the remaining stock (99 buildings) will possibly be lost, and so on.

These rates are applied to the annual housing production of Turkey to estimate the number of surviving stock built during 1955-2006. Moreover, earthquake losses of 1999 are also separately considered. According to SPO (2000) 93,000 dwelling units became uninhabitable in the 1999 earthquakes. As a result, nearly 313,250 dwelling units are calculated as a stock loss.

APPENDIX C: Questionnaire Form and Implementation Method of Household Budget Survey (2004)

QUESTIONNAIRE FORM

Questions presented below are obtained from HBS questionnaire form (2004). Original questionnaire form is 89 pages organized in 11 sections which cover questions about socio-economic characteristics of Hh, attributes of the dwelling occupied by Hh, consumption expenditures, non-consumption expenditures, employment status and income, etc. It is impractical to present the original questionnaire form here, thus only the questions regarding the variables employed in 5th Chapter of this research are given below[121]. Question numbers indicated here refer to the original question numbers in the HBS.

Q 2.1 Record the individuals in the household.

Id	Name	Sex	**Age**	Relationship to Head of Hh
1				
2				
3				
--				

Q 2.2 What is the **type of household**?

	Hh Type	No child			Under 18 years child	At least one child above 18 years
Nuclear Family	Single child				1	2
	Two children				3	4
	Three or more children				5	6
	No child		7			
Extended Family			8		9	10
Single Parent			11		12	13
Non-family (students, labours, etc.)			14			
Other Family			15			

Q 3.1 What is the **type of dwelling** you occupy?

Single family house
Detached.....1 Attached.....2
Apartment (less than 10 flats)
Basement.....3 Normal Flat.....4 Duplex.....5
Apartment (10 and more flats)
Basement.....6 Normal Flat.....7 Duplex.....8
Squatter Housing.....9 Other (specify)..…....10

[121] It must be noted that 'Hh income' variable is not directly obtained from a single question in the HBS questionnaire. Rather TURKSTAT calculates 'annual Hh income' employing several questions and tables. These questions and tables are not possible to present here.

Q 3.2 What is the **mode of tenure** in your dwelling?
Owner-occupier.....1 Tenant.....2
Lodging.....3 Other (privileged tenants).....4

Q 3.3 How much **rent** is paid per month for this dwelling?

Tenant _ _ _ _ _ _ _ _ _ _ _TL
Lodgings _ _ _ _ _ _ _ _ _ _ _TL
Other (privileged tenants) _ _ _ _ _ TL

Q 3.6 In current market conditions, approximately how much per month would it cost to rent this dwelling (**imputed rent**)?

Owner-occupier _ _ _ _ _ _ _ _ _ _ _ _ _ TL
Lodgings _ _ _ _ _ _ _ _ _ _ _ _ _ TL
Other (privileged tenants) _ _ _ _ _ _ _ TL

Q 3.10 How long has the household been resident in this accommodation? _ _ Years

Q 3.11 In which **year** the accommodation was **built**? _ _ _ _ Year

Q 3.16 How many **rooms** are there in your accommodation (including living/dining rooms) and what is the size of dwelling in square meters?
Number of rooms _ _ Size of the dwelling _ _ _ sq meters

Q 6.4 HOUSING, WATER, ELECTRICITY, GAS AND OTHER FUELS
(This table design is valid for all consumption expenditures)

Id	Name of the Consumption	Brand	Type and detailed description	Unit Kg Number Package	Amount	Unit Market Price (TL)	Total Value (TL)	Paid in Advance (TL)	Place of purchase	Period of Purchase
	01	02	03	04	05	06	07	08	09	10
04.3.1 – Materials Used for Repairs and Maintenance of the Dwelling										
01				_ _						
02				_ _						
03				_ _						
..				_ _						
..				_ _						
SUM										

Q 8.62 If you have money invested in stocks and shares listed below please state dividend/interest paid or credited to you during the past 12 months.
a- From deposit/savings accounts of Turkish Lira _ _ _ _ _ _ _ TL
b- From deposit/savings accounts of foreign currency _ _ _ _ _ _ _ TL
c- From government or private sector bonds and bills _ _ _ _ _ _ _ TL

IMPLEMENTATION METHOD

HBS (2004) covers observations on individual Hhs collected through January 1st – December 31st. Each month 720 Hhs were surveyed. Total sample size is 8640 Hhs. In other words, Hhs were not followed up for the entire year. Therefore, consumption expenditures obtained from HBS are ***average monthly expenditures***.

Stratified two stage cluster sampling was adopted as the sampling method. Geographic coverage of the survey is all of the settlements within the borders of the Republic of Turkey. The sampling was based on a two stage stratification of urban areas (with 20 001 and more inhabitants) and rural areas (with 20 000 and less inhabitants). The basic source of sampling for areas within the municipal boundaries was the Building Census (2000) and the Numeration Study (2000). In areas outside municipal boundaries (villages), results of 1997 Census of Population was employed. First, sample blocks were identified from the above mentioned data sources. Then new blocks were established with reference to population size. Hhs (major units of observation) were drawn in the third step, based on the address updating lists of these blocks considering the information on education, employment, occupation, ownership status of Hh head, total Hh size and etc.

Three basic methods were adopted to collect data: interviewing, regular recording, and questionnaire. First, Hhs were interviewed to obtain information on social-economic status, employment status of family members, income, etc. Second, Hhs were asked to record every expenditure items daily to the 'expenditure diaries' provided by the TURKSTAT throughout the survey month, and the expenditure data was compiled from these records. The rest of the data was collected by the questionnaire itself. Through the implementation process, surveyors visited Hhs several time. Implementation schedule for surveyors and list of works done through the implementation process are presented below.

Timing of Visits	Purpose of Visits
Before the Survey Month If Hh head is not available in the first visit, a second visit is arranged.	-Surveyor introduces the purpose, scope, implementation steps of the survey to secure the cooperation of Hh. -Questions regarding socio-economic characteristics of Hh, attributes of the dwelling, consumption patterns of Hh are completed. -Hh is explained how to fill the 'expenditure diaries' and these diaries are left to Hh.
1st Week Hh is visited twice.	- Surveyor examines the Hh expenditure diaries and transfers the recorded information to original questionnaire. -Questions regarding non-consumption expenditures, payments, savings, investment expenditures, and income are completed.
2nd Week Hh is visited twice.	- Surveyor examines the Hh expenditure diaries and transfers the recorded information to original questionnaire.
3rd and 4th Weeks Each week one visit is arranged.	- Surveyor examines the Hh expenditure diaries and transfers the recorded information to original questionnaire.
After the Survey Month Last visit.	- Surveyor examines the Hh expenditure diaries and transfers the recorded information to original questionnaire. Expenditure diaries are taken from the Hh. -Questions regarding Hh composition, employment status, and income are completed.

APPENDIX D: Data Preparation – Reduction and Transformation of the Household Budget Survey (2004) Data

DATA PREPARATION AND REDUCTION

An essential task before conducting any analysis with any database is the preparation of data which means labelling and coding variables, and checking and correcting errors. HBS data was already labelled by TURKSTAT and codes were prepared as a separate text file. Two basic methods are employed for inspection of the errors related to invalid data entries and missing values[122]. For categorical variables **frequency tables** were obtained and the range of responses (minimum and maximum values) was controlled. No coding error and no missing information was detected for the categorical variables. For continuous variables **descriptive statistics** were employed as a tool for inspecting errors. Minimum, maximum and the mean values were observed to detect any unusual value. Only one variable, 'age of dwelling', displayed unusual minimum values. This variable was further explored sorting the data, and 7 cases were detected to be coded erroneously out of range. Cross-checking with another variable 'duration of occupancy', these errors were corrected. Furthermore, variables 'Hh income' and 'RM expenditures' displayed a number of extremely low and high values. Yet, these cases were not dropped from the sample since they are not errors but real life observations.

Original data provided by HBS covers 8544 observations collected over rural and urban parts of the Turkey. Cases corresponding to urban Hhs (5985 cases) are employed in this part of the study. HBS data provides observations on Hhs living in apartment blocks (64.6 per cent), single family houses (32.5 per cent), squatters (2.7 per cent), and other types of houses such as prefabricated ones (0.2 per cent). This study investigates basically reinvestment decisions in the apartment blocks. Hhs' reinvestments in single family houses are also considered as significant and included in the empirical investigation. However, Hhs living in squatter houses (164 cases) and in other types of houses (12 cases) are dropped from the sample. Furthermore, this study investigates reinvestment behaviour of Hhs living in privately owned dwellings. Therefore, Hhs living in public housing / lodgings (30 cases) are also excluded. During the initial analysis of raw data, a single case was detected to be a multivariate outlier, thus it is also excluded from the analysis. ***The remaining 5778 cases are analysed in this part of the study.***

TRANSFORMATION OF THE DATA

Data on consumption expenditures and Hh income are provided in the HBS as actual monetary values in Turkish Lira (TL). Since January 2005, currency of Turkey is new Turkish Lira (TRY), which is equal to 1,000,000 TL. Therefore in the first step, all monetary values were converted to TRY. Variables categorized under consumption expenditures (e.g. RM expenditures, monthly rent) are provided by TURKSTAT as ***average monthly expenditures***. Since, Hhs were asked to record their expenditures in the survey month, information gathered has different reference periods[123]. On the contrary, data on 'Hh income', one of the key independent variables of this research, is originally inflated to December 2004 by

[122] This inspection is undertaken by the aid of SPSS program, version 11.5.
[123] The change in the cost of a fixed basket of products and services is 8.63 per cent between January-December 2004.

TURKSTAT. Therefore in the second step, all expenditure values were inflated to the end of survey year, December 2004. First, Hhs were ordered with respect to their survey month, then an index value (monthly inflation rate) was assigned to them in order to inflate all monetary values to December. 'Survey month', as a separate variable, is not provided by TURKSTAT in the raw data of HBS. Yet, each of the surveyed Hhs are given a unique and ordered 'id number'. Since 720 Hhs were surveyed in each month starting from January, 'survey month' can be inferred with absolute precision from the 'id number' provided in the raw data. At the final stage, December 2004 TRY values were converted to Euro with the average conversion rate of the same month **(1 Euro = 1.85 TRY)**. ***Therefore, all monetary values employed in the analyses are Euro and represent 2004 prices.***

'Hh income', on the other hand, is provided by TURKSTAT as annual income. Since all of the consumption expenditures are monthly, employing average monthly income in analysis is useful. Hh income was recalculated (divided by 12) in order to obtain average monthly income.

APPENDIX E: Logistic Regression Technique and the Associated SPSS Outputs

LOGISTIC REGRESSION[124]

Logistic regression is a flexible technique which helps to handle multivariate analysis. Logistic regression is useful in predicting a dependent variable (group membership) on the basis of independent variables, and to evaluate the individual and total impact of independent variables on the odds of observing a particular outcome. Continuous, discrete, dichotomous variables or a mix of them can be employed as independent variables in this method. The dependent variable has to be discrete with two or more categories. **Binary logistic regression** method is a special type of logistic regression which is appropriate when the dependent variable is a dichotomy, i.e. zero or nonzero RM expenditures. When the dependent variable has multiple categories which can be ranked, i.e. RM expenditure categories, then **ordinal logistic regression** is a convenient method to apply. Logistic regression evaluates the probability of an event (i.e. likelihood of RM decision), given the factors related to that event (i.e. Hh characteristics).

Logistic regression equation can be written as:
$\theta = (e^{u}) / (1+e^{u})$
Where θ is the estimated probability of an outcome / event (i.e. has done RM), and u is the usual linear regression equation:
$u = \alpha + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_i X_i$
The same model can be expressed as:
$\ln(\text{prob(event)} / (1-\text{prob(event)}) = \alpha + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_i X_i$

The quantity to the left of the equal sign is called a logit. The coefficients in the logistic regression model indicate the changes in the logit based on the values of the independent variables. In ordinal logistic regression there is more than one logistic regression equation. If the dependent variable has k categories then there are k-1 equations. An equation is solved for each category except the last one. First equation finds the probability that a case is above the lowest category. The second equation finds the probability that the case is above the second category, and so on.

BINARY LOGISTIC REGRESSION

In binary logistic regression output of the SPSS the following tables are usually observed:

Case Processing Summary: Displays the cases included in the analysis, missing cases, and unselected cases.
Dependent Variable Encoding: Displays the reference (coded 0) and response (coded 1) categories for the dependent variable. Logistic regression equation in SPSS is always solved for the category coded 1.
Categorical Variables Coding: Prior to analysis, discrete variables have to be recoded into dummy variables. There must be one fewer dummies than there are categories. This section of the output displays the dummy (dichotomous) coding for discrete variables. The category

[124] More details on the Binary Logistic Regression and Ordinal Logistic Regression methods can be found in Tabachnick & Fidell (2001), Norusis (2008), and Garson (2009a, 2009b). The information provided in this section is fundamentally derived from these sources.

coded as 0 indicates the reference category and other categories are evaluated in comparison to the reference category.

Omnibus Tests of Model Coefficients: Displays the comparison of the constant-only model with the full model based on the chi square test. A significant chi square value indicates that the independent variables, as a set, reliably predict the dependent variable. In other words, if chi square test is significant, then there is adequate fit of the data to the model.

Model Summary: Displays the log likelihood difference of the constant-only and full model which the model chi square test is based. Additionally, as measures of effect size, SPSS provides Cox and Snell's R^2, and Nagelkerke's R^2. These measures are approximations to R^2 provided in linear regression. Cox and Snell's R^2 can not achieve a maximum value of 1 and thus it is normally lower than the Nagelkerke's R^2 which modifies Cox and Snell's R^2 to vary from 0 to 1.

Hosmer and Lemeshow Goodness-of-Fit Test: This test is provided by SPSS on request. It is a test for overall fit of a binary logistic regression model. A non significant value indicates that the model adequately fits the data. This test is preferred over classification tables when assessing model fit.

Classification Table: It is a cross tabulation of the observed and predicted values of the dependent variable. It displays the predictive success of the model in correctly classifying the outcome category. Classification table of the constant only model is usually compared with the classification table of the model defined by the user.

Variables in the Equation: Displays unstandardized beta coefficients (B), standard error of beta (S.E.), Wald statistic derived from B and S.E., significance of the Wald statistic, and Exp(B) (odds ratio) for each independent variable and constant term. Significant Wald statistic means that the parameter is significant in the model. Positive or negative beta coefficients indicate that independent variable increases or decreases the probability of the event of interest. Values close to 0 indicates that the variable does not change the probability of the event much. Odds ratio, on the other hand, is usually employed to explain the impact of predictor variables on the probability of an event. It is the predicted change in odds for a unit increase in the corresponding independent variable. Ratios less than 1 correspond to decreases whereas ratios more than 1 correspond to increases in odds. Values very close to 1 indicate that unit changes in that independent variable do not affect the dependent variable.

SPSS OUTPUT FOR BINARY LOGISTIC REGRESSIONS

1. Likelihood of RM Decisions: All Hhs (HBS Data)

Case Processing Summary

Unweighted Cases		N	Percent
Selected Cases	Included in Analysis	5778	100
	Missing Cases	0	0
	Total	5778	100
Unselected Cases		0	0
Total		5778	100

Categorical Variables Coding

		Frequency	Parameter coding			
			(1)	(2)	(3)	(4)
Hh Income (Income Quintiles)	Lowest (REF)	1155	0	0	0	0
	Low	1156	1	0	0	0
	Medium	1156	0	1	0	0
	High	1156	0	0	1	0
	Highest	1155	0	0	0	1
Duration of Occupancy	1 Year or Less	628	1	0	0	
	2-10 Years	3026	0	1	0	
	11-40 Years	2030	0	0	1	
	More than 40 Years (REF)	94	0	0	0	
Season	Winter (REF)	1457	0	0	0	
	Spring	1436	1	0	0	
	Summer	1442	0	1	0	
	Autumn	1443	0	0	1	
Mode of Tenure	Owner-occupier	3766	1	0		
	Tenant_privileged	370	0	1		
	Tenant (REF)	1642	0	0		
Savings	No Savings (REF)	5616	0			
	Some Savings	162	1			

Dependent Variable Encoding

Original Value	Internal Value
Non-repairers	0
Repairers	1

CONSTANT ONLY MODEL

Classification Table[a,b]

Observed			Predicted		
			Probability of Repairers		Percentage Correct
			Non-repairers	Repairers	
Step 0	Probability of repairers	Non-repairers	5092	0	100
		Repairers	686	0	0
Overall Percentage					88.1

a Constant is included in the model
b The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	-2.005	.041	2429.227	1	.000	.135

MODEL DEFINED BY USER

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	118.143	16	.000
	Block	118.143	16	.000
	Model	118.143	16	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	4092.625	.020	.039

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	3.506	8	.899

Classification Table[a]

Observed			Predicted		
			probability of repairers		Percentage Correct
			Non-repairers	Repairers	
Step 1	Probability of repairers	Non-repairers	5092	0	100
		Repairers	686	0	0
	Overall Percentage				88.1

a The cut value is .500

Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B) (Odds Ratio)
Mode of Tenure						
Tenant			2.76	2	.251	
Owner-Occupier	.02	.11	.03	1	.869	1.02
Privileged Tenant	.28	.18	2.43	1	.119	1.32
Hh Income						
Lowest Income			46.27	4	.000	
Low Income	.52	.16	10.86	1	.001	1.67
Middle Income	.90	.15	35.05	1	.000	2.46
High Income	.89	.16	32.57	1	.000	2.44
Highest Income	.96	.17	33.46	1	.000	2.62
Savings						
Some Savings	.36	.22	2.68	1	.101	1.43
Duration of Occupancy						
1 Year or Less	-.80	.32	6.26	1	.012	.45
2-10 Years	-.78	.29	7.27	1	.007	.46
11-40 Years	-.56	.28	3.96	1	.047	.57
40+ Years			10.05	3	.018	
Monthly Rent						
Monthly Rent (in 50 Euros)	-.11	.04	8.71	1	.003	.90
Season						
Winter			20.40	3	.000	
Spring	.30	.12	5.82	1	.016	1.35
Summer	.53	.12	20.03	1	.000	1.71
Autumn	.37	.12	9.05	1	.003	1.45
Age of the Hh Head						
Hh Head Age (in 10 years)	.06	.03	2.81	1	.093	1.06
Dwelling Size						
Number of Rooms	.19	.06	8.55	1	.003	1.21
Constant	-3.09	.42	53.50	1	.000	.05

2. Likelihood of RM Decisions: Owner-occupiers (HBS Data)

Case Processing Summary

Unweighted Cases		N	Percent
Selected Cases	Included in Analysis	3766	100
	Missing Cases	0	0
	Total	3766	100
Unselected Cases		0	0
Total		3766	100

Dependent Variable Encoding

Original Value	Internal Value
Non-repairers	0
Repairers	1

Categorical Variables Coding

		Frequency	Parameter coding			
			(1)	(2)	(3)	(4)
Hh Income (Income Quintiles)	Lowest (REF)	541	0	0	0	0
	Low	724	1	0	0	0
	Medium	789	0	1	0	0
	High	833	0	0	1	0
	Highest	879	0	0	0	1
Duration of Occupancy	1 Year or Less	199	1	0	0	
	2-10 Years	1695	0	1	0	
	11-40 Years	1782	0	0	1	
	More than 40 Years (REF)	90	0	0	0	
Season	Winter (REF)	968	0	0	0	
	Spring	885	1	0	0	
	Summer	941	0	1	0	
	Autumn	972	0	0	1	
Savings	No Savings (REF)	3639	0			
	Some Savings	127	1			

CONSTANT ONLY MODEL

Classification Table[a,b]

Observed			Predicted		
			probability of repairers		Percentage Correct
			Non-repairers	Repairers	
Step 0	Probability of repairers	Non-repairers	3288	0	100
		Repairers	478	0	0
Overall Percentage					87.3

a Constant is included in the model
b The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	-1.928	.049	1551.974	1	.000	.145

MODEL DEFINED BY USER

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	65.518	14	.000
	Block	65.518	14	.000
	Model	65.518	14	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	2800.40	.017	.032

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	6.781	8	.560

Classification Table[a]

Observed			Predicted		
			probability of repairers		Percentage Correct
			Non-repairers	Repairers	
Step 1	Probability of repairers	Non-repairers	3288	0	100
		Repairers	478	0	0
Overall Percentage					87.3

a The cut value is .500

Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B) (Odds Ratio)
Hh Income						
Lowest Income			26.55	4	.000	
Low Income	.45	.21	4.71	1	.030	1.57
Middle Income	.87	.20	18.85	1	.000	2.39
High Income	.83	.20	16.28	1	.000	2.28
Highest Income	.95	.21	19.65	1	.000	2.58
Savings						
Some Savings	.43	.24	3.34	1	.068	1.54
Duration of Occupancy						
1 Year or Less	-.82	.37	4.82	1	.028	.44
2-10 Years	-.79	.30	6.80	1	.009	.46
11-40 Years	-.58	.29	4.01	1	.045	.56
40+ Years			8.38	3	.039	
Monthly Rent						
Monthly Rent (in 50 Euros)	-.10	.04	5.60	1	.018	.90
Season						
Winter			16.61	3	.001	
Spring	.25	.15	2.75	1	.097	1.29
Summer	.55	.14	14.74	1	.000	1.73
Autumn	.44	.15	9.33	1	.002	1.56
Age of the Hh Head						
Hh Head Age (in 10 years)	.02	.04	.34	1	.562	1.02
Dwelling Size						
Number of Rooms	.15	.08	3.68	1	.055	1.16
Constant	-2.73	.49	31.74	1	.000	.07

3. Likelihood of RM Decisions: Tenants (HBS Data)

Case Processing Summary

Unweighted Cases		N	Percent
Selected Cases	Included in Analysis	1642	100
	Missing Cases	0	0
	Total	1642	100
Unselected Cases		0	0
Total		1642	100

Dependent Variable Encoding

Original Value	Internal Value
Non-repairers	0
Repairers	1

Categorical Variables Coding

		Frequency	Parameter coding			
			(1)	(2)	(3)	(4)
Hh Income (Income Quintiles)	Lowest (REF)	516	0	0	0	0
	Low	352	1	0	0	0
	Medium	301	0	1	0	0
	High	254	0	0	1	0
	Highest	219	0	0	0	1
Duration of Occupancy	1 Year or Less	408	1	0	0	
	2-10 Years	1122	0	1	0	
	11-20 Years	99	0	0	1	
	More than 20 Years (REF)	13	0	0	0	
Season	Winter (REF)	399	0	0	0	
	Spring	455	1	0	0	
	Summer	415	0	1	0	
	Autumn	373	0	0	1	

CONSTANT ONLY MODEL

Classification Table[a,b]

Observed			Predicted		
			probability of repairers		Percentage Correct
			Non-repairers	Repairers	
Step 0	Probability of repairers	Non-repairers	1484	0	100
		Repairers	158	0	0
	Overall Percentage				90.4

a Constant is included in the model
b The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	-2.240	.084	716.433	1	.000	.106

MODEL DEFINED BY USER

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	28.246	13	.008
	Block	28.246	13	.008
	Model	28.246	13	.008

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	1011.82	.017	.036

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	3.753	8	.879

Classification Table[a]

Observed			Predicted		
			probability of repairers		Percentage Correct
			Non-repairers	Repairers	
Step 1	Probability of repairers	Non-repairers	1484	0	100
		Repairers	158	0	0
	Overall Percentage				90.4

a The cut value is .500

Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B) (Odds Ratio)
Hh Income						
Lowest Income			13.23	4	.010	
Low Income	.39	.27	2.14	1	.144	1.48
Middle Income	.74	.26	7.86	1	.005	2.10
High Income	.75	.28	7.01	1	.008	2.11
Highest Income	1.00	.31	10.57	1	.001	2.71
Duration of Occupancy						
1 Year or Less	-1.23	.72	2.91	1	.088	.29
2-10 Years	-1.23	.70	3.09	1	.079	.29
11-20 Years	-.95	.74	1.65	1	.199	.39
20+ Years			3.59	3	.309	
Monthly Rent						
Monthly Rent (in 50 Euros)	-.18	.10	3.37	1	.066	.84
Season						
Winter			3.22	3	.358	
Spring	.21	.25	.75	1	.386	1.24
Summer	.42	.24	3.01	1	.083	1.52
Autumn	.15	.26	.33	1	.567	1.16
Age of the Hh Head						
Hh Head Age (in 10 years)	.08	.08	1.07	1	.300	1.08
Dwelling Size						
Number of Rooms	.24	.13	3.36	1	.067	1.28
Constant	-2.61	.93	7.82	1	.005	.07

4. Likelihood of RM Decisions: All Hhs (Ankara Survey Data)

Case Processing Summary

Unweighted Cases		N	Percent
Selected Cases	Included in Analysis	1174	63.6
	Missing Cases	672	36.4
	Total	1846	100
Unselected Cases		0	0
Total		1846	100

Categorical Variables Coding

		Frequency	Parameter coding			
			(1)	(2)	(3)	(4)
Hh Income	500 Euro or Less (REF)	217	0	0	0	0
	500-1000 Euro	434	1	0	0	0
	1000-1500 Euro	258	0	1	0	0
	1500-2500 Euro	161	0	0	1	0
	More than 2500 Euro	104	0	0	0	1
Monthly Rent	Less than 175 Euro (REF)	110	0	0	0	
	175-275 Euro	608	1	0	0	
	276-400 Euro	390	0	1	0	
	More than 400 Euro	66	0	0	1	
Duration of Occupancy	1 Year or Less (REF)	104	0	0	0	
	2-10 Years	618	1	0	0	
	11-40 Years	438	0	1	0	
	More than 40 Years	14	0	0	1	
Occupation Density	Underoccupation (REF)	611	0	0		
	Comfort	495	1	0		
	Overcrowding	68	0	1		
Neighbourhood Environment	Extremely Poor / Below Ave. (REF)	224	0	0		
	Average	540	1	0		
	Above Ave. / Excellent	410	0	1		
Neighbourhood Accessibility	Extremely Poor / Below Ave. (REF)	102	0	0		
	Average	421	1	0		
	Above Ave. / Excellent	651	0	1		
Mode of Tenure	Owner-occupier	809	1	0		
	Tenant_privileged	64	0	1		
	Tenant (REF)	301	0	0		
Perception of Dwelling Size	No (REF)	1013	0			
	Yes	161	1			
RM in Common Parts	No Investment (REF)	587	0			
	Some Investments	587	1			

Dependent Variable Encoding

Original Value	Internal Value
Non-repairers	0
Repairers	1

CONSTANT ONLY MODEL

Classification Table[a,b]

Observed			Predicted		
			probability of repairers		Percentage Correct
			Non-repairers	Repairers	
Step 0	Probability of repairers	Non-repairers	794	0	100
		Repairers	380	0	0
Overall Percentage					67.6

a Constant is included in the model
b The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	-.737	.062	139.562	1	.000	.479

MODEL DEFINED BY USER

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	150.138	23	.000
	Block	150.138	23	.000
	Model	150.138	23	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	1328.191	.120	.168

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	14.023	8	.081

Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B) (Odds Ratio)
Mode of Tenure						
Tenant			.775	2	.679	
Owner-Occupier	.03	.183	.034	1	.854	1.03
Privileged Tenant	.27	.315	.738	1	.390	1.31
Hh Income						
500 Euro or Less			2.814	4	.590	
500-1000 Euro	-.22	.197	1.235	1	.267	.80
1000-1500 Euro	-.08	.220	.143	1	.705	.92
1500-2500 Euro	-.38	.259	2.110	1	.146	.69
More than 2500 Euro	-.11	.274	.150	1	.699	.90
Age of the Hh Head						
Hh Head Age	.23	.056	17.049	1	.000	1.26
Duration of Occupancy						
1 Year or Less			33.178	3	.000	
2-10 Years	-1.38	.244	32.067	1	.000	.25
11-40 Years	-1.44	.279	26.439	1	.000	.24
40+ Years	-1.81	.673	7.271	1	.007	.16
Occupation Density						
Underoccupation			1.906	2	.385	
Comfort	.18	.143	1.659	1	.198	1.20
Overcrowding	.24	.294	.671	1	.413	1.27
Dwelling Age						
Age	-.03	.056	.330	1	.565	.97
Dwelling Size						
Floor Area	.03	.078	.194	1	.660	1.03
Monthly Rent						
Less than 175 Euro			6.734	3	.081	
175-275 Euro	.24	.252	.930	1	.335	1.27
276-400 Euro	.56	.268	4.372	1	.037	1.75
More than 400 Euro	.66	.382	2.974	1	.085	1.93
RM in Common Parts						
RM	.73	.142	26.893	1	.000	2.09
Perception of Dwelling Size						
Size	.99	.195	25.511	1	.000	2.68
Neighbourhood Accessibility						
Extremely Poor / Below Ave.			11.088	2	.004	
Average	-.64	.253	6.416	1	.011	.53
Above Ave. / Excellent	-.18	.243	.521	1	.470	.84
Neighbourhood Environment						
Extremely Poor / Below Ave.			11.511	2	.003	
Average	.70	.206	11.399	1	.001	2.00
Above Ave. / Excellent	.51	.222	5.264	1	.022	1.66
Constant	-1.79	.628	8.143	1	.004	.17

Classification Table[a]

Observed			Predicted		
			probability of repairers		Percentage Correct
			Non-repairers	Repairers	
Step 1	Probability of repairers	Non-repairers	727	67	91.6
		Repairers	277	103	27.1
	Overall Percentage				70.7

a The cut value is .500

5. Likelihood of RM Decisions: Owner-occupiers (Ankara Survey Data)

Categorical Variables Coding

		Frequency	Parameter coding			
			(1)	(2)	(3)	(4)
Hh Income	500 Euro or Less (REF)	147	0	0	0	0
	500-1000 Euro	278	1	0	0	0
	1000-1500 Euro	183	0	1	0	0
	1500-2500 Euro	123	0	0	1	0
	More than 2500 Euro	78	0	0	0	1
Monthly Rent	Less than 175 Euro (REF)	60	0	0	0	
	175-275 Euro	431	1	0	0	
	276-400 Euro	273	0	1	0	
	More than 400 Euro	45	0	0	1	
Duration of Occupancy	1 Year or Less (REF)	28	0	0	0	
	2-10 Years	385	1	0	0	
	11-40 Years	384	0	1	0	
	More than 40 Years	12	0	0	1	
Occupation Density	Underoccupation (REF)	426	0	0		
	Comfort	339	1	0		
	Overcrowding	44	0	1		
Neighbourhood Environment	Extremely Poor / Below Ave. (REF)	184	0	0		
	Average	370	1	0		
	Above Ave. / Excellent	255	0	1		
Neighbourhood Accessibility	Extremely Poor / Below Ave. (REF)	83	0	0		
	Average	316	1	0		
	Above Ave. / Excellent	410	0	1		
Perception of Dwelling Size	No (REF)	707	0			
	Yes	102	1			
RM in Common Parts	No Investment (REF)	346	0			
	Some Investments	463	1			

Case Processing Summary

Unweighted Cases		N	Percent
Selected Cases	Included in Analysis	809	65.3
	Missing Cases	429	34.7
	Total	1238	100
Unselected Cases		0	0
Total		1238	100

Dependent Variable Encoding

Original Value	Internal Value
Non-repairers	0
Repairers	1

CONSTANT ONLY MODEL

Classification Table[a,b]

Observed			Predicted		
			probability of repairers		Percentage Correct
			Non-repairers	Repairers	
Step 0	Probability of repairers	Non-repairers	548	0	100
		Repairers	261	0	0
Overall Percentage					67.7

a Constant is included in the model
b The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	-.742	.075	97.273	1	.000	.476

MODEL DEFINED BY USER

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	118.559	21	.000
	Block	118.559	21	.000
	Model	118.559	21	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	898.886	.136	.190

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	15.820	8	.045

Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B) (Odds Ratio)
Hh Income						
500 Euro or Less			3.593	4	.464	
500-1000 Euro	-.11	.241	.218	1	.641	.89
1000-1500 Euro	.14	.267	.279	1	.597	1.15
1500-2500 Euro	-.36	.318	1.253	1	.263	.70
More than 2500 Euro	-.22	.335	.417	1	.519	.81
Age of the Hh Head						
Hh Head Age	.35	.069	25.571	1	.000	1.41
Duration of Occupancy						
1 Year or Less			14.067	3	.003	
2-10 Years	-1.56	.435	12.846	1	.000	.21
11-40 Years	-1.62	.447	13.096	1	.000	.20
40+ Years	-2.12	.811	6.818	1	.009	.12
Occupation Density						
Underoccupation			3.024	2	.220	
Comfort	.30	.175	2.928	1	.087	1.35
Overcrowding	.05	.383	.017	1	.895	1.05
Dwelling Age						
Age	-.07	.069	.981	1	.322	.93
Dwelling Size						
Floor Area	.01	.098	.019	1	.890	1.01
Monthly Rent						
Less than 175 Euro			4.210	3	.240	
175-275 Euro	.58	.347	2.784	1	.095	1.79
276-400 Euro	.75	.371	4.079	1	.043	2.11
More than 400 Euro	.81	.501	2.602	1	.107	2.24
RM in Common Parts						
RM	.64	.171	13.855	1	.000	1.89
Perception of Dwelling Size						
Size	.96	.250	14.623	1	.000	2.60
Neighbourhood Accessibility						
Extremely Poor / Below Ave.			8.389	2	.015	
Average	-.45	.294	2.292	1	.130	.64
Above Ave. / Excellent	.12	.283	.166	1	.684	1.12
Neighbourhood Environment						
Extremely Poor / Below Ave.			6.825	2	.033	
Average	.62	.237	6.821	1	.009	1.86
Above Ave. / Excellent	.50	.263	3.567	1	.059	1.64
Constant	-2.51	.846	8.813	1	.003	.08

Classification Table[a]

Observed			Predicted		
			probability of repairers		Percentage Correct
			Non-repairers	Repairers	
Step 1	Probability of repairers	Non-repairers	492	56	89.8
		Repairers	189	72	27.6
	Overall Percentage				69.7

a The cut value is .500

6. Likelihood of RM Decisions: Tenants (Ankara Survey Data)

Case Processing Summary

Unweighted Cases		N	Percent
Selected Cases	Included in Analysis	301	60.9
	Missing Cases	193	39.1
	Total	494	100
Unselected Cases		0	0
Total		494	100

Categorical Variables Coding

		Frequency	Parameter coding			
			(1)	(2)	(3)	(4)
Hh Income	500 Euro or Less (REF)	64	0	0	0	0
	500-1000 Euro	125	1	0	0	0
	1000-1500 Euro	63	0	1	0	0
	1500-2500 Euro	28	0	0	1	0
	More than 2500 Euro	21	0	0	0	1
Monthly Rent	Less than 175 Euro (REF)	37	0	0	0	
	175-275 Euro	147	1	0	0	
	276-400 Euro	98	0	1	0	
	More than 400 Euro	19	0	0	1	
Duration of Occupancy	1 Year or Less (REF)	71	0	0		
	2-10 Years	203	1	0		
	11-40 Years	27	0	1		
Occupation Density	Underoccupation (REF)	157	0	0		
	Comfort	126	1	0		
	Overcrowding	18	0	1		
Neighbourhood Environment	Extremely Poor / Below Ave. (REF)	32	0	0		
	Average	140	1	0		
	Above Ave. / Excellent	129	0	1		
Neighbourhood Accessibility	Extremely Poor / Below Ave. (REF)	16	0	0		
	Average	86	1	0		
	Above Ave. / Excellent	199	0	1		
Perception of Dwelling Size	No (REF)	257	0			
	Yes	44	1			
RM in Common Parts	No Investment (REF)	210	0			
	Some Investments	91	1			

Dependent Variable Encoding

Original Value	Internal Value
Non-repairers	0
Repairers	1

CONSTANT ONLY MODEL

Classification Table[a,b]

Observed			Predicted		
			probability of repairers		Percentage Correct
			Non-repairers	Repairers	
Step 0	Probability of repairers	Non-repairers	206	0	100
		Repairers	95	0	0
Overall Percentage					68.4

a Constant is included in the model
b The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	-.774	.124	38.950	1	.000	.461

MODEL DEFINED BY USER

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	52.512	20	.000
	Block	52.512	20	.000
	Model	52.512	20	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	322.847	.160	.225

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	6.476	8	.594

Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B) (Odds Ratio)
Hh Income						
500 Euro or Less			5.011	4	.286	
500-1000 Euro	-.48	.401	1.419	1	.234	.62
1000-1500 Euro	-.27	.455	.345	1	.557	.77
1500-2500 Euro	-.12	.543	.051	1	.822	.88
More than 2500 Euro	.67	.610	1.219	1	.270	1.96
Age of the Hh Head						
Hh Head Age	.01	.127	.005	1	.945	1.01
Duration of Occupancy						
1 Year or Less			13.130	2	.001	
2-10 Years	-1.18	.337	12.323	1	.000	.31
11-40 Years	-1.36	.585	5.429	1	.020	.26
Occupation Density						
Underoccupation			1.829	2	.401	
Comfort	.15	.313	.234	1	.629	1.16
Overcrowding	.81	.600	1.829	1	.176	2.25
Dwelling Age						
Age	.09	.123	.511	1	.475	1.09
Dwelling Size						
Floor Area	.05	.192	.080	1	.777	1.06
Monthly Rent						
Less than 175 Euro			4.581	3	.205	
175-275 Euro	-.26	.481	.298	1	.585	.77
276-400 Euro	.44	.491	.812	1	.368	1.56
More than 400 Euro	.13	.773	.027	1	.868	1.14
RM in Common Parts						
RM	1.02	.303	11.389	1	.001	2.78
Perception of Dwelling Size						
Size	1.20	.393	9.320	1	.002	3.32
Neighbourhood Accessibility						
Extremely Poor / Below Ave.			3.779	2	.151	
Average	-1.21	.638	3.599	1	.058	.30
Above Ave. / Excellent	-1.13	.614	3.411	1	.065	.32
Neighbourhood Environment						
Extremely Poor / Below Ave.			.518	2	.772	
Average	.35	.503	.482	1	.488	1.42
Above Ave. / Excellent	.24	.512	.212	1	.645	1.27
Constant	-.13	1.311	.010	1	.919	.87

Classification Table[a]

Observed			Predicted		
			probability of repairers		Percentage Correct
			Non-repairers	Repairers	
Step 1	Probability of repairers	Non-repairers	189	17	91.7
		Repairers	61	34	35.8
	Overall Percentage				74.1

a The cut value is .500

ORDINAL LOGISTIC REGRESSION

In ordinal logistic regression output of the SPSS the following tables are usually observed:

Case Processing Summary: Displays the categorical variables included in the analysis, their categories and distributions, and missing cases.
Model Fitting Information: Displays the likelihood ratio test based on the difference between the researcher-specified model and the intercept-only model. A significant result indicates a well-fitting model.
Goodness-of-Fit: Displays a chi square test (Pearson and Deviance) to assess how much predicted cell frequencies differ from observed frequencies. Both for Pearson and Deviance tests, a well-fitting model is indicated by a non-significant result.
Pseudo R-Square: Displays R^2 statistics as measures of model effect size. These measures are approximations to R^2 provided in linear regression. Yet, these are not interpreted as percent of variance explained by independent variables. Negelkerke R^2 is the most preferred one among them. However, it tends to be lower than the corresponding OLS R^2.
Parameter Estimates: Displays unstandardized coefficients (Estimate), standard error of the coefficients (Std.Error), Wald statistic derived from the estimates, significance of the Wald statistic, and associated confidence intervals for the significance levels. Significant Wald statistic means that the parameter is significant in the model. For covariates, positive estimates indicate that increasing values of independent variable increases the likelihood of higher scores on the ordinal dependent variable. Similarly, negative parameter estimates indicate that as the values of independent variable increases the likelihood of lower scores on the ordinal dependent variable increases. For categorical variables, positive coefficients mean a likelihood of higher scores on the dependent variable compared to the reference category. Negative estimates indicate a likelihood of lower scores on the dependent variable compared to the reference category.
Test of Parallel Lines: This table display the test of the null hypothesis which states that the location parameters (slope coefficients) are the same across all of the response categories. Non significant results indicate that the null hypothesis stating that the lines are parallel is not rejected. If the test proves to be significant, then either the link function selected is incorrect or some of the categories of dependent variable have to be combined to achieve parallelism.

SPSS OUTPUT FOR ORDINAL LOGISTIC REGRESSIONS

1. Size of the RM Expenditures: All Repairers (HBS Data)

Case Processing Summary

		N	Marginal Percentage
RM Expenditure Categories	Less than 25 Euro	475	69.2%
	25-99 Euro	129	18.8%
	100 Euro or More	82	12.0%
Hh Income	Highest	164	23.9%
	High	162	23.6%
	Medium	165	24.1%
	Low	121	17.6%
	Lowest	74	10.8%
Duration of Occupancy	More than 20 Years	125	18.2%
	11-20 Years	174	25.4%
	2-10 Years	325	47.4%
	1 Year or Less	62	9.0%
Season	Spring	166	24.2%
	Summer	207	30.2%
	Autumn	182	26.5%
	Winter	131	19.1%
Savings	Some savings	28	4.1%
	No savings	658	95.9%
Mode of Tenure	Tenant	158	23.0%
	Privileged Tenant	50	7.3%
	Owner-occupier	478	69.7%
Valid		686	100.0%

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	1045.970			
Final	948.754	97.217	15	.000

Link function: Logit.

Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	1119.756	1129	.572
Deviance	883.279	1129	1.000

Link function: Logit.

Pseudo R-Square

Cox and Snell	.132
Nagelkerke	.164
McFadden	.086

Link function: Logit.

Parameter Estimates

	Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Threshold							
Less than 25 Euro	1.53	.66	5.37	1	.020	.24	2.83
25-99 Euro	2.85	.67	18.26	1	.000	1.54	4.16
Location							
Monthly Rent (in 50 Euros)	.26	.08	10.79	1	.001	.11	.42
Floor Area (in 25 sq meters)	-.13	.04	8.91	1	.003	-.22	-.05
Mode of Tenure							
Tenant	-.79	.26	9.08	1	.003	-1.30	-.28
Privileged Tenant	-.59	.36	2.68	1	.101	-1.29	.12
Owner-Occupier	.00	.	.	0	.	.	.
Hh Income							
Highest Income	1.30	.40	10.32	1	.001	.51	2.09
High Income	.57	.39	2.10	1	.148	-.20	1.35
Middle Income	.92	.38	5.78	1	.016	.17	1.67
Low Income	.70	.40	3.00	1	.083	-.09	1.49
Lowest Income	.00	.	.	0	.	.	.
Savings							
Some savings	.74	.39	3.58	1	.058	-.03	1.50
No savings	.00	.	.	0	.	.	.
Season							
Spring	1.51	.30	25.65	1	.000	.93	2.10
Summer	.99	.29	11.32	1	.001	.41	1.57
Autumn	1.04	.30	12.35	1	.000	.46	1.63
Winter	.00	.	.	0	.	.	.
Duration of Occupancy							
More than 20 Years	.08	.37	.04	1	.838	-.65	.80
11-20 Years	-.20	.35	.31	1	.578	-.89	.50
2-10 Years	-.33	.33	1.03	1	.309	-.97	.31
1 Year or Less	.00	.	.	0	.	.	.

Link function: Logit.

Test of Parallel Lines(a)

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Null Hypothesis	948.754			
General	926.119	22.634	15	.092

The null hypothesis states that the location parameters (slope coefficients) are the same across response categories.

a Link function: Logit.

2. Size of the RM Expenditures: Repairer Owner-Occupiers (HBS Data)

Case Processing Summary

		N	Marginal Percentage
RM Expenditure Categories	Less than 25 Euro	306	64.0%
	25-99 Euro	101	21.1%
	100 Euro or More	71	14.9%
Hh Income	Highest	130	27.2%
	High	116	24.3%
	Medium	116	24.3%
	Low	77	16.1%
	Lowest	39	8.2%
Duration of Occupancy	More than 20 Years	109	22.8%
	11-20 Years	150	31.4%
	2-10 Years	196	41.0%
	1 Year or Less	23	4.8%
Season	Spring	105	22.0%
	Summer	145	30.3%
	Autumn	136	28.5%
	Winter	92	19.2%
Savings	Some savings	24	5.0%
	No savings	454	95.0%
Valid		478	100.0%

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	779.207			
Final	719.880	59.327	13	.000

Link function: Logit.

Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	767.203	763	.450
Deviance	658.563	763	.997

Link function: Logit.

Pseudo R-Square

Cox and Snell	.117
Nagelkerke	.140
McFadden	.069

Link function: Logit.

Parameter Estimates

	Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Threshold							
Less than 25 Euro	2.11	.81	6.84	1	.009	.53	3.69
25-99 Euro	3.39	.81	17.40	1	.000	1.80	4.99
Location							
Monthly Rent (50 Euros)	.19	.08	4.86	1	.028	.02	.35
Floor Area (in 25 sq meters)	-.07	.05	1.75	1	.186	-.16	.03
Hh Income							
Highest Income	1.67	.51	10.58	1	.001	.66	2.68
High Income	.88	.51	3.02	1	.082	-.11	1.87
Middle Income	1.20	.50	5.84	1	.016	.23	2.17
Low Income	.93	.52	3.26	1	.071	-.08	1.95
Lowest Income	.00	.	.	0	.	.	.
Savings							
Some savings	.56	.42	1.82	1	.177	-.26	1.39
No savings	.00	.	.	0	.	.	.
Season							
Spring	1.58	.33	22.47	1	.000	.93	2.24
Summer	.94	.32	8.36	1	.004	.30	1.57
Autumn	.96	.33	8.59	1	.003	.32	1.60
Winter	.00	.	.	0	.	.	.
Duration of Occupancy							
More than 20 Years	-.01	.46	.00	1	.979	-.91	.88
11-20 Years	-.44	.44	1.00	1	.316	-1.31	.42
2-10 Years	-.53	.44	1.50	1	.221	-1.39	.32
1 Year or Less	.00	.	.	0	.	.	.

Link function: Logit.

Test of Parallel Lines(a)

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Null Hypothesis	719.880			
General	712.509	7.371	13	.882

The null hypothesis states that the location parameters (slope coefficients) are the same across response categories.

a Link function: Logit.

3. Size of the RM Expenditures: Repairer Tenants (HBS Data)

Case Processing Summary

		N	Marginal Percentage
RM Expenditure Categories	Less than 25 Euro	130	82.3%
	25-99 Euro	23	14.6%
	100 Euro or More	5	3.2%
Hh Income	Highest	29	18.4%
	High	30	19.0%
	Medium	36	22.8%
	Low	31	19.6%
	Lowest	32	20.3%
Duration of Occupancy	More than 20 Years	3	1.9%
	11-20 Years	13	8.2%
	2-10 Years	105	66.5%
	1 Year or Less	37	23.4%
Season	Spring	43	27.2%
	Summer	48	30.4%
	Autumn	35	22.2%
	Winter	32	20.3%
Valid		158	100.0%

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	169.735			
Final	142.879	26.856	12	.008

Link function: Logit.

Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	412.897	254	.000
Deviance	138.720	254	1.000

Link function: Logit.

Pseudo R-Square

Cox and Snell	.156
Nagelkerke	.234
McFadden	.154

Link function: Logit.

Parameter Estimates

	Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Threshold							
Less than 25 Euro	1.12	1.56	.51	1	.475	-1.95	4.18
25-99 Euro	3.25	1.61	4.09	1	.043	.10	6.39
Location							
Monthly Rent (50 Euros)	.83	.30	7.75	1	.005	.25	1.42
Floor Area (in 25 sq meters)	-.47	.14	11.94	1	.001	-.74	-.20
Hh Income							
Highest Income	1.13	.86	1.72	1	.190	-.56	2.81
High Income	.16	.79	.04	1	.835	-1.38	1.71
Middle Income	.38	.74	.27	1	.607	-1.08	1.84
Low Income	.69	.79	.76	1	.382	-.86	2.24
Lowest Income	.00	.	.	0	.	.	.
Season							
Spring	2.19	.98	4.98	1	.026	.27	4.11
Summer	2.10	1.00	4.38	1	.036	.13	4.07
Autumn	1.47	1.02	2.11	1	.146	-.52	3.47
Winter	.00	.	.	0	.	.	.
Duration of Occupancy							
More than 20 Years	1.77	1.65	1.15	1	.283	-1.46	5.01
11-20 Years	.98	.88	1.25	1	.264	-.74	2.71
2-10 Years	.28	.61	.20	1	.651	-.92	1.48
1 Year or Less	.00	.	.	0	.	.	.

Link function: Logit.

Test of Parallel Lines(c)

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Null Hypothesis	142.879			
General	145.584[a]	.[b]	12	. □

The null hypothesis states that the location parameters (slope coefficients) are the same across response categories.

a The log-likelihood value cannot be further increased after maximum number of step-halving.

b The log-likelihood value of the general model is smaller than that of the null model. This is because convergence cannot be attained or ascertained in estimating the general model. Therefore, the test of parallel lines cannot be performed.

c Link function: Logit.

4. Size of the RM Expenditures: All Repairers (Ankara Survey Data)

Case Processing Summary

		N	Marginal Percentage
RM Expenditure Categories	Less than 500 Euro	160	44.6%
	500-1500 Euro	96	26.7%
	1500 Euro or More	103	28.7%
Hh Income	More than 2500 Euro	38	10.6%
	1500-2500 Euro	45	12.5%
	1000-1500 Euro	82	22.8%
	500-1000 Euro	120	33.4%
	Less than 500 Euro	74	20.6%
Mobility Expectation	No	276	76.9%
	Yes	83	23.1%
Monthly Rent	More than 400 Euro	25	7.0%
	276-400 Euro	143	39.8%
	175-275 Euro	164	45.7%
	Less than 175 Euro	27	7.5%
RM in Common Parts	No Investment	219	61.0%
	Some Investments	140	39.0%
Dwelling is in Disrepair	No	320	89.1%
	Yes	39	10.9%
Mode of Tenure	Tenant	88	24.5%
	Privileged Tenant	21	5.8%
	Owner-occupier	250	69.6%
Neighbourhood Services	Above Ave. / Excellent	107	29.8%
	Average	163	45.4%
	Extremely Poor / Below Ave.	89	24.8%
Neighbourhood Accessibility	Above Ave. / Excellent	229	63.8%
	Average	98	27.3%
	Extremely Poor / Below Ave.	32	8.9%
Neighbourhood Environment	Above Ave. / Excellent	132	36.8%
	Average	183	51.0%
	Extremely Poor / Below Ave.	44	12.3%
Valid		359	100%
Missing		1487	

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	769.061			
Final	608.503	160.558	22	.000

Link function: Logit.

Pseudo R-Square

Cox and Snell	.361
Nagelkerke	.409
McFadden	.209

Link function: Logit.

Parameter Estimates

	Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Threshold							
Less than 500 Euro	1.74	1.145	2.317	1	.128	-.501	3.988
500-1500 Euro	3.32	1.157	8.251	1	.004	1.056	5.590
Location							
Age of the Hh Head (in 10 yrs)	.00	.099	.000	1	.991	-.195	.193
Land Value (in 50 Euros per sqm)	.17	.095	3.147	1	.076	-.018	.356
Floor Area (in 25 sq meters)	.11	.115	.930	1	.335	-.115	.337
Duration of Occupancy (in 5 yrs)	.08	.067	1.263	1	.261	-.056	.207
Mode of Tenure							
Tenant	-2.80	.441	40.261	1	.000	-3.660	-1.932
Privileged Tenant	.01	.466	.001	1	.980	-.902	.926
Owner-Occupier	.00	.	.	0	.	.	.
Hh Income							
More than 2500 Euro	.77	.475	2.629	1	.105	-.161	1.700
1500-2500 Euro	.85	.452	3.557	1	.059	-.033	1.739
1000-1500 Euro	1.22	.377	10.417	1	.001	.477	1.954
500-1000 Euro	.88	.351	6.282	1	.012	.192	1.566
Less than 500 Euro	.00	.	.	0	.	.	.
Mobility Expectation							
No	.32	.333	.901	1	.342	-.337	.969
Yes	.00	.	.	0	.	.	.
Monthly Rent							
More than 400 Euro	1.38	.728	3.587	1	.058	-.048	2.805
276-400 Euro	.37	.573	.419	1	.518	-.752	1.494
175-275 Euro	1.01	.544	3.421	1	.064	-.060	2.074
Less than 175 Euro	.00	.	.	0	.	.	.
RM in Common Parts							
No Investment	.65	.242	7.208	1	.007	.175	1.122
Some Investments	.00	.	.	0	.	.	.
Disrepair							
No	-.29	.443	.430	1	.512	-1.159	.578
Yes	.00	.	.	0	.	.	.
Neighbourhood Services							
Above Ave. / Excellent	-.25	.339	.525	1	.469	-.910	.419
Average	-.16	.294	.280	1	.596	-.733	.421
Extremely Poor / Below Ave.	.00	.	.	0	.	.	.
Neighbourhood Accessibility							
Above Ave. / Excellent	.13	.406	.098	1	.754	-.669	.923
Average	.55	.435	1.576	1	.209	-.306	1.398
Extremely Poor / Below Ave.	.00	.	.	0	.	.	.
Neighbourhood Environment							
Above Ave. / Excellent	-.57	.403	1.996	1	.158	-1.361	.221
Average	-.64	.372	2.994	1	.084	-1.374	.085
Extremely Poor / Below Ave.	.00	.	.	0	.	.	.

Link function: Logit.

Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	680.040	690	.599
Deviance	608.503	690	.988

Link function: Logit.

Test of Parallel Lines(c)

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Null Hypothesis	608.503			
General	587.673(a)	20.830(b)	22	.531

The null hypothesis states that the location parameters (slope coefficients) are the same across response categories.
a The log-likelihood value cannot be further increased after maximum number of step-halving.
b The Chi-Square statistic is computed based on the log-likelihood value of the last iteration of the general model. Validity of the test is uncertain.
c Link function: Logit.

5. Size of the RM Expenditures: Repairer Owner-occupiers (Ankara Survey Data)

Case Processing Summary

		N	Marginal Percentage
RM Expenditure Categories	Less than 500 Euro	74	29.6%
	500-1500 Euro	82	32.8%
	1500 Euro or More	94	37.6%
Hh Income	More than 2500 Euro	24	9.6%
	1500-2500 Euro	32	12.8%
	1000-1500 Euro	63	25.2%
	500-1000 Euro	79	31.6%
	Less than 500 Euro	52	20.8%
Mobility Expectation	No	222	88.8%
	Yes	28	11.2%
Monthly Rent	More than 400 Euro	18	7.2%
	276-400 Euro	99	39.6%
	175-275 Euro	121	48.4%
	Less than 175 Euro	12	4.8%
RM in Common Parts	No Investment	169	67.6%
	Some Investments	81	32.4%
Dwelling is in Disrepair	No	235	94.0%
	Yes	15	6.0%
Neighbourhood Accessibility	Above Ave. / Excellent	156	62.4%
	Average	68	27.2%
	Extremely Poor / Below Ave.	26	10.4%
Neighbourhood Environment	Above Ave. / Excellent	90	36.0%
	Average	125	50.0%
	Extremely Poor / Below Ave.	35	14.0%
Neighbourhood Services	Above Ave. / Excellent	74	29.6%
	Average	111	44.4%
	Extremely Poor / Below Ave.	65	26.0%
Valid		250	100%
Missing		988	

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	546.887			
Final	501.128	45.760	20	.001

Link function: Logit.

Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	500.418	476	.212
Deviance	501.128	476	.206

Link function: Logit.

Pseudo R-Square

Cox and Snell	.167
Nagelkerke	.188
McFadden	.084

Link function: Logit.

Test of Parallel Lines(c)

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Null Hypothesis	501.128			
General	482.399(a)	18.728(b)	20	.540

The null hypothesis states that the location parameters (slope coefficients) are the same across response categories.

a The log-likelihood value cannot be further increased after maximum number of step-halving.

b The Chi-Square statistic is computed based on the log-likelihood value of the last iteration of the general model. Validity of the test is uncertain.

c Link function: Logit.

Parameter Estimates

	Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Threshold							
Less than 500 Euro	1.90	1.301	2.136	1	.144	-.649	4.452
500-1500 Euro	3.48	1.315	7.021	1	.008	.907	6.061
Location							
Age of the Hh Head (in 10 yrs)	.05	.109	.198	1	.656	-.165	.262
Land Value (in 50 Euros per sqm)	.26	.110	5.698	1	.017	.047	.477
Floor Area (in 25 sq meters)	.08	.133	.397	1	.529	-.177	.344
Duration of Occupancy (in 5 yrs)	.06	.071	.775	1	.379	-.076	.201
Hh Income							
More than 2500 Euro	.58	.521	1.238	1	.266	-.442	1.601
1500-2500 Euro	.62	.488	1.602	1	.206	-.339	1.573
1000-1500 Euro	1.35	.413	10.684	1	.001	.540	2.157
500-1000 Euro	.81	.374	4.747	1	.029	.082	1.546
Less than 500 Euro	.00	.	.	0	.	.	.
Mobility Expectation							
No	-.30	.413	.529	1	.467	-1.110	.509
Yes	.00	.	.	0	.	.	.
Monthly Rent							
More than 400 Euro	.87	.858	1.018	1	.313	-.816	2.546
276-400 Euro	.25	.697	.129	1	.720	-1.116	1.615
175-275 Euro	.99	.659	2.263	1	.132	-.300	2.284
Less than 175 Euro	.00	.	.	0	.	.	.
RM in Common Parts							
No Investment	.63	.268	5.527	1	.019	.105	1.156
Some Investments	.00	.	.	0	.	.	.
Disrepair							
No	.16	.544	.092	1	.762	-.901	1.230
Yes	.00	.	.	0	.	.	.
Neighbourhood Services							
Above Ave. / Excellent	-.45	.383	1.369	1	.242	-1.199	.303
Average	-.07	.328	.043	1	.837	-.710	.575
Extremely Poor / Below Ave.	.00	.	.	0	.	.	.
Neighbourhood Accessibility							
Above Ave. / Excellent	.24	.438	.295	1	.587	-.620	1.096
Average	.53	.470	1.252	1	.263	-.395	1.446
Extremely Poor / Below Ave.	.00	.	.	0	.	.	.
Neighbourhood Environment							
Above Ave. / Excellent	-.44	.449	.970	1	.325	-1.321	.437
Average	-.71	.406	3.020	1	.082	-1.501	.090
Extremely Poor / Below Ave.	.00	.	.	0	.	.	.

Link function: Logit.

APPENDIX F: Comparison of Distributions in Ankara Survey with the General Distributions

During the Ankara Survey, more than 8000 Hhs in approximately 950 buildings were visited. The response rate remained approximately 25 per cent. In order to check whether the low response rates create any bias for the purposes of this study, the distributions in Ankara Survey are compared below with the distributions in HBS (urban Turkey and urban Ankara) in the following table. ***Since Ankara Survey covers only the apartment stock, all figures given in the table are calculated for this type of stock.*** HBS 2004 has no information on urban Ankara, therefore this information is derived from HBS 2003.

Variables	HBS (2004) Urban Turkey	HBS (2003) Urban Ankara*	Ankara Survey Urban Ankara**
Owner-occupiers (%)	64	66.8	67.1
Hh Head Age (Mean)	45.6	47.1	47.1
Hh Size (Mean)	3.7	3.5	3.2
Dwelling Age (Mean)	16.7	17.1	28
Number of Rooms (Mean)	3.6	3.8	3.7
Floor Area (Mean)	106.3	104.5	108.3

*NUTS2 Region

**Central Districts

Source: TUKSTAT, *HBS 2003, 2004 Raw Data*, *Ankara Survey 2007-08 Raw Data*

Distributions presented in the table above displays that particularly average dwelling age in Ankara Survey is higher compared to HBSs. Yet, this may not be considered as a bias in distribution since apartment construction activity in Ankara started and intensified earlier in the city centre compared to the rest of the province and the country. Moreover, average dwelling age in the original sample of Ankara Survey is approximately 26.7 years. Considering these facts and the comparison of distributions given in the table above there is no reason to believe that low response rates in the Ankara Survey create a significant bias for the purposes of analyses in this study.

APPENDIX G: Survey Design, Implementation, Data Preparation and Reduction Steps of the Ankara Survey

SURVEY DESIGN AND IMPLEMENTATION

Sampling

In order to implement a Hh questionnaire in the apartment blocks of Ankara, first, records of apartment blocks which were registered to FO Books in the local Deeds Offices of Çankaya, Yenimahalle, Keçiören, Altındağ, and Mamak districts were obtained. These records cover information related to buildings and individual flats such as the exact location of each building (neighbourhood name, building plot and parcel id), date of registration, number of individual flats in the building, etc. The records were converted to a combined list ordered with respect to date of registration and neighbourhood names for a systematic sampling. Every 20th record was selected and thereby 948 buildings were sampled[125]. Therefore, in principle an unbiased sample distribution in time and space was obtained. Distribution of the sampled buildings with respect to districts are presented in the table below.

District Name	Sampled Buildings	
	Frequency	%
Çankaya	573	60.4
Yenimahalle	135	14.2
Keçiören	132	13.9
Altındağ	78	8.2
Mamak	30	3.2
Total	948	100

Questionnaire Construction

Hh questionnaire of the Ankara Survey is composed of several sections aiming to explore 'Hh mobility', 'Hh reinvestments', 'housing management', 'entry to homeownership', etc. Each section was designed with reference to the relevant theoretical and empirical literature in the field. Predominantly fixed-choice (close-ended) questions are employed to obtain information about the demographic features of the Hh, attributes of the dwelling unit occupied by Hh, Hh's evaluation of the neighbourhood attributes (i.e. accessibility, services), Hh reinvestments (i.e. volume, type, purpose) etc. Hh questionnaire of the Ankara Survey covers 52 questions that are common for all Hhs as well as 19 separate questions for owner-occupiers and 13 questions for tenants. Therefore, in total the questionnaire includes 71 questions for owner-occupiers and 65 questions for tenants.

In the Ankara Survey, Hhs' reinvestments in the dwelling they occupy were investigated through a contingency question with six steps. Hhs were asked to report information about the reinvestment activities they undertook during the year preceding the survey. For Hhs who undertook reinvestments in the last 12 months; purpose of the work done, total cost, source of finance, distribution of payments, and type of the work done were investigated separately. For

[125] Out of 948 sampled buildings, 552 of them were the sample in the 1984 Survey.

all Hhs (regardless of reinvestment status in the last year), planned reinvestments and difficulties faced by Hhs in doing these works were enquired with another question. Both questions were directed to all tenure modes. Appendix H presents the questionnaire form of the Ankara Survey.

Implementation

At the first stage, sampled buildings were marked on aerial photographs in order to facilitate the implementation process and ensure the surveyors to find the right addresses (refer to the map below). Then, guidelines of implementation were prepared and surveyors were trained on the implementation process (i.e. how to use aerial photographs, number and timing of visits to Hhs, how to label and organize completed questionnaire forms). At the third stage questionnaire forms and guidelines were reproduced and delivered to the surveyors together with field maps.

At least three visits were done by surveyors to each building to access as much Hhs as possible. Every Hh in the surveyed buildings (regardless of mode of tenure) was encouraged to participate in the multiple-choice questionnaire. Hhs were not interviewed face-to-face, rather the questionnaire forms were distributed to the Hhs and after a convenient time period collected by surveyors. Since this was a housing survey, flats which were used other than housing purposes (i.e. offices) were excluded in the implementation phase. In total, more than 8000 Hhs were visited by surveyors. Yet, the questionnaire was hardly responded by 1916 Hhs. The table below displays frequency and percentage of Hhs who participated in the Ankara Survey with respect to districts

District Name	Households	
	Frequency	%
Çankaya	898	46.9
Yenimahalle	177	9.2
Keçiören	572	29.9
Altındağ	177	9.2
Mamak	92	4.8
Total	1916	100

DATA PREPARATION AND REDUCTION

In order to process the Ankara Survey data, first it was necessary to transfer all of the information in completed questionnaire forms to computer environment. A code book template was prepared in SPSS (ver. 11.5) to facilitate a standardized data entry process by different surveyors. The code book includes:

(1) variable names: the short name of the variables,
(2) type: whether variables are coded as numeric or string,
(3) width: how many digits are allowed during value assignment,
(4) label: description of the variables,
(5) value labels: codes of the variables.

After transfer of the data to SPSS, **frequency tables** and **descriptive statistics** were employed to check for errors related to invalid entries and missing values. For categorical variables (i.e. mode of tenure) the range of responses was controlled. There were few coding errors and these were corrected by the aid of the original questionnaire forms. For continuous variables (i.e. Hh head age) minimum, maximum and the mean values were observed to detect any unusual value. Again, original questionnaire forms were employed to correct any unusual value entered during data transfer.

Original data obtained from the Ankara Survey covers 1916 observations. Of these Hhs, reinvestment behaviour of owner-occupiers (66.3 per cent), privileged tenants (6.2 per cent), and tenants (26.9 per cent) are considered in this study. Hhs living in other conditions (i.e. in lodgings) are dropped from the sample (0.6 per cent – 12 cases). During the initial controls, 4 cases were detected to display inconsistent information regarding the Hh head age, duration of occupancy, and age of the dwelling, thus they were dropped from the sample. From the remaining 1900 Hhs, 54 of them neither replied to question related to realized reinvestments nor to planned reinvestments (question 49 - 50, Appendix H). These Hhs were also dropped from the sample since it was not possible to identify them as repairers or non-repairers. ***The remaining 1846 cases are analysed in this study.***

APPENDIX H: Questionnaire Form of the Ankara Survey

Questions presented below are obtained from the Ankara Survey questionnaire form (2007-08). Original questionnaire form is 9 pages which cover 71 questions for owner-occupiers and 65 questions for tenants. It is impractical to present the original questionnaire form here, thus only the questions regarding the variables employed in 6th Chapter of this research are given below. Question numbers indicated here refer to the original question numbers in the Ankara Survey.

Q 3. Age and sex of the household head:	Age	Sex (1) Female ☐ (2) Male ☐

Q 8. Please specify the last month's disposable household income:

More than 5000 Euro (1)	2500-5000 Euro (2)	1500-2500 Euro (3)	1000-1500 Euro (4)	500-1000 Euro (5)	Less than 500 Euro (6)

Q 11. How many individuals reside permanently in your dwelling (household size)? ☐

Q 14. How long has the household been resident in this accommodation? _____years

Q 15. a-)What was the household size when the household first moved into this accommodation? ☐

b-)What was the reason and time of the last change in the household size while residing in this accommodation?

No change (1)	Birth (2)	Death (3)	Hh member moved out (4)	New Hh member moved in (5)	Other (6)
	Year:	Year:	Year:	Year:	Year:

Q 19. What is the size of dwelling? ☐ **m^2**

Q 21. How many rooms are there in your dwelling including the living room (excluding kitchen, bathroom, etc.)? ☐

Q 26. What is the mode of tenure in your dwelling?

Owner-occupier, no rent (1)	Privileged tenant, no rent (2)	Privileged tenant, paying rent (3)	Tenant, paying rent (4)	Lodging (5)	Other (6)

Q 30. Does the Hh expect to stay in this dwelling for the next 5 years?	Yes (1)	No (2)

Q 34. Was any repairs and maintenance work done in the last 12 months by the building management in the common parts of the apartment block? If no please proceed to the next question, if yes please specify:

a- Repairs and maintenance work done (more than 1 box can be checked)

Exterior painting (1)	Interior painting (2)	Insulation, roof repairing (3)	Elevator maintenance and repair (4)	Landscaping (5)	Retrofitting (6)	Other (7)

b- Installations-infrastructure maintenance and repair done (more than 1 box can be checked)

Electricity (1)	Plumbing (2)	Sewage (3)	Water storage tank (4)	Central water heating system (5)
Conversion of central heating system to individual heating (6)		Security precautions (7)	Cable TV, satellite connection, etc. (8)	Other (9)

Q 44. Please evaluate your neighbourhood environment on a 1 to 5 scale (1-exteremely poor; 5-excellent)

Services	Extremely Poor (1)	Below Average (2)	Average (3)	Above Average (4)	Excellent (5)
Accessibility	Extremely Poor (1)	Below Average (2)	Average (3)	Above Average (4)	Excellent (5)
Distance to friends/relatives	Extremely Poor (1)	Below Average (2)	Average (3)	Above Average (4)	Excellent (5)
Safety	Extremely Poor (1)	Below Average (2)	Average (3)	Above Average (4)	Excellent (5)
Environment	Extremely Poor (1)	Below Average (2)	Average (3)	Above Average (4)	Excellent (5)

Q 45. Please specify two of the most significant problems you observe in your dwelling.

No problem (1)	Problems with neighbours (2)	Burglary (3)	Size of the dwelling is small (4)
Size of the dwelling is large (5)	Rent is high (6)	Dwelling is in disrepair (7)	Other (8)

Q 49. Was any expenditure done by the Hh for repairs and maintenance of this dwelling in the last 12 months?

1. No (proceed to question 50)	2. Yes;

a- How do you define the major purpose of the work done?

Non-discretionary Repairs (1)	Ease of Use (2)	Quality Improvement (3)	Beautification (4)	House Value Increase (5)	Other (6)

b- How much did the entire job cost?

Less than 500 Euro (1)	500-1500 Euro (2)	1500-2500 Euro (3)	2500-5000 Euro (4)	More than 5000 Euro (5)

c- How did the Hh finance the work done? (Please check only 1 box)

Savings (1)	Loans (2)	Incur Debt (3)	Monthly Income (4)	Sale of Property / Assets (5)	Other (6)

d- How was the distribution of payments through time?

Paid in advance (1)	In 3 months (2)	3-6 months (3)	6-9 months (4)	9-12 months (5)	Longer than 12 months (6)

e- Which of the following works were done? (Maximum 5 jobs can be reported)

Regular repairs-maintenance (1)	Replacement of electrical system or plumbing (2)	Kitchen remodelling (3)	Bathroom remodelling (4)
Wall added/demolished (5)	Replacement of heating system (6)	Painting / Wall covering (7)	Carton-Pierre (Papier mache) (8)
Retrofitting against Seismic Hazards (9)	Replacement of Floor Covering (i.e. carpet, wood / ceramic flooring) (10)	Replacement of door/window frames (11)	Balcony closed (12)
Insulation (13)	Security precautions (steel door, burglar / fire alarm, window grate) (14)	Suspended Ceiling (15)	Other (16)

Q 50. If you plan to do repairs and maintenance in your dwelling;
a- Please state the type of the works as given in the section 'e' of the previous question (maximum 5 jobs can be reported) .....

b- What are the difficulties faced in doing these works? (maximum 2 boxes can be checked)

High costs (1)	Time constraints (2)	Unavailability of skilled labour (3)	Technical difficulties (4)
Legal constraints (5)	Requires consent of the home owner (6)	Requires unanimous/collective decision in the apartment (7)	Other (8)

OWNER-OCCUPIERS

Q 71. In current market conditions, approximately how much per month would it cost to rent this dwelling?	

TENANTS

Q 53. How do you describe your home owner?

Mother - Father (1)	Sister - Brother (2)	Relative (3)	Friend (4)
Acquaintance (5)	Stranger (6)	Institution (7)	Other (8)

Q 54. How much rent is paid per month for this dwelling?

No rent (1)	Less than 100 Euro (2)	100-175 Euro (3)	176-275 Euro (4)	276-400 Euro (5)	400-500 Euro (6)	More than 500 Euro (7)

APPENDIX I: Measures of Association – Ankara Survey Data

Measures of Association: Pearson, Eta Correlations and Crammer's *V*[126]

	RM in Common Parts	Hhs' Perception of Dwelling		Hhs' Perception of Neighbourhood		
		Size	**Disrepair**	**Services**	**Accessibility**	**Environment**
RM Exp.	.17**	.05	.13**	-.09*	-.09*	-.07
Income	.02	.01	.04	-.02	-.01	.00
HhH Age	.10**	.01	.05*	.03	.01	-.01
Occupancy	.12**	.00	.00	-.06*	-.03	-.10**
Dw. Age	.06**	.02	.05*	-.05	.05*	-.05*
Floor Area	.10**	.28**	.07**	.05*	-.01	.00
Rent	.01	.08**	.07**	.01	.07**	.07**
Land Value	.05**	.02	.01	-.04	.07**	.00
Tenure	.23**	.08**	.17**	.12**	.12**	.13**
Mobility	.12**	.16**	.15**	.04	.06*	.01
Density	.01	.13**	.05	.02	.02	.03
RM in Common Parts	1	.00	.01	.02*	.01	.05
Size	.00	1	.08**	.03	.06*	.02
Disrepair	.01	.08**	1	.04	.05	.07**
Services	.02*	.03	.04	1	.39**	.50**
Accessibility	.01	.06*	.05	.39**	1	.30**
Environment	.05	.02	.07**	.50**	.30**	1

* $p < .05$
** $p < .01$
Source: Balamir, M., *Ankara Survey 2007-08 Raw Data.*

[126] Associations among continuous variables are investigated through Pearson correlations whereas nominal by interval or ratio associations are examined by Eta coefficients. Crammer's *V* is employed as a measure of association among nominal variables. Eta and Crammer's *V* values range from 0 to 1, whereas Pearson correlation coefficient varies from -1 to 1. Nominal variables are 'mode of tenure', 'mobility expecctation', 'occupation density', 'RM in common parts of the apartment', Hhs' evaluation of 'dwelling size' and 'disrepair'.