

# IS IT WORTH THE WAIT?

A quantitative study of the influence of waiting time on satisfaction with the dwelling and satisfaction with the neighborhood of social housing tenants in The Netherlands

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## **ABSTRACT**

Residential satisfaction can be described as a measure of the disparity of the current and preferred neighborhood and housing situation of a household. Many studies have been conducted into the determinants of satisfaction with both the dwelling and the neighborhood. However, these studies do not take into account the waiting time for social housing and how this affects satisfaction. In this study, waiting time for social housing is the main explanatory variable to predict its impact on the satisfaction with the dwelling and the neighborhood. An Ordered Logistic Regression was carried out to investigate whether there is a relationship between the waiting time for a social housing and satisfaction with the dwelling and the neighborhood. The statistical analysis shows that no significant association is found between waiting time and satisfaction with the dwelling as well as waiting time and satisfaction with the neighborhood. In addition, it was investigated whether a difference can be observed between tenants who have refused a dwelling they have been allocated and tenants who have not. The statistical analysis shows no difference in satisfaction with the dwelling or the neighborhood and whether or not to refuse a dwelling offered. Follow-up research based on additional data, including a general measurement of residential satisfaction, is necessary.

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## 1. INTRODUCTION

This chapter provides an introduction to this research. The motivation for the research is described, as well as its relevance to both society and science. This chapter also describes the problem statement and aim of this research and the main and sub-questions to which this research must provide an answer.

### 1.1 Motivation

The Dutch Housing market is overheated and is going through a crisis: There is a serious shortage of housing and due to the pressure on the housing market, prices for owner-occupied housing are rising, there are long waiting lists for social (public) housing and there are few affordable rental properties in the private rental sector. Affordability has increasingly worsened in the past few years, especially for lower income households with less financial possibilities. For this income group, public housing is one of the main options and therefore, social housing is an essential sector in the Dutch Housing System.

The Dutch Housing market has the largest public housing program in Europe (Scanlon et al, 2014). In 2020, 2,294,219 of the total supply of housing in The Netherlands were social housing units owned by a housing association, which is a significant proportion of the stock of rental property (69%) and account for 29% of the total housing stock (CBS, 2020a). When reference is made to social or public housing in the Netherlands, this refers in particular to housing owned by housing associations. Most developed, high-income countries contain housing assistance policies targeted at low income-households. Examples of housing policy measures include public housing programs, housing subsidy and subsidized construction of below-the-market-rate housing. To ensure the ability to afford of rental housing, The Netherlands has two policy instruments: housing allowance and rent regulation (Schilder & Scherpenisse, 2018). Rent control is applicable to all dwellings that are below a certain qualitative level and whose monthly rent at the start of the rental agreement is below the then current regulatory limit (which is €737.14 in 2020) (Ministerie van Algemene Zaken, 2019; Schilder & Scherpenisse, 2018). Housing allowance, to cover a part of the housing expenses, applies to tenants of social housing with a low income. The subsidy depends on the rent level, the composition of the household, age, personal assets and income. When the rent level exceeds the regulation boundary, households automatically do not qualify for housing allowance (Ministerie van Algemene Zaken, 2019; Schilder & Scherpenisse, 2018).

Social housing is one of the main options for low-income households or households who, for other reasons, have difficulty in finding suitable housing (e.g. people with a disability). Tenants

of housing associations pay a below-market rate rent and are entitled to housing subsidy if their income is not sufficient enough. Since the new Housing Act came into effect in 2015, the rules of 'fair housing allocation' (in Dutch: '*passend toewijzen*') have to be taken into account in the allocation of housing. As of January 1, 2016, housing allocations must accommodate 90 percent of home seekers with a low income in a rental house that matches their income (Ministerie van Binnenlandse Zaken en Koningsrelaties, 2020). With '*passend toewijzen*', the government wants to prevent people with the lowest incomes from living in expensive housing (Ministerie van Binnenlandse Zaken en Koningsrelaties, 2020). The income, household size and age determine in which income group a home seeker falls and that then determines which house they qualify for. This has consequences for the length of the waiting lists for certain target groups. In addition, the registration period of the home seeker is taken into account in the allocation and the registration, and thus the accumulated waiting time of a home seeker expires. All this together affects the possibilities and limitations of house seekers (Mulder, 1993).

Although the number of social housing units has been steadily increasing, the demand for social housing is still high and waiting lists are rising. A study by RIGO Research en Advies (2019) into the waiting times in five regions (Drechtsteden, Groningen, Hengelo, Utrecht and Zuid-Kennemerland) shows that registration and search times differ greatly from region to region, but that waiting times have increased in all regions. The number of active home seekers who respond to advertisements has also risen in all regions. According to Algemeen Dagblad (Rubio, 2020) the waiting time for social housing in the region of The Hague is getting longer and longer with an average waiting time of 68 months in 2020, while this was 40 months in 2016. Research by Woonbond (2020) shows that the average waiting time has increased in recent years in the regions of Amsterdam, Haaglanden, Utrecht and Rijnmond by more than six months. The waiting time has almost doubled in the Haaglanden region. The average number of responses per house offered also increased in all regions.

Despite long search times, home seekers do not automatically accept a house offered. According to the Dutch Housing Survey 2018, of all recently relocated tenants, around 40% have refused to offer a house while looking for another house (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties & Centraal Bureau voor de Statistiek, 2019). In areas with high tension on the housing market, a housing offer is more often refused during the search for a housing association than in areas with less market pressure. In these areas, home seekers are probably more critical when accepting a house offered because the possibility of moving again in the foreseeable future to a house that better meets the wishes is smaller in areas where housing is scarcer (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties & Centraal

Bureau voor de Statistiek, 2019). According to the Dutch Housing Survey 2018, one of the main reasons why an offered house is refused is that the house does not meet the requirements. On the other hand, people are in need of a house and might therefore accept a house which actually does not meet their requirements in terms of housing or neighborhood characteristics, which might result in residential dissatisfaction.

Residential satisfaction is can be described as a measure of the disparity of the current and preferred neighborhood and housing situation of a household (Galster, 1987; Galster & Hesser, 1981). As a crucial predictor of cognitive, affective and attitudinal attributes of occupants, residential satisfaction is an important concept (Chen et al., 2019). Aspects such as life satisfaction, attachment to the neighborhood, psychological and human well-being, and residential mobility are all influenced by residential satisfaction (Chen et al., 2019). However, the question is to what extent waiting time for a social rental home affects satisfaction with the home and living environment, given the fact that people sometimes have to wait a long time for a suitable home. This study provides an important contribution to our understanding of the relationship between waiting time for public housing and satisfaction with the house and neighborhood, among public tenants. The aim of this study is to gain insight into how waiting time affects satisfaction with the house and living environment.

## **1.2 Social and scientific relevance**

Not only is the availability, affordability and accessibility of housing critical for city residents, it also influences the durability, economic vitality and quality of cities by determining if and where individuals can find a house. According to the 2015 Housing Act, housing associations are allowed to invest in the vicinity of the houses they own such as the maintenance of their own greenery around their complexes. In addition, housing associations agree with municipalities exactly what they will do to improve the quality of life in a neighborhood. Residential satisfaction can be described as a measure of the disparity of the current and preferred neighborhood and housing situation of a household (Galster, 1987). The extent to which the wants and desires of people are met by their residential circumstances is a concern for scientists, policy makers, urban plan makers, designers, analysts, and architects. In the Netherlands, providing a safe and suitable residential environment is part of the national housing goal and the importance of having access to decent housing and a decent living environment is even a human right. This study is socially relevant as it examines the influence of the waiting times for social housing on the residential satisfaction of social housing tenants. It thus offers understandings concerning the residential experience that can be applied to assess the success of housing programs and allocation systems.

Various studies have been conducted into differences in the allocation of social rental housing. These studies focus in particular on a lottery or waiting list as an allocation mechanism and its consequences on welfare outcomes (Van der Vlist & Van Ommeren, 2016), labor market outcomes (Van Dijk, 2018) and the outcome of the two mechanism in equilibrium (Leshno, 2019; Arnosti & Shi, 2020).

Studies on public housing focus in particular on the match and mismatch on physical adequacy and affordability between social housing units and their tenants (Jonkman & Janssen-Jansen, 2018) and is particularly focused on mapping skewness. English (1979) noted that applicants accepted social housing which did not completely meets their demands was that they had to wait for far less time than they would have had for housing of their first choice in the same town. This evidence suggests that some applicants may be able to exercise choice and be more satisfied with their housing, even though highly constrained, within the public sector. Willis (1984) investigates the utility and money costs of waiting for public housing in the United Kingdom and shows how dissatisfaction, through waiting for public housing, can be measured. He finds that the actual costs vary between individuals, depending upon the individual's rate of time preference, expected life in public housing, the maximum time he/she is prepared to wait, the cost of alternative housing, the relative subsidy attached to public housing, and income. If the cost of waiting is viewed as a risk of failing to acquire public housing despite being on the waiting list, then the cost is somewhat greater. According to Clapham & Kintrea (1986), the result of waiting lists is that the less needy, who actually have the option of waiting, usually do better with respect to the quality of dwelling offered to them. They also find that households with pressing reasons for moving have high costs of remaining in their present accommodation. These are the people that are prepared to live in almost any location (Clapham & Kintrea, 1986). People who want to move because they are dissatisfied with their dwelling and its location might have a delay in their search due to the allocation system, however, these households take an extensive search process by being able to wait and consider several houses offered to them (Clapham & Kintrea, 1986). This suggests that waiting longer for a new social housing can result in a higher degree of satisfaction. Niner (1989) contributes to this by stating that people in need of social housing are pushed to accept poor quality accommodation or accommodation which does not matches their wishes, mostly in the least desirable neighborhoods. According to Fitzpatrick & Pawson (2007), this contributes to 'tenure polarization' and 'spatial polarization' and geographical concentrations of poverty and state that 'being able to wait' contributes to securing good quality housing matching an applicant's needs. However, they also argue that a situation in which offers can be refused without sanctions would work to the detriment of people who most need social housing (Fitzpatrick & Pawson, 2007). Research by Bonnal et al., (2012) shows whether the criteria



used by social housing providers when allocating a home in Paris are much different from social criteria. In all of these studies, little attempt has been made to measure tenants' dissatisfaction arising from failure to acquire public housing immediately they see the 'need' or when they join the waiting list. This dissatisfaction may be in terms of failure to acquire public housing, failure to acquire it in a house type or neighborhood of their preference or the difficulty of being able to transfer to alternative public housing after acquiring a house.

Residential satisfaction has been used in the in various ways, but there are basically two types of residential satisfaction studies: Those who view residential satisfaction as a determinant of conduct (remain in place or relocate to different residence) or those who view residential satisfaction as a measure of residential quality (Weidemann & Anderson, 1985; Mohit & Azim, 2012). It has been utilized as an indicator of beginning residential mobility and, consequently, changed residential preferences and neighborhood shift (Galster, 1987; Speare, 1974). It is utilized as a provisional assessment metric for assessing the successfulness of residential projects built by the public and private sectors (Galster, 1987). It is utilized to assess resident's perceptions of inadequacies in their actual housing environment in order to upgrade the status quo (Galster, 1987) and as a significant determinant of a person's perceived overall "quality of life (Galster, 1987).

There are numerous studies on identifying determinants of residential satisfaction. Multiple determinants of residential satisfaction have been identified. The joint conclusion is that residential satisfaction is related to the dwelling and neighborhood context and to the individual characteristics of the household (Amérigo & Aragonés, 1997; Lu, 1999; Galster & Hesser, 1981).

Very little is known about how waiting time for public housing actually impacts the residential satisfaction of public housing tenants in terms of satisfaction with the house and the neighborhood. In part, this lack of evidence

This study seeks to fill in the gap in the literature by studying the influence that waiting time has on residential satisfaction and has not been conducted before.

### **1.3 Problem statement and aim**

Various studies have been conducted into how waiting times for public housing can be shortened and what the effects of the different allocation systems are on waiting time. The results of the studies differ, but it appears that people who are in high need of public housing are more likely to accept a dwelling that is not fully suited to their needs and would therefore

be less satisfied with their dwelling (Clapham & Kintrea, 1986 ; Niner, 1989; English, 1979). Being able to refuse a home offered would actually ensure that tenants are more satisfied with their house (Fitzpatrick & Pawson, 2007; English, 1979). The influence that waiting time has on residential satisfaction is underexposed in existing scientific research. Waiting times for public housing have been on the social and political agenda in the Netherlands for some time, given the pressure on the housing market. In addition, it is important that everyone can live pleasantly and satisfactorily. This makes this research both socially as scientifically relevant.

The aim of this study is to investigate to what extent there is a relationship between the waiting time for public housing and the residential satisfaction in terms of satisfaction with the house and satisfaction with the neighborhood among public tenants. In view of the fact that the waiting time determines when one is eligible for a home, that is, the longer the waiting time, the greater the chance of success, it is expected that a longer waiting time will lead to a higher degree of residential satisfaction. This is because applicants may be able to exercise choice, consider several houses offered to them and eventually be more satisfied with their housing. The results of this research may be a reason for changing the allocation system for social rental housing, increasing tenant satisfaction and easing the pressure on the housing market. The study group of this thesis contains all movers to a social rental home in the last two years. This can include first-time movers to social housing, as well as turnover movers.

#### **1.4 Main and sub-questions**

The central question for this study is: *“To what extent does waiting time for public housing influence the residential satisfaction of social rental tenants in The Netherlands?”*

The corresponding sub-questions are as follows:

1. How is social housing allocated in the Netherlands and how is waiting time determined?
2. Which determinants have an effect on residential satisfaction according to the literature?
3. What is the relationship between the waiting times for public housing and the residential satisfaction of social tenants in The Netherlands?
4. Are there differences between the residential satisfaction of social tenants who have refused a home and social tenants who have not refused a home?

The first sub-question is answered on the basis of information and literature about the system for public housing in The Netherlands. It provides the background and setting for this research and gives information on the way social housing is allocated and how waiting time is determined.

In the second sub-question, based on literature research, it is investigated which factors influence residential satisfaction. This sub-question mainly examines which factors are specifically important for social tenants.

The third sub-question is answered using quantitative methods to estimate what the relationship is between waiting times for public housing and residential satisfaction. The Dutch Housing Survey, also called the WoOn survey, is used for this. The WoOn survey includes comprehensive data on a cross-section of Dutch housing and households. It contains information about the characteristics of the current home, the previous home and any desired future home. It shows why the household wants to move and why it has not yet been possible to find a new home. When it comes to public housing, the survey contains questions about registration time, search duration, number of viewings and refusals. In addition, it contains information about the household, such as the number of persons that make up the household, the level of education, age, type of home and whether it is an owner-occupied home or rental home, and in the latter case, in which sector.

According to Fitzpatrick & Pawson (2007) and English (1979) being able to refuse a home offered would actually ensure that tenants are more satisfied with their house. The fourth sub-question examines this and tests whether there are differences between the residential satisfaction of two groups, namely home seekers who have not refused an offer and home seekers who have refused an offer. The question is answered using quantitative methods and uses the data of the WoOn-survey.

## **1.5 Outline**

The remainder of this thesis is structured as follows: Chapter 2 sets out the context of this research. It deals with the first sub-question. Chapter 3 examines the underlying theory of residential satisfaction and thus deals with the second sub-question. Chapter 4 deals with the conceptual model, the dataset and its characteristics, the method used in this research and its associated assumptions and ends with the hypotheses. The results of this quantitative study are outlined in chapter 5 and answers sub-questions 3 and 4. Chapter 6 describes implications of this research and provides recommendations for further research. Finally, chapter 7 draws the conclusions of this research and answers the main research question.

## **2. CONTEXT: PUBLIC HOUSING IN THE NETHERLANDS**

This chapter deals with the first sub-question 1: *'How is social housing allocated in the Netherlands and how is waiting time determined?'*. It reflects the background and setting of this research. Besides, it provides information about the public housing system in the Netherlands, the way in which social rental housing is allocated and how waiting time is established.

### **2.1 History and Policy**

As shown in the introduction, housing associations occupy an important place in the organization of Dutch public housing policy. The first housing associations arose in the second half of the nineteenth century on a private initiative by wealthy citizens, factory directors and organized workers, and not by the government (Hakfoort et al., 2002; Hoekstra, 2017). The aim of these housing associations was to build simple housing for workers and to improve living conditions (Hakfoort et al., 2002). The aim was not to provide homes to low-income households, as we know housing associations today. With the adoption of the Housing Act in 1901, housing associations were given a formal role in public housing policy. The Housing Act governed the quality of housing and established a framework for public funding to housing associations (Hakfoort et al., 2002; Hoekstra, 2017).

After the Second World War, housing associations played an important role in solving the then prevailing housing shortage due to wartime damage and high demographic growth (Hakfoort et al., 2002; Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2015). To reduce the housing shortages, the government gave out grants to housing associations for them in order to provide large numbers of new social housing units (Hoekstra, 2017). The central government had a strong influence and control over the housing associations, which were, as it were, acting as executive bodies of the government (Hoekstra, 2017). After the 1980s, government subsidies diminished, and the housing associations became more independent and ultimately fully financially independent (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2015). The strong financial position, as a result of the sale of part of their housing stock at the time of low interest rates and rising house prices, made it possible to engage in other activities besides providing affordable rental housing (Hoekstra, 2017). For example, housing associations began to focus on realizing, managing and leasing commercial and social real estate and investing in social projects, investments in environment, public space and housing for elderly (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2015; Hoekstra, 2017). In addition, they also invested in commercial real estate, more expensive

rental properties and the owner-occupied segment (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2015).

As a consequence of abuses in the social rental sector, involving incidents due to administrative failure and financial mismanagement, and the use of financial resources for purposes other than housing people with a limited budget as a result of the multitude of new activities, the national authorities have taken tight control of the Dutch social rental sector from the 21<sup>st</sup> century (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2015).

In 2011, a debate erupted among the European Union and the Dutch government regarding state aid received by housing associations. State aid can be given to entities that provide Services of General Economic Interest: SGEI (in Dutch: 'diensten van algemeen belang' – DAEB). SGEIs are economic operations that are of particular interest to the public and that would not be offered (or would not be offered under other circumstances) without government intervention. SGEIs are the economic operations that the government considers to be of special interest to a group of socially disadvantaged persons and that would not be offered (or would not be offered under other circumstances) in the absence of government action (European Commission, 2016). Because housing associations also offered services that were not of general economic interest (Non-SGEI or niet-daeb), the requirements of the European Commission were not met, and state aid ended up in activities for which it is not permitted. As a result, a new way of allocating housing by housing associations applied from 2011. Of all vacant dwellings with a controlled rent level, 90% must be allocated to households belonging to the housing associations' target group, namely socially deprived or less privileged in the lower-income group. In addition to this, a rule was introduced in 2013 with the aim of stimulating the flow of households outside the target group of housing associations (these are the skewed tenants: households that rent a house with a rent that is too low in relation to their income). In addition, the rent of housing rented by non-target households may be increased annually by a higher percentage than the rent of households belonging to the target group. This rule also aims to stimulate flow.

## **2.2 New Housing Act 2015**

In 2015 the New Housing Act came into effect, whereby housing associations returned to their core task: building, renting out and managing social rental housing for low income households or those having trouble getting appropriate housing for other reasons (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2015). In line with this, they are allowed to provide specifically defined social housing and certain services for livability as SGEI activities. Other activities that cannot be considered SGEI activities must be carried out by commercial entities

or can be carried out under restrictive terms and conditions (e.g., building new housing in the free market) (Hoekstra, 2017). In addition, the Housing Association Authority has been established, which supervises public housing and financial supervision of the sector and can impose sanctions (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2015). Also, housing associations, municipalities and tenants must make so-called performance agreements about the local housing assignment and the housing allocation system has become stricter (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2015).

### **2.3 Allocation of social housing**

Since the New Housing Act 2015 came into effect, two types of allocation rules apply: rules for allocating social housing to the target group and rules for appropriately allocating a house with a rental price that matches the income. This must prevent low-income home seekers from being allocated a house that is too expensive and that they cannot afford, which leads to payment problems. In addition, it prevents the amount that the government has to spend on housing allowance from rising too high.

Housing associations must allocate their homes to the target group of the social housing policy. At least 90% of the vacant social housing (with a rent up to € 737.14 in 2020) must be allocated to their target groups (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2020c). The main target group of housing associations are households with an income below € 39,055 (price level 2020) (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2020c). Of all vacant social housing, at least 80% must be allocated to that group (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2020c). In addition, associations are allowed to allocate 10% of the homes that become available to households with an income between € 39,055 and € 43,574 until 2021 (price level 2020) but this 10% can also be allocated to households with an income below € 39,055 (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2020c). The remaining vacant housing, up to a maximum of 10%, may be allocated freely so that housing associations may assign to households with an income above € 43,574 (price level 2020) but must give priority to people who, due to a physical or psychological disability, find it difficult to find suitable housing (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2015). This so-called 80/80/10 rule applies until January 1, 2021. From then on, housing associations must allocate 90% of the social rental housing that becomes available to households with an income up to € 39,055 (price level 2020). Housing associations are free to allocate the remaining, up to 10% of the available homes.

For the allocation of social housing, a maximum rental price and a maximum household income apply. Housing associations must ensure that for at least 95% of the housing they let to

households with an income below the standard income of the housing allowance, the rent is below the so-called cap (in Dutch this is called ‘*aftoppingsgrens*’) (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2020b). The capping limit (*aftoppingsgrens*) is the limit set to prevent people from renting a home that is more expensive than they can actually afford. If the rent is above the capping limit, it is not possible to receive the full housing allowance. Two capping limits are used: a low capping limit for one and two-person households of € 619.01 and a high capping limit for three or more-person households of € 663.40. This applies to households with an income that falls within the maximum income limits of the housing allowance (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2020a). The allocation limits in 2020 can be found in table 1 and do not apply to liberalized rental housing with a rent above € 737.14.

**Table 1: Allocation limits of social housing 2020 (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2020a).**

Household	Annual income 2020	(Basic) rent
One person (< state pension age)	< € 23,225	Until € 619.01
	Between € 23,225 and € 39,055	Between € 619.01 and € 737.14
	> € 39,055	From € 737.14 (No rental allowance)
One person (> state pension age)	< € 23,175	Until € 619.01
	Between € 23,175 and € 39,055	Between € 619.01 and € 737.14
	> € 39,055	From € 737.14 (No rental allowance)
Two persons (< state pension age)	< € 31,550	Until € 619.01
	Between € 31,550 and € 39,055	Between € 619.01 and € 737.14
	> € 39,055	From € 737.14 (No rental allowance)
Two persons (> state pension age)	< € 31,475	Until € 619.01
	Between € 31,475 and € 39,055	Between € 619.01 and € 737.14
	> € 39,055	From € 737.14 (No rental allowance)
Three or more persons (< state pension age)	< € 31,550	Until € 663.40
	Between € 31,550 and € 39,055	Between € 663.40 and € 737,14
	> € 39,055	From € 737.14 (No rental allowance)
Two or more persons (> state pension age)	< € 31,475	Until € 663.40
	Between € 31,475 and € 39,055	Between € 663.40 and € 737,14
	> € 39,055	From € 737.14 (No rental allowance)

## 2.4 Housing allowance

Housing allowance is a government subsidy for the costs of renting a home. To be eligible for housing allowance, the monthly rent of the house must be lower than the liberalization limit (€ 737.14 in 2020), which is also the maximum rental price to allow for housing allowance. For

people under 23, the rent allowance limit is € 432.51 in 2020. In addition, to be eligible for housing allowance, the assets (savings and investments) must not be too high. Up to and including 2019, income limits determined whether someone was eligible for housing allowance. Since 1 January 2020, these income limits have lapsed and the housing allowance gradually decreases as income increases. The income limits are still used for appropriate allocation.

The amount of the housing allowance to be received depends on the amount of the income in relation to the amount of the rent. Based on this, a basic rent is determined, which is the amount that a recipient can at least pay himself. The housing allowance fully or partially compensates for the gap between the actual and the basic rent. The extent to which the housing allowance compensates for this difference is determined by a number of limits set by the government. The higher the rent, the more the tenant has to pay proportionately.

Another important understanding is the 'quality discount limit' (in Dutch: '*Kwaliteitskortingsgrens*'). In 2020 the quality discount limit is € 432.51. The amount between the basic rent and the quality discount limit is fully reimbursed by housing allowance. If the actual rent is higher than the quality discount limit, then it depends on the age and household composition of a recipient what he will receive from the rent above the quality discount limit. The government applies the so-called capping limits. The capping limit is the limit set to prevent people from renting a home that is more expensive than they can actually afford. If the rent is above the capping limit, it is not possible to receive the full allowance. Two capping limits are used: a low capping limit for one and two-person households of € 619.01 and a high capping limit for three or more-person households of € 663.40. This applies to households with an income that falls within the maximum income limits of the housing allowance (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2020a).

## **2.5 How to find social rental housing**

In most regions in the Netherlands, housing associations offer their homes through a joint housing distribution system (RIGO Research en Advies, 2019). House seekers who want to be considered for a social rental house usually have to respond to advertisements in which houses are offered. Most social houses are assigned in order of registration period which is the households' rank on the waiting lists (also called first-come-first-served systems (FCFS)). In addition, a part is assigned through lottery, to give so-called emergency seekers with little registration time a chance. This mostly concerns less popular housing (RIGO Research en Advies, 2019). The allocation takes into account certain "suitability criteria" that a home seeker must meet, such as the income criterion and household composition.



The term 'waiting time' indicates how long it took home seekers to find a social rental house. It is a relative concept, as the waiting time depends on the available supply and the wishes of the house seeker. However, there is a difference between the registration period and the search period. The registration period indicates how long home seekers were registered before they found a house (RIGO Research en Advies, 2019). The search duration is the period between the first response of the home seeker and the lease (RIGO Research en Advies, 2019). This is usually much lower than the registration period.

Exceptions to the general allocation rules are made for some type of home seekers. Home seekers who have to move for a very urgent reason can request urgency so that they can get a home with priority. In addition, homes are sometimes rented out directly to special target groups outside the distribution system, including ex-clients of social relief institutions and permit holders. Urgents are home seekers who have been given an urgency status on the basis of an urgency regulation. This is usually for social or medical reasons (RIGO Research en Advies, 2019). A special group of urgents are so-called restructuring or urban renewal officials, who have to move due to demolition or renovation of their home. In most systems, urgents need to respond to the offer themselves, taking precedence over other home seekers (RIGO Research en Advies, 2019). Special target groups are a collective term for groups of house hunters who are helped to find a home outside the regular system for various reasons, including ex-clients from social relief institutions and permit holders. These home seekers usually get a home through direct mediation.

Home seekers can respond to homes they are interested in before a certain deadline via the online system (RIGO Research en Advies, 2019). After the deadline has passed, the list of responses will be formed based on registration duration. A certain number of people at the top of the waiting list will then be invited for a viewing. The candidate with the highest position will be given the opportunity to accept or decline the house. If the candidate refuses, the house will be offered to the next house seeker on the candidate list. In most regions there are no sanctions associated with refusing a home because it is felt that this is part of the freedom of choice of home seekers (RIGO Research en Advies, 2016). In only a few places or regions house seekers who refuse a home three times within a year are blocked for six months or have to pay a fine (RIGO Research en Advies, 2016). With most housing associations, the registration, and therefore the registration time, expires when a household accepts a home. This affects the possibilities and limitations of house seekers (Mulder, 1993).

## THE WAITINGTIMELINE

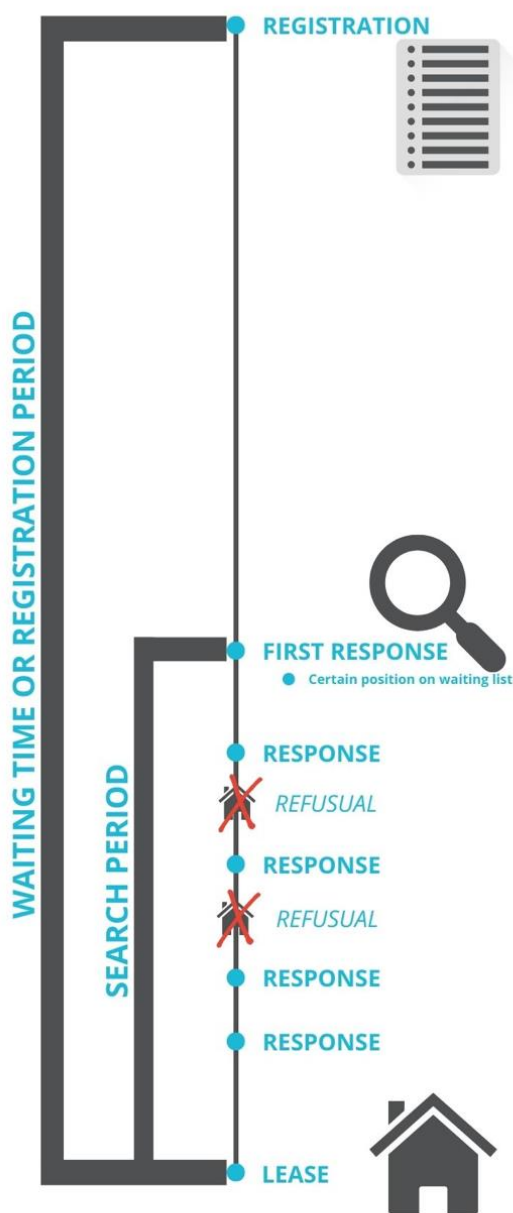


Illustration 1 schematically shows the search for a social rental home. The term 'waitingtime' encompasses the entire process of searching for a home. This process starts with registering with a housing association and ends with the signing of a lease. The waiting time starts with a 'registration period': this is the time of registration, which is necessary to be able to respond to a home. The registration period ends with the signing of the lease. The home seeker is then deregistered from the home seekers database but can re-register. The process will then start again. The 'search period' starts from the first moment that the home seeker starts to actively respond to homes. The 'search period' starts from the first moment that the home seeker starts to actively respond to homes. This can be immediately after registration, but it often happens that home seekers have not yet built-up sufficient waiting time to be eligible for a home. It is therefore often the case that the 'search period' starts a lot later than the 'registration period'. The "search period" ends, as does the "registration period", when the home seeker has found a home. During the search period, a candidate may be assigned a home. It is possible for the home seeker to refuse the home. The search then continues.

Illustration 1: Allocation limits of social housing 2020 (Author, 2020).

The term "waiting time" contains the total registration time and not just the "search period". As indicated earlier, "waiting time" is a relative concept, as it depends on the available supply and the wishes of the house seeker. As a result, it is not possible to display this process in a complete timeline. In addition, there are large differences in waiting time between different cities and regions.

### 3. THEORY

Residential satisfaction is a complex cognitive construct. The concept has been approached by researchers with different disciplinary background. The evaluation between what someone expects and what someone receives determines the level of satisfaction. Between what someone strives for and what someone achieves, there can be a discrepancy that ranges between the lack of something and the fulfillment of something (Campbell et al., 1976; Parker & Mathews, 2001). According to Williamson (1981), satisfaction is driven by the ability to form social relationships as well as physical aspects. This section discusses the theories of residential satisfaction and its parameters and will provide input for the continuation of this research.

#### 3.1 The concept of residential satisfaction

Residential satisfaction is generally defined as a condition where one's housing aspirations are met and where the users are at ease with the amenities, neighbors, and environment (Dekker et al., 2011; Lu, 1999). The most used definition in literature is the one that Galster (1987) and Galster & Hesser (1981) use in their research, where residential satisfaction is described as the disparity of the current and preferred neighborhood and housing situation.

Studies on residential satisfaction are basically grouped into two types (Weidemann & Anderson, 1985). The former considers residential satisfaction as a predictor of behavior (intention to stay or move) In these studies, residential satisfaction is the independent variable and is based on the following three theories: the housing needs theory, housing deficit theory and psychological construct theory. The latter considers residential satisfaction as a criteria of housing quality (Weidemann & Anderson, 1985). In these studies, residential satisfaction is the dependent variable.

Rossi (1955) studied the adjustment of housing space to housing needs and shows in his study *Why Families Move* that during a lifetime, households have different needs regarding the amount of space they require. He introduces the Housing Needs Theory which entails that changes in the household environment or its composition, caused by the family structure shifts associated with life cycle changes, are triggers for dissatisfaction with the living environment (Brown and Moore, 1970; Rossi, 1955). Households are less satisfied with their residential environment, mostly because of a change in space requirements. Households react to this discontent by moving.

The Housing Deficit Theory operationalizes residential (dis)satisfaction and describes that households assess their residential situation based on personal and cultural norms (Morris & Winter, 1978). An actual living situation that does not match personal and cultural norms leads to a housing deficit. This leads to discontent with the residential situation and, as a result, households will make adjustments to their dwellings or move to a place or dwelling that better suits their personal and cultural norms (Morris & Winter, 1978).

The Psychological Construct Theory is introduced by Galster (1985) and rests on the theory that an individual's cognitive construct acts as a reference to face with living conditions and lead to congruence or incongruence. Each individual has certain needs and ambitions, which influences the assessment of the quality or quantity of the facet (Galster & Hesser, 1981).

In addition to these two types of studies, residential satisfaction studies have been addressed from two main viewpoints: the purposive approach and the aspiration-gap approach. The purposive approach defines satisfaction as the degree to which the surrounding is either facilitating or constraining the user's objective (Canter & Rees, 1982; Amole, 2009). People or households have certain objectives, aspirations, and corresponding activities to achieve those objectives (Galster, 1987). The extent to which an individual's or household's residential situation is seen as conducive to achieving these personal goals and aspirations is seen as an explaining factor for their satisfaction (Galster, 1987; Amole, 2009; Ibem & Amole, 2013). For example, a household may have the goal of living in a safer environment and therefore choose to live in a gated community. If the goal is thereby achieved, it could lead to increased residential satisfaction (Tan, 2016). The research implications of this approach are that research must investigate objectives, corresponding activities and environmental factors (Galster, 1987). The aspiration-gap approach defines satisfaction as the difference in an individuals or households perceived actual residential situation and environment and their aspired needs (Galster, 1987; Galster & Hesser, 1981; Amole, 2009). Households will be cognitively conditioned on preferred housing and neighborhood characteristics. If the actual conditions meet the households' preferred needs and aspirations, it is more likely that the household has a positive residential satisfaction level (Galster, 1987; Amérigo & Aragonés, 1997; Tan, 2016). The objective characteristics of the environment and personal characteristics may affect perceptions and evaluations and will therefore need to be identified, which is an implication of this approach (Galster, 1987).

### **3.2 Determinants of residential satisfaction**

As explained above, residential satisfaction includes both the dwelling and neighborhood characteristics. Although housing satisfaction and neighborhood satisfaction are viewed as two

distinct issues and are commonly parsed independently, the two appear to be intimately connected (Galster & Hesser, 1981; Lu, 1999). Research on the determining drivers of residential satisfaction originally focused on the objective characteristics of occupants (Amérigo & Aragonés, 1990). However, residential satisfaction is not exclusively influenced by objective characteristics (Lu, 1999). Galster & Hesser (1981) explain that two sets of objective factors influence residential satisfaction: contextual characteristics and compositional characteristics. Contextual characteristics are the physical and environmental characteristics of the dwelling and the neighborhood. Compositional characteristics are the household characteristics such as stage in the life cycle and social class (Galster & Hesser, 1981). Galster & Hesser (1981) found that the individual's subjective assessments of the physical or social environment contributes to residential satisfaction as well. Amérigo & Aragonés (1997) agree and explain in their model on residential satisfaction that the objective attributions of the residential area are assessed, these turn into subjective perceptions and result in a particular level of satisfaction. Generally, three categories of factors influencing residential satisfaction can be distinguished: dwelling factors, neighborhood factors and demographic or socio-economic characteristics (Hamersma et al., 2014; Buys & Miller, 2012; Lu, 1999). The bottom line is that residential satisfaction is determined by objective characteristics as well as subjective assessments, which in turn includes personal and environmental characteristics.

### **Determinants of dwelling satisfaction**

The characteristics of the dwelling itself are important for evaluating satisfaction with the dwelling. The quantitative features of the dwelling, such as *dwelling size* in terms of *total available square meters* or *number of rooms*, can be seen as the most important determinant of residential satisfaction (Morris & Winter, 1978; Campbell et al., 1976; Buys & Miller, 2012; Dekker et al., 2011; Baker, 2008; Clark & Onaka, 1983; Rossi, 1955; Galster & Hesser, 1981). A more spacious house would offer residents more freedom, resulting in a higher degree of satisfaction (Lu, 1999; Van Beuningen, 2018). A higher number of square meters often goes together with a higher number of rooms. The study by Van Beuningen (2018) shows that the number of rooms per person in the household is a strong determinant of home satisfaction. Although the size of the room is not important, the ability to seek privacy as a resident is important to the degree of satisfaction with the home. A positive correlation among the number of rooms and the level of satisfaction with the dwelling has been found by Morris & Winter (1978). When the quantitative features do not meet the space requirements of the household, this may result in dissatisfaction (Rossi, 1955; Clark & Onaka, 1983; Galster & Hesser, 1981; Dekker et al., 2011).

The second most important determinant of residential satisfaction in terms of dwelling conditions, is *dwelling type*. However, the relationship between the type of home and home satisfaction is difficult to establish due to the subjective wishes of the resident himself. Literature indicates that more spacious housing tends to have more satisfied residents (Lu, 1999). This implies that residents of detached or semi-detached houses would be more satisfied with their home and this is also evident from the study by Diaz-Serrano & Stoyanova (2010): living in a detached or semi-detached house result in higher residential satisfaction than living in a flat. However, the extent to which other factors influence residential satisfaction is a matter of the variables present in the dataset of the relevant studies.

A third determinant of home satisfaction is the *age of the dwelling or building year*. Pruitt (1977) found a negative relationship between a dwellings' age and satisfaction with the dwelling. Age of the dwelling is often related to a building style, design, quality of building materials, sustainability or comfort. Research by Galster (1987) shows that residents of a younger dwelling have a higher degree of satisfaction with the house than residents of an older dwelling. In Galster's (1987) study, residents of homes built before 1940 are particularly less satisfied with their homes. The study includes homes built up to 1969.

A fourth determinant of satisfaction with the home relates to the *quality level or maintenance level of the property* (Ibem & Amole, 2013; Amerigo & Aragones, 1997; Galster & Hesser, 1981). This appears to be an important variable in particular for public housing, where tenants of homes that are poorly maintained have a higher degree of dissatisfaction with the home (Ibem & Amole, 2013). Galster & Hesser (1981) included qualitative features of the house in their research, such as interior and exterior condition and overall modernity. They found that poor condition, incomplete or inoperable sanitary, heating or kitchen facilities result in less satisfaction. According to Amerigo & Aragones (1997), individual, social and cultural values determine one's standard of residential quality or maintenance level of a dwelling and its surroundings. On the basis of this standard, everyone makes observations on the actual living environment. If the gap between the standard and the actual view becomes smaller, this leads to a higher degree of satisfaction.

Several studies show *tenure or home ownership* as a significant variable for housing satisfaction. For example, people with an owner-occupied home turn out to be more satisfied with their home than people with a rental home (Amerigo & Aragones, 1997; Lu, 1999; Speare, 1974; Dekker et al., 2011; Van Beuningen, 2018). Research by Van Beuningen (2018) shows that in the Netherlands this is related to the WOZ value: the higher the WOZ value, the more often people are satisfied with their home. The variables tenure is not included in this study,

as this study focuses specifically on tenants. In addition, the WOZ value is not included as there is little or no variation in the WOZ values of the respondents' homes. This can be explained by the fact that there is little variation in the type of homes.

### **Determinants of neighborhood satisfaction**

Neighborhood satisfaction in general is an important predictor of residential satisfaction. How neighborhood factors come about is a very complex and broad process. Research by Adams (1992) shows that satisfaction with the immediate environment or neighborhood has a significant influence on the overall quality of life and satisfaction in life. The study by Lu (1999) shows that environmental characteristics have a clear effect on housing satisfaction, but that is less than that housing characteristics have an effect on neighborhood satisfaction. It also appears that satisfaction with the neighborhood positively correlates to satisfaction with the dwelling (Lu, 1999).

With regard to neighborhood characteristics, a distinction can be made between subjective and physical environmental characteristics. Subjective environmental characteristics generally affect satisfaction with the neighborhood more than physical characteristics (Bruin & Cook, 1997; Lu, 1999; Oh, 2003). Subjective characteristics generally weigh more heavily for residents because perception influences people more than reality. In addition, there is often a discrepancy between what the resident sees as his or her neighborhood and what the actual, geographic delimitation of the neighborhood is.

*Social cohesion* is a determining factor in the formation of neighborhood satisfaction (Oh, 2003). The relationship between neighbors enhance satisfaction with the neighborhood (Amerigo & Aragonés, 1997; Amole, 2009; Huang & Du, 2015; Iben & Amole, 2013, Li et al., 2019). Research by Galster (1987), Galster & Hesser (1981) and Amérigo & Aragonés (1990) show that the lack of relationships with neighbors is associated with a lower residential satisfaction. Adriaanse (2007) explains that neighborhood satisfaction is influenced by an individual's evaluation of the social climate in their neighborhood. Hamersma et al., (2014) agrees and finds that contact level, which can be explained as the (perception of) social cohesion or relationships in the neighborhood, has a positive influence on residential satisfaction.

Another aspect that has an influence on satisfaction with the neighborhood is the *perceived safety*. Research by Galster & Hesser (1981) shows that residents perceptions of neighborhood crime is associated with significantly lower neighborhood satisfaction. The same appears from research by Lovejoy et al., (2010): perceived safety in the neighborhood is an

important indicator for neighborhood satisfaction. When the inhabitants feel safe in a setting, this will result in a higher level of satisfaction.

A third determinant of satisfaction with the neighborhood is *density* or *urbanization*. A significant relationship between density and satisfaction with the neighborhood is found by Grigolon et al., (2014), Campbell et al., (1976), Li et al., (2019) and Hur & Morrow-Jones (2008). High density or a higher level of urbanization impact the level of residential satisfaction negatively and is explained by negative externalities such as noise, pollution and congestion. Previously, it was theorized that living in densely populated or urban areas would result in a lower degree of satisfaction due to the anonymity that living in an urban area would bring, compared to sparsely populated rural communities. However, the systemic model of Kasarda & Janowitz (1974) shows that residents of densely populated urban areas would be no less satisfied with their environment, as long as they have good social networks.

Other factors that are important for neighborhood satisfaction are proximity (in walking distance) to neighborhood facilities such as recreational, shopping, medical and educational facilities. The quality and quantity of the facilities is also important (Amérigo & Aragonés, 1997; Li et al., 2019; Huang & Du, 2015). However, these factors are not included as variables in this study as the distance and quality of the shops are not measured in the WoOn study. Also, there is mixed evidence on the relevance of these variables (Lovejoy et al., 2010).

### **Demographic characteristics of the individual or household**

In literature, various relationships are found between personal, socio-economic and demographic characteristics and residential satisfaction of both households and individuals. Galster & Hesser (1981) call these the compositional characteristics.

*Age* is one of the indicators that shows a significant relation to residential satisfaction. In general, a higher age is associated with a higher residential satisfaction (Morris & Winter, 1978; Galster & Hesser, 1981; Lu, 1999; Li et al., 2019; Diaz-Serrano & Stoyanova, 2010; Campbell et al., 1976; Amérigo & Aragonés, 1997; Rossi, 1955; Kroesen et al. 2010; Lu, 2002; Permentier et al., 2011). Research by Galster & Hesser (1981) shows that respondents under the age of 35 show a correlation with a lower degree of satisfaction with the neighborhood. This is mainly explained by a lower degree of undertaking activities with the neighbors.

*Household composition* appears to be a variable that is recorded differently. Where it is included, it is included as a control variable. The variable has some overlap with the life-course literature regarding age. The composition of a household can in part be linked to age and the



associated stage of life. The study by Lu (1999) shows that single parents less often demonstrate a high degree of housing satisfaction than married pairs with kids.

*Household size* appears to show a negative relation to residential satisfaction, whereby a rise in the number of children in a household is associated with lower scores in both housing satisfaction as neighborhood satisfaction (Galster & Hesser, 1981; Rossi, 1955; Diaz-Serrano & Stoyanova, 2010). According to Huang & Du (2015), the influence of family size on residential satisfaction is mainly due to the culture and background of households, as some cultures prefer large families. *Marital status* is also often included as a control variable. However, its effect varies, resulting in mixed evidence on the relevance of these variables (Galster & Hesser, 1981; Dennis Lord & Rent, 1987; Lovejoy et al., 2010; Ibem & Amole, 2013).

*Age, household size, household composition and marital status* can be explained according to the life-cycle model by Rossi (1955). In that model, housing preferences and needs change when an individual or household is going through different stages in life, which in turn leads to dissatisfaction with the current residential situation. For example, as the number of people in a household increases, the required number of square meters or rooms in the home increases (Rossi, 1955).

Another factor which influences residential satisfaction is *gender*. This is again a variable where the effects differ. According to Galster & Hesser (1981), female heads of the household are generally less satisfied with both the home and the quality of the home. The study by Lu (1999) shows that men are generally less satisfied with the home than women. The research by Amole (2008) shows that gender is not a predictor of satisfaction.

As far as *household income* is concerned, research shows that households with a higher income also have a higher residential satisfaction, which may be due to the increased choices they have in choosing their residency whereas having a low income might discourage a household from choosing a dwelling and a location (Morris & Winter, 1978; Dekker et al., 2011; Amérigo & Aragonés, 1997; Galster & Hesser, 1981; Clark & Dieleman, 1996; Campbell et al., 1976; Li et al., 2019; Deurloo et al., 1994). However, the factor household income is not included in this study, as certain income limits are applied for the social rental sector. In some studies the *level of education* is included as a control variable. However, no unambiguous result is found. According to Dekker et al., (2011), education has a negative effect on residential satisfaction, while Ren & Folmer (2017) find a positive effect and Lu (1999) an insignificant effect. Education level, positions are related to income. Since there is little

variation in income within the sample, little variation in education level is expected and this variable will not be investigated further.

Various studies have shown that the *length of residence* is related to satisfaction with the dwelling or the neighborhood, although the results differ. One study shows that more years of living in a neighborhood is associated with a higher level of residential satisfaction and some studies show the opposite (Kasarda & Janowitz, 1974; Amole 2009; Lu, 1999; Galster & Hesser, 1981; Speare, 1974; Onibokun, 1976; Marans & Rodgers, 1975). This factor is not included in this survey, as the sample contains respondents who moved to their home in the past 2 years to complete the survey. As a result, there is little variation in the length of residence.

**3.3 Conclusion**

Residential satisfaction can be described as a measure of the disparity of the current and preferred neighborhood and housing situation of a household (Galster, 1987; Galster & Hesser, 1981). A distinction can be made in satisfaction with the dwelling and satisfaction with the living environment or neighborhood. Therefore, residential satisfaction includes objective characteristics of the dwelling and the neighborhood. Nevertheless, the individual’s subjective assessment of the physical or social environment and compositional characteristics such as household characteristics like stage in the life cycle and social class, contribute as well (Amérigo & Aragonés, 1997; Lu, 1999; Galster & Hesser, 1981). The bottom line is that residential satisfaction is determined by objective characteristics as well as subjective assessments, which in turn includes personal and environmental characteristics as well as physical and social components. The determinants which are further explored in this study are listed by category in Table 2.

**Table 2: Determinants of residential satisfaction (Author, 2020).**

<b>Determinants of satisfaction with the dwelling</b>	<b>Determinants of satisfaction with the neighborhood</b>	<b>Demographic characteristics</b>
Dwelling size in sqm.	Social cohesion	Age
Number of rooms	Perceived safety	Household composition
Dwelling type	Density	Household size
Building year		
Maintenance condition of the property		

## 4. DATA & METHODOLOGY

This chapter starts with the conceptual model of this research. Also, a description of the dataset is provided and key figures of the dataset are presented. The cleaning process is described and the variables are operationalized. It thus provides a basis for conducting the data research. Also addressed in this chapter are the methods for conducting the quantitative research, the model and the associated assumptions. Finally, this chapter describes the hypotheses and expectations of this study.

### 4.1 Conceptual model

Figure 1 shows the conceptual model of this research. This is a schematic representation of this research. It shows which factors influence residential satisfaction and provides a basis for subsequent data research and the development of an empirical model. The literature study showed that residential satisfaction includes satisfaction with both the home and the living environment. Satisfaction with the home and satisfaction with the living environment are in turn formed by certain characteristics. Waiting time is the main attribute on which this research focus. As a result, this study analyzes how satisfaction with the dwelling and satisfaction with the neighborhood is affected by waiting time.

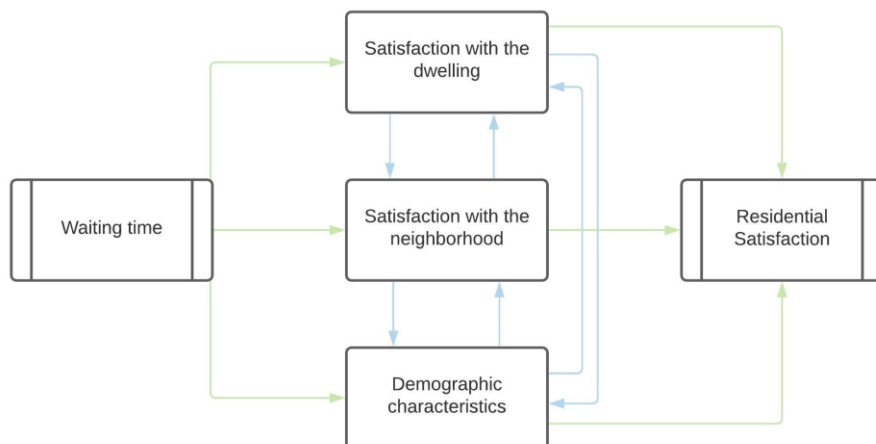


Figure 1: Conceptual model (Author, 2020).

### 4.2 Dataset

This study uses different sources in order to answer the central research question and the sub-questions. Literature has already provided information about residential satisfaction in general. The data of the WoOn-survey can be used to provide more information about the relationship between waiting time and residential satisfaction.

The WoOn survey, also known as the Dutch Housing Survey, has been conducted since 1964 on behalf of the Ministry of the Interior and Kingdom Relations. Since 2006, the survey has been conducted every three years and the data collection is carried out by Statistics Netherlands. The most recent version is conducted in 2018. The WoOn survey is a study of the housing situation of Dutch households, their appearance and the living environment and the choices they make on the housing market. It is a program consisting of a basic study, the so-called Housing Market module, and a number of follow-up modules in which specific topics are investigated. The WoON provides insight into the composition of households, their living situation, their housing costs, their housing preferences, relocations realized and relocation plans and numerous related data. With the availability of more high-quality register data (such as, among others, the Basic Registration of Persons, Tax authority data, Rental points of housing owned by housing associations), more information is being added to WoON (Janssen-Jansen, 2018). This includes, among others, data about the income and assets of households, information about benefits received by households, the value of homes, energetic quality of homes and car ownership. This makes it an important source of information for many parties and an important pillar in support of policy preparation, evaluation and accountability. Since 2006, the survey has been conducted every three years. It offers valuable opportunities to follow housing market developments over time and to place outcomes within the changing economic and social context

In this study, the data of WoON 2018 is used. The data collection for WoON 2018 was carried out by Statistics Netherlands from mid-August 2017 to April 2018. The basis of WoON is a very extensive survey among persons aged 18 and older living in all parts of the Netherlands. A number of preconditions must be met for the data collection, such as a certain number of responses, the sample the sample design, the approach strategy and various quality requirements (Janssen-Jansen, 2018). A total of 114,381 people were invited to participate in the survey, and this resulted in 67,523 responses (59%) (Janssen-Jansen, 2018).

Various control and consistency checks were carried out at WoOn 2018, namely checks for completeness, checks for inconsistencies within the questionnaires and checks for inconsistencies with regard to register data. For example, a response is rejected and removed from the response file if more than 15% of the questions are answered with 'don't know' or 'refuse', or if the sample person is not the same as the respondent, or if the respondent's date of birth is incorrect. Due to the size and scope, the control and consistency checks and the wide population of the study, reliable statements can be made at the national, provincial and local levels (Janssen-Jansen, 2018).

The WoON 2018 questionnaire is based on the WoON 2015 questionnaire. Compared to 2015, WoON 2018 includes a new question block about searching times for public housing. For example, extra questions were asked to people who moved to a social rental home in the past 2 years and people who are searching for a public rental house. These questions are about their search duration, their registration period and how often they have responded to a house. With regard to residential satisfaction, WoOn 2018 contains variables such as home satisfaction, socio-demographic and personal features, housing costs, dwelling features and neighborhood features. Furthermore, the data distinguish home satisfaction, neighborhood satisfaction and general satisfaction in life which makes statements and conclusions exclusively on residential satisfaction possible. The availability and completeness of the dataset regarding both waiting times in the public rental sector and residential satisfaction makes the dataset suitable for this research and makes it possible to make generalizing statements for the Netherlands.

#### **4.3 Data selection, cleaning and analysis**

The total data set consists of 67,523 respondents of which 37,898 are homeowners and 21,454 are tenants. Of all 21,417 tenants who have indicated from whom they rent their home, 68.53% rent from a housing association. This equates to 14,677 tenants. To assess the representativeness of the dataset, it is important to compare a number of distributions in the sample with the population. To this end, population data ownership and rentals are taken from the publicly accessible data from Statistics Netherlands (CBS, 2020b). In 2018, the housing stock consisted of 4,386,769 owner-occupied homes and 3,275,965 rental homes, which is equal to 56.67% and 42.32% of the homes respectively. In the dataset used, these are 37,898 homeowners and 21,454 tenants, which amounts to 64.98% and 35.02% respectively.

With regard to the original dataset, this study has a few boundaries. First of all, this research focuses on social tenants. Respondents who indicated to own a home were the first to be removed from the dataset, including missing values. Subsequently, respondents who indicated that they did not pay rent for the home were removed from the dataset. What remains are respondents who rent a house. Respondents who do not rent from a housing association have been removed from the dataset. This leaves only tenants of housing associations. Because the waiting time is important in this study, a selection is made for respondents who know how long their waiting time was before they moved to their current home. In the WoOn survey, this concerns respondents who moved to their current address no more than 2 years before completing the survey. In addition, it concerns respondents who have actually been registered with the housing association and can therefore indicate their waiting time. After cleaning the dataset, 1,448 observations remained. Unfortunately, the wOonsurvey does not contain

information about the registration period of respondents who moved to a home more than 2 years ago. The study group of this thesis therefore contains all movers to a social rental home. This can include first-time movers to social housing, as well as turnover movers. No distinction is made in the dataset, nor in this study.

#### **4.4 Operationalization variables**

##### **Dependent variable**

This study concerns a study into residential satisfaction. From the literature, it can be concluded that residential satisfaction consists of two components, namely the dwelling and the neighborhood. The method of measuring residential satisfaction is critical in empirical analyses since it has an immediate impact on the results (Lu, 1999). The general residential satisfaction is not measured in the WoOn-Survey. This means that no question is asked that measures both satisfaction with the home and the living environment. Both components are measured separately from each other by the questions: "How satisfied are you with your current home?" And "How satisfied are you with your current living environment?". The answer options consist of (1) very satisfied, (2) satisfied, (3) not satisfied, but not dissatisfied either, (4) dissatisfied and (5) very dissatisfied. The answers of the respondents are based on a Likert-type scale, which indicates an ordinal dependent variable. Both variables have been rescaled so that higher values represent a higher degree of satisfaction.

Many researchers use some kind of aggregate measure or an additive index to determine residential satisfaction. However, inclusive measures of satisfaction with dwelling and neighborhood may be more adequate than randomly generated measures of additivity (Galster, 1987; Lu, 1999). Contextual correlates of residential satisfaction do not understand the correct functional forms of the satisfaction-context relationship, making empirical estimates likely to be biased (Galster, 1987). A respondent places varying levels of importance on certain characteristics of the dwelling or the neighborhood. This weight is mostly not well understood and the correlates do not provide insight into this relationship, leaving important differences in the parameters unaccounted for (Galster, 1987). This makes combining and constructing independently calculated, trustworthy measures of satisfaction very difficult if not impossible (Moore, 1986). A solution to this may be to use a general evaluation based on a singular question (Lu, 1999). Therefore, this research is performed with the two components of residential satisfaction as separate dependent variables. Thus, two regressions are performed. As a consequence, no statements can be made about the effect of waiting time on the overall residential satisfaction, but only about the effect of waiting time on satisfaction with the dwelling and satisfaction with the living environment separately.

### **Independent variable**

The independent variable in this study is waiting time. In the WoON survey, respondents who indicated that they rented a home from a housing association were asked whether they were registered with a housing association before moving to their current home. If this question is answered with "yes", you will then be asked about the waiting time by means of the question "How long were you registered? It concerns the number of years + months. If you were registered with multiple organizations, it is the longest registration ". Respondents must then first enter the number of years and then the number of months. These variables have been merged into a new variable, so that the total number of months that a respondent has been registered becomes transparent. Waiting time is therefore measured as a continuous variable.

The visual normality tests, by means of a histogram, box plot, q-q plot and scatter plot which can be found in appendix I, showed that there is no normal distribution for the variable waiting time and that the variable contains extreme values. Transforming the variable into a natural logarithm removes 18 observations that take the value 0. This value would mean that there has not been any waiting time. These respondents are not relevant to the study and therefore removal does not pose any further problems. Based on the visual normality tests of the natural logarithmic distribution of Waiting time, only a marginal improvement of the distribution of the variable is realized. The Shapiro Wilk W test shows a significant result. When looking at the W value, the logarithmic distribution of waiting time is the closest to 1. While transforming the variable into a natural logarithm does not produce perfection, the natural logarithm comes closest to the W value in, as a result of which it was decided to maintain the transformation.

### **Control variables**

Apart from the independent variable that is central in this research, a few control variables are considered. These are relevant variables that could possibly distort the results of the current research, if these variables were not controlled. The control variables are subdivided into control variables that are relevant for satisfaction with the home, control variables that are relevant for satisfaction with the living environment and control variables that are relevant for both dependent variables. Adding these variables into the analysis will probably increase the explanatory power of the model and control for the effects of other variables prevents the model from giving misleading statistical evidence.

#### **Control variables of satisfaction with dwelling:**

*Dwelling size in terms of square meters and number of rooms* are both taken from the dataset in which these variables are included as a continuous variable.

*Dwelling type* is a categorical variable consisting of a total of 8 classes: (1) Flat, apartment, multi-storey house, up- or downstairs apartment; (2) Terraced house, corner house; (3) Semi-detached house; (4) Detached house; (5) Farm, house with garden business; (6) House with separate shop, office, practice or business space; (7) Housing unit with shared use of kitchen or toilet; (8) Other type of housing. There appear to be no observations in categories 4, 5 and 6 and there are no missing values (8).

*Building period* is included from the dataset as a categorical variable. Although the dataset has included this variable as a continuous variable (building year), the categorical variant was chosen because of the scale level. The continuous variable varies on more than 500 scales, compared to 5 scales of the dependent variable. The scales of the categorical variable are (1) <1945; (2) 1945-1959; (3) 1960-1969; (4) 1970-1979; (5) 1980-1989; (6) 1990-1999; (7) 2000-2009; (8) > 2010. The variable has been rescaled so that higher value represents an older dwelling. This makes the interpretation of the variable easier.

*Maintenance condition* is the survey measured by the statement "The house is poorly maintained?". The statement is measured on a Likert scale where the answer options are: (1) totally agree, (2) agree, (3) do not agree but do not disagree either, (4) disagree and (5) totally disagree. The variable has been rescaled so that the answer categories are positively oriented and are therefore in line with the answer categories of other variables. However, the negative component in the question must be taken into account in the interpretation. A higher value implies a poorly maintained home.

#### **Control variables of satisfaction with neighborhood:**

*Social cohesion* is measured using a likert scale in which the respondent must indicate to what extent he agrees with the statement "I have a lot of contact with my immediate neighbors". The answer options are: (1) totally agree, (2) agree, (3) do not agree but do not disagree either, (4) disagree and (5) totally disagree. For the purpose of interpretation, the variable has been rescaled, so that a higher value represents a higher level of contact with neighbors.

*Safety* is measured on a likert scale in which the respondent must indicate to what extent he agrees with the statement "I am afraid of being harassed or robbed in this neighborhood". The answer options are: (1) totally agree, (2) agree, (3) do not agree but do not disagree either, (4) disagree and (5) totally disagree. The variable has been rescaled so that the answer categories are positively oriented and are therefore in line with the answer categories of other variables. However, the negative component in the question must be taken into account in the interpretation. A higher value implies lower degree of perceived safety.



The degree of *urbanization* is based on the number of addresses located within a square kilometer. This is categorized in the following 5 scales: (1) Very urban, > 2500 addresses per square km<sup>2</sup>; (2) Highly urban, 1500-2500 addresses per square km<sup>2</sup>; (3) Moderate Urban, 1000-1500 addresses per square km<sup>2</sup>; (4) Little Urban 500-1000 addresses per square km<sup>2</sup> and (5) Not urban, <500 addresses per square km<sup>2</sup>. The variable has been rescaled, so that a higher value represents a higher level of urbanity.

#### **Demographic control variables:**

*Age* is classified according to the following 7 classes: (1) 17-24 years; (2) 25-34 years; (3) 35-44 years; (4) 45-54 years; (5) 55-64 years old; (6) 65-74 years and (7) 75 years and older.

*Household composition* is included in 5 classes: (1) One-person household; (2) pair; (3) Couple + children; (4) 1-parent family and (5) non-family household.

*Household size* is included in 5 classes: (1) 1 person; (2) 2 persons; (3) 3 persons; (4) 4 persons and (5) 5 or more persons.

#### **4.5 The model**

This is a quantitative study on the effect of waiting time on satisfaction with the dwelling and the neighborhood, in other words, residential satisfaction. As explained earlier, this research is performed with the two components of residential satisfaction as separate dependent variables. Thus, two regressions are performed. The dependent variables, dwelling satisfaction and neighborhood satisfaction, are ordinal variables measured on a 5-point Likert scale.

Ordinal, or categorical, variables violate the assumptions for Ordinary Least Square (OLS) models that requires that outcome variables have interval or ratio level measurement. The cutpoints for all the categories of the ordinal outcome variables in this study are known. Because the range between categories 2 and 3 may be different from the range between 3 and 4, accepting a particular range between the categories would be random (McCullagh, 1980). The relative effect of particular explanatory variables on satisfaction is probably being underestimated and it often fails to model linearity, normality and homoscedasticity (Mckelvey & Zavoina, 1975; Lu, 1999).

The Binary Logit Model is frequently used for categorical variables. However, it assumes that the dependent variable is dichotomous or binary in nature. The range is between 0 and 1 and there are often two categorical levels, such as "yes" and "no" or "satisfied" and "dissatisfied".

Another model that can be used is the Multinomial Logistic Regression. However, this regression assumes that there is no order in the categories of the outcome variable, so that information about the ranking is lost when reporting back the data on contributing factors of each independent variable

With categorized and ranked outcome variables, the Proportional Odds Model with the Ordinal Logistic Regression is a widely used model (Liu, 2009). It is a generalized version of the binary logistic regression model in case there are over two ordinal levels of the response variable (Liu, 2009). The probabilities (the odds) of being below or on a special level of the answer categories is estimated by the model and it estimates the impact of the independent variables on satisfaction with house or the neighborhood. The parameters relate to the estimated probability of being more satisfied than the least satisfied category or the lower category and can be read as those of a normal logistic regression (Roet & Mulder, 2010). The categories of the ordinal variables can be thought of as contiguous intervals on the continuous scale (Lu, 1999). The ordinal logistic regression model is also understood as a latent-variables model (Liu, 2009; Lu, 1999). The ordinal response variable, noted as  $y$ , is seen as the discretized implementation of an underlying latent (unobservable) continuous random variable  $y^*$ . The  $y$  is the observed ordinal variable, and we can only observe the underlying latent variable  $y^*$  when it crosses thresholds. Thresholds are the boundaries between the dependent variable outcomes: an increase from 'Very Dissatisfied' to 'Dissatisfied' is crossing a threshold and keeps the ordinal nature of the outcomes of dependent variables. The underlying latent variable  $y^*$  would conform to a linear regression model which holds:

$$y^* = x\beta + \varepsilon_i$$

$y^*$  represents the latent variable,  $x$  is the covariate,  $\beta$  is the regression coefficient and  $\varepsilon$  is the error term. Let  $y_i^*$  be divided by some cut points or thresholds:  $\alpha_1, \alpha_2, \alpha_3 \dots \alpha_j$  and  $\alpha_1 < \alpha_2 < \alpha_3 \dots < \alpha_j$ . Considering the observed level of satisfaction for the dwelling and neighborhood separately are the ordinal outcomes,  $y$ , ranging from 'Very Dissatisfied' to 'Very Satisfied' where 1 = Very Dissatisfied, 2 = Dissatisfied, 3 = Neutral, 4 = Satisfied and 5 = Very Satisfied, define:

$$y = \left\{ \begin{array}{l} \text{Very Dissatisfied (= 1) if } y^* \leq \alpha_1 \\ \text{Dissatisfied (= 2) if } \alpha_1 < y^* \leq \alpha_2 \\ \text{Neutral (= 3) if } \alpha_2 < y^* \leq \alpha_3 \\ \text{Satisfied (= 4) if } \alpha_3 < y^* \leq \alpha_4 \\ \text{Very Satisfied (= 5) if } \alpha_4 < y^* \leq \infty \end{array} \right\}$$

The probability of reporting a particular level of housing or neighborhood satisfaction is  $P_i = P(y = i/x)$ . The probability of a respondent at any satisfaction level can be estimated:

$$\begin{aligned}
 P(y = 1) &= P(y^* \leq \alpha_1) = P(x\beta + \varepsilon_i \leq \alpha_1) = F(\alpha_1 - x\beta); \\
 P(y = 2) &= P(\alpha_1 < y^* \leq \alpha_2) = F(\alpha_2 - x\beta) - F(\alpha_1 - x\beta); \\
 P(y = 3) &= P(\alpha_2 < y^* \leq \alpha_3) = F(\alpha_3 - x\beta) - F(\alpha_2 - x\beta) - F(\alpha_1 - x\beta); \\
 P(y = 4) &= P(\alpha_3 < y^* \leq \alpha_4) = F(\alpha_4 - x\beta) - F(\alpha_3 - x\beta) - F(\alpha_2 - x\beta) - F(\alpha_1 - x\beta); \\
 P(y = 5) &= P(\alpha_4 < y^* \leq \infty) = 1 - F(\alpha_4 - x\beta)
 \end{aligned}$$

With this model, estimation of the cumulative probabilities is possible:

$$P(y \leq j) = F(\alpha_j - x\beta)$$

Where  $j = 1, 2, \dots, J-1$ . Since there are five categories,  $J = 5$ .

The analysis of the regressions will be performed using the statistical analysis program Stata. Stata expresses the ordinal logistic regression model in the next logit format:

$$\begin{aligned}
 \ln(Y'_j) &= \text{logit}[\pi(x)] \\
 &= \ln\left(\frac{\pi_j(x)}{1 - \pi_j(x)}\right) \\
 &= \alpha_j + (-\beta_1 X_1 - \beta_2 X_2 - \dots - \beta_p X_p)
 \end{aligned}$$

Where  $\pi_j(x) = \pi(Y \leq j | x_1 x_2 \dots x_p)$ , which is the probability of being below or on category  $j$ , given a set of predictors.  $J = 1, 2, \dots, J-1$ .  $\alpha_j$  are the cut points and  $\beta_1, \beta_2, \dots, \beta_p$  are the logit coefficients. One of the assumptions of the Proportional Odds Model is that the probability (or odds) of any predictor is assumed consistent across categories, which is the case with this formula. The Proportional Odds Model works with the natural log of the odds or the logit. The proportional odds model can be redefined to estimate the  $\ln$  (odds) of being at or below the  $j^{\text{th}}$  category:

$$\begin{aligned}
 &\text{logit} [\pi(Y \leq j | x_1 x_2 \dots x_p)] \\
 &= \ln\left(\frac{\pi(Y \leq j | x_1 x_2 \dots x_p)}{\pi(Y > j | x_1 x_2 \dots x_p)}\right) \\
 &= \alpha_j + (-\beta_1 X_1 - \beta_2 X_2 - \dots - \beta_p X_p)
 \end{aligned}$$

Hence, over  $J-1$  response categories, this model forecasts cumulative logits. Converting the cumulative logits obtains the estimated cumulative odds and probabilities of being at or below the  $j^{\text{th}}$  category.

The Proportional Odds Model comes with a few assumptions which need to be checked to ensure that it is a valid model:

1. There is an ordering in the dependent variable;

2. One or more of the independent variables must be treated as either continuous or categorical;
3. No multicollinearity;
4. Proportional odds.

As explained earlier, the dependent variables (satisfaction with dwelling and satisfaction with neighborhood) are both measured at an ordinal level. The outcomes are categorical ranging from 'Very Dissatisfied' to 'Very Satisfied' on a 5-point Likert scale. The independent variable, waiting time, will be treated as continuous. Thus, assumptions 1 and 2 are satisfied.

To understand possible associations between the variables, a Spearman's correlation was run. The Spearman correlation test is a nonparametric test. It is designed to determine the strength and direction of the relationship between two variables measured on an ordinal or continuous scale. It shows that for both satisfaction with the dwelling and satisfaction with the neighborhood, in both cases except for one variable, all variables are below the 0.7 limit for high correlation. The correlations can be found in appendix II and III. The Variance Inflation Factor (VIF) can be used to assess whether multicollinearity might be a concern in the dataset. Predictors that are highly collinear can cause problems when interpreting results. A VIF is not useful here because the dependent variable of an ordinal logistic regression model is categorical in nature. However, it still gives an idea of possible problems with multicollinearity. The VIF is calculated using the Collin procedure in Stata. The tolerance level for each variable is computed as well. The VIF factor should not be greater than 10 and the tolerance level should not be below 0.1. For both satisfaction with the dwelling and satisfaction with the neighborhood, the VIF levels are not greater than 10 or below 0.1. For satisfaction with the dwelling, the mean VIF is 1.55 and for satisfaction with the neighborhood, the mean VIF is 1.44. Thus, we can conclude that also assumption 3 is satisfied.

The final assumption about proportional probabilities implies that there is an equal correlation among any couple of outcome groups. To test this assumption, the Brant test can be used. Appendix IV shows the Brant test for both variables. It shows that for satisfaction with the dwelling, three of the nine variables are significant at the 0.01 level (sqm, smaintenance, age, hhcompos). For satisfaction with the neighborhood,  $p > \chi^2 = 0.260$  which means that the assumption about the proportional odds is met and that there is only one set of coefficients, implying that there is just a single model. When violating this assumption, which is the case for satisfaction with the dwelling, different models are required to explain the association between each set of outcome groups. The multinomial logistic regression model is a model to consider in this case. However, compared to the parallel-lines model this model has many more parameters, making its interpretation not so easy (Williams, 2006). The *gologit* model is not in

conflict with the parallel-lines assumption. Like the other model, this model also includes far more parameters than necessary. Even when the assumption is violated for some variables, both models liberate all the variables from the parallel-lines constraint (Williams, 2006). *Gologit2* fits partial proportional odds models, easing the parallel-lines constraint for those variables where it is not warranted and thus circumvents the restriction (Williams, 2006). However, as Williams (2006) and Lu (1999) stated, when a vast share of the variables are proportional, there should be no major issues expected when executing the ordered Logistic Regression. Therefore, for satisfaction with the dwelling as well as satisfaction with the neighborhood, the *ologit* function in Stata will be used.

To test for differences in the degree of satisfaction with the dwelling or living environment between social renters who have refused a home offered and renters who have not refused a home offered, a Mann-Whitney Test is performed with the Stata command *ranksum*. To do this, the sample is first split into two sub-samples, namely a group that refused and a group that did not. The Mann-Whitney Test then compares the two sample means that tests whether two sample means are equal or not.

#### **4.6 Hypotheses**

A number of hypotheses are formulated to map the expectations regarding the results. Although the effect of waiting times on the residential satisfaction of social tenants has not been investigated before, on the basis of the literature on waiting times and residential satisfaction separately, hypotheses can be formulated:

##### Hypothesis 1:

H<sub>0</sub>: In the population, there is no association between waiting time and satisfaction with the dwelling.

H<sub>1</sub>: In the population, there is an association between waiting time and satisfaction with the dwelling.

##### Hypothesis 2:

H<sub>0</sub>: In the population, there is no association between waiting time and satisfaction with the neighborhood.

H<sub>1</sub>: In the population, there is an association between waiting time and satisfaction with the neighborhood.

Literature has shown that applicants accepted social housing which did not completely meet their demands because they had to wait for far less time than they would have had for housing

of their first choice in the same town (English, 1979). The literature also shows that household owners with pressing reasons for moving have high costs of remaining in their present accommodation. These are the people that are prepared to live in almost any location (Clapham & Kintrea, 1986). Niner (1989) contributes to this by stating that people in need of social housing are pushed to accept poor quality accommodation or accommodation which does not match their wishes, mostly in the least desirable neighborhoods. These findings suggest that some applicants may be able to exercise choice and be more satisfied with their housing, even though highly constrained, within the public sector. It can therefore be expected that there is an effect of waiting time on satisfaction.

An exploration of the dataset already shows that despite long search times, home seekers do not automatically accept a house offered. According to the Dutch Housing Survey 2018, of all recently relocated tenants, around 40% have refused to offer a house while looking for another house (Ministry of the Interior and Kingdom Relations & Central Bureau of Statistics, 2019). In areas with high tension on the housing market, a housing offer is more often refused during the search for a housing association than in areas with less market pressure. In these areas, home seekers are probably more critical when accepting a house offered because the possibility of moving again in the foreseeable future to a house that better meets the wishes is smaller in areas where housing is scarcer (Ministry of the Interior and Kingdom Relations & Central Bureau of Statistics, 2019). According to the Dutch Housing Survey 2018, one of the main reasons why an offered house is refused is that the house does not meet the requirements. On the other hand, people are in need of a house and might therefore accept a house which actually does not meet their requirements in terms of housing or neighborhood characteristics, which might result in residential dissatisfaction. The literature also shows that people who want to move because they are dissatisfied with their dwelling and its location might have a delay in their search due to the allocation system. However, these households take an extensive search process by being able to wait and consider several houses offered to them (Clapham & Kintrea, 1986). This therefore creates the expectation that there is a difference in residential satisfaction between tenants who have refused a home offered and tenants who have refused no home. The following hypotheses have therefore been formulated:

### Hypothesis 3:

$H_0$ : In the population, satisfaction with the dwelling is not equal between social renters who have refused a home offered and renters who have not refused a home offered.

$H_1$ : In the population, satisfaction with the dwelling is equal between social renters who have refused a home offered and renters who have not refused a home offered.

Hypothesis 4:

H<sub>0</sub>: In the population, satisfaction with the neighborhood is not equal between social renters who have refused a home offered and renters who have not refused a home offered.

H<sub>1</sub>: In the population, satisfaction with the neighborhood is equal between social renters who have refused a home offered and renters who have not refused a home offered.

## 5. RESULTS

This section elaborates on the results of the Ordered Logistic Regressions for satisfaction with the dwelling and satisfaction with the neighborhood. The Ordered Logistic Regression is performed in Stata, using *ologit*.

### 5.1 Interpretation

The Ordered Logistic Regression estimates the log odds of the predictors. Because the log odds differ by a scale factor, they cannot be used to interpret the magnitude of the predictors on the outcome variable. Both dependent variables are ordinal with 5 categories. A positive log odd means that the predictor increases the odds of being in a higher category of satisfaction and would be more satisfied since the categories are orientated positively. With the log odds, the odds ratio can be computed with the following formula:  $\text{odds ratio} = \exp^{\log \text{ odds}}$ . A percentage outcome can be calculated using the formula  $((\exp^{\log \text{ odds}})-1)*100$ .

### 5.2 Results of Satisfaction with the dwelling

Table 3 displays the results of the Ordered Logistic Regression of satisfaction with the dwelling. By adding independent variables step by step to the model, it is possible to gain insight into the overall effect of these explanatory variables on satisfaction. Model 1 is based on the dependent and independent variable, satisfaction with the dwelling and waiting time, only. In model 2, variables that represent characteristics of the dwelling are added. In model 3, variables that represent demographic characteristics are added as well.

Model 1 shows that waiting time is significant at the 10% level. However, the p-value is 0.055 which indicates that it is nearly significant for the 5% level. The coefficient is positive, indicating that social tenants that who have had a longer waiting time are more satisfied with their dwelling. The log odds of waiting time are 0.0762347, indicating an odds ratio of 1.0792 which means that social tenants are 7,92% more likely to be satisfied with their dwelling when they had a longer waiting time. This is in line with English (1979) findings, which indicates that applicants who are able to wait longer are more satisfied with their housing. Looking at the Pseudo R2, model 1 has a small explanatory power of 0.11%.

In model 2, variables that represent characteristics of the dwelling are added. All variables, except waiting time, are significant to at least one of the statistical significance levels. In this model, the type of home is tested with the reference category "Flat, apartment, multi-storey house, up- or downstairs apartment". This shows that compared to the reference category Terraced house, corner house and Semi-detached house are associated with a lower degree



of home satisfaction. This is a striking result, as research by Diaz-Serrano & Stoyanova (2010) has shown that living in a detached or semi-detached house result in higher residential satisfaction than living in a flat. There is no multicollinearity between waitingtime and dwelling type. However, this result can be explained by the fact that there are almost no semi-detached houses in the supply of housing associations. Only 23 respondents in the dataset live in such a home. The waiting time for these types of homes is on average 6 years. Compared to the reference category, homes in which facilities are shared are associated with a higher degree of home satisfaction. This could be student housing, for example.

Furthermore, this model shows that an increase in the number of square meters and the number of rooms has a positive influence on residential satisfaction. The log odds of square meters is 0.0040178, indicating an odds ratio of 1.004 which means that social tenants are 40% more satisfied with their dwelling when more square meters are available. Social tenants are 6.27% more satisfied with their dwelling when the dwelling has more rooms. This is consistent with the findings from the literature. Various researchers, such as Lu (1999), Van Beuningen (2018), Morris & Winter (1978), Campbell et al., (1976), Buys & Miller (2012) and Galster & Hesser (1981) came to the same finding.

The building period is also a factor in declaring satisfaction with the home. The log odds of the building period is negative, namely -0.1176691. This corresponds to an odds ratio of 1.1249, which means that an older home represents a lower level of satisfaction, namely about 12%. This is consistent with the findings of Galster (1987) who indicated that residents of a younger dwelling have a higher degree of satisfaction with the house than residents of an older dwelling. When interpreting the result of maintenance, account must be taken of the negative statement of the question in the dataset, as described in chapter 4.4. It appears that the poorer the home is maintained, the less satisfied someone is. While this is a logical assumption, it is also consistent with the findings of Ibem & Amole (2013) who find that tenants of homes that are poorly maintained have a higher degree of dissatisfaction with the home. This model has Psuedo R2 of 7.9%.

In model 3, variables representing demographic characteristics have also been added. The Psuedo R2 increases to 8.3%. None of the added variables are significant. In addition, none of the categories of the variable type dwelling are significant in this model. After adding demographic characteristics, the relative importance of sqm, building period and maintenance becomes less. Waitingtime also decreases, although the result is not significant. Adding more variables to the model results in less and less significant variable waitingtime. Age makes a positive contribution to dwelling satisfaction. This is consistent with the findings of Morris &

Winter (1978), Galster & Hesser (1981), Lu (1999) and many other researchers. The study by Lu (1999) shows that single parents less often demonstrate a high degree of housing satisfaction than married pairs with kids. This is also evident from the results of the regression, although the result is not significant. Household size appears to have a negative influence on satisfaction with the dwelling, however this result is not significant as well. It does agree with the literature: Galster & Hesser (1981) and Diaz-Serrano & Stoyanova (2010) found the same result.

These findings provide an answer to the question if there is an effect of waiting time on satisfaction with the dwelling. The null hypothesis states that there is no association between waiting time and satisfaction with the dwelling. The results of the Ordered Logistic Regression Model of satisfaction with the dwelling show no significant results for the independent variable. There is no credible evidence that there is an association between waiting time and satisfaction with the dwelling, however, there is also no proof that there is no association between waiting time and satisfaction with the dwelling. Thus, we fail to reject the null hypothesis. Waiting time is not a relevant explanatory factor for satisfaction with the dwelling. It can be concluded that when it comes to satisfaction with the dwelling, other factors are more important in explaining satisfaction with the dwelling than waiting time.

Table 4 shows the results of the Mann-Whitney test, performed by splitting the sample in two sub-samples (refusers and non-refusers) to test for differences between satisfaction with the dwelling of social renters who have refused a dwelling offered (ref = yes) and renters who have not refused a dwelling offered (ref = no). Literature has shown that being able to refuse a dwelling offered would actually ensure that tenants are more satisfied with the dwelling (Fitzpatrick & Pawson, 2007; English 1979). The test shows a p-value of 0.4042, which is bigger than all the significance levels (1%, 5% and 10%), therefore, we fail to reject the null hypothesis. There is no evidence that suggests that the median satisfaction for the dwelling differs between social renters who have refused a home offered and social renters who have not refused a home offered, however, there is no evidence that suggests that the median satisfaction between these groups is equal either. Although a difference between groups is expected, whereby the group of home seekers who refused an assigned dwelling (ref = yes) would have a higher degree of satisfaction with the dwelling than those who did not refuse an assigned dwelling (ref = no), no evidence that supports this expectation has been found in this study.

**Table 3: Ordered Logistic Regression on "Satisfaction with Dwelling"**

	Model 1				Model 2				Model 3			
	Log Odds	Standard Error	95% confidence interval		Log Odds	Standard Error	95% confidence interval		Log Odds	Standard Error	95% confidence interval	
Waitingtime_in	0.0762347*	0.0396809	-0.0015385	0.1540079	0.0597579	0.0412950	-0.0211788	0.1406947	0.0504032	0.04157	-0.031071	0.1318772
Sqm					0.0040178*	0.0021496	-0.0001952	0.0082309	0.0039763*	0.00217	-0.000285	0.0082375
Rooms					0.0608738*	0.0592365	-0.0552277	0.1769753	0.0987093	0.06183	-0.022472	0.2198901
<u>Typedw</u> (base = Flat, ap., multi-storey house, up- or downstairs ap.)												
Terraced house, corner house					-0.1168262**	0.1280737	-0.3678460	0.1341937	-0.0611546	0.13078	-0.317472	0.1951631
Semi-detached house					-0.2820921*	0.4145934	-0.3678460	0.5304961	-0.1858016	0.41981	-1.008616	0.6370133
Housing with shared use of kitchen or toilet					0.1243081*	0.6303330	-1.1111220	1.3597380	0.3257127	0.63898	-0.926672	1.578098
Other type of housing					0.1925834*	0.4490220	-0.6874836	1.0726500	0.2521472	0.45354	-0.636781	1.141075
Buildingperiod					-0.1176691***	0.0282599	-0.1730575	-0.0622806	-0.1086651***	0.02867	-0.164849	-0.052482
Smaintenance					-0.7307617***	0.0549933	-0.8385467	-0.6229768	-0.7089508***	0.05558	-0.81788	-0.052482
Age									0.0706374**	0.03025	0.0113452	0.1299296
<u>Hhcompos</u> (base= one-person)												
Pair									-0.0828212	0.18805	-0.45139	0.2857471
Pair + Child(ern)									0.012371	0.38442	-0.741082	0.765824
1-parent family									-0.2618176	0.25655	-0.764651	0.2410152
Non-family household									-0.2618176	0.34234	-0.781359	0.5605886
Hhsize									-0.1103853	0.12412	-0.321944	0.1646144
<i>Observations</i>	1448				1448				1448			
<i>LR Chi2</i>	3.69				268.95				292.26			
<i>Prob &gt; Chi2</i>	0.0547				0.0000				0.0000			
<i>Pseudo R2</i>	0.0011				0.0790				0.0830			

Note: The dependent variable is Waitingtime\_in. \*, \*\*, \*\*\* are significant at 10%, 5% and 1% respectively.

**Table 4: Mann-Whitney Test - Satisfaction with dwelling VS. Refusals**

Ref	Observations	Rank sum	Expected
Yes (refuser)	387	180496.5	183631.5
No (non-refuser)	561	269329.5	266194.5
Combined	948	449826.0	449826.0
Z	-0.834		
Prob >  z	0.4042		

Note: Variable ref indicates whether or not an individual has refused a dwelling offered. Ho:  $sdwelling(ref==Yes) = sdwelling(ref==No)$

### 5.3 Results of Satisfaction with the neighborhood

Table 5 displays the results of the Ordered Logistic Regression of satisfaction with the neighborhood. By adding independent variables step by step to the model, it is possible to gain insight into the overall effect of these explanatory variables on satisfaction. Model 1 is based on the dependent and independent variable, satisfaction with the neighborhood and waiting time, only. In model 2, variables that represent characteristics of the neighborhood are added. In model 3, variables that represent demographic characteristics are added as well.

Model 1 shows that waiting time is significant at the 10% level. The coefficient is positive, indicating that social tenants that who have had a longer waiting time are more satisfied with their dwelling. The log odds of waiting time is 0.0663893, indicating an odds ratio of 1.0686 which means that social tenants are 6,86% more likely to be satisfied with their neighborhood when they had a longer waiting time. This is in line with the findings of Clapham & Kintrea (1986) who find that being able to wait results in a higher degree of satisfaction. Looking at the Pseudo R2, model 1 has a small explanatory power of 0.08%.

In model 2, variables that represent characteristics of the neighborhood are added. All variables, except waiting time and urbanity, are significant to at least one of the statistical significance levels. Waiting time becomes even less significant in this model, showing that the added variables explain more of satisfaction with the living environment than waiting time. Social cohesion appears to have a positive influence on satisfaction with the neighborhood. The log odds is 0.5314115, corresponding to an odds ratio of 1,7013, meaning that social tenants are 70% more likely to be on a higher level of satisfaction when there is more social cohesion. This is in line with the results of Galster (1987), Galster & Hesser (1981) and Amérigo & Aragonés (1990) who show that the lack of relationships with neighbors is associated with a lower residential satisfaction. The variable safety is negative, but a higher value of the variable safety implies here a lower degree of perceived safety. This implies that when social tenants feel less safe, they are more likely to be on a lower level of satisfaction

with the neighborhood. This is in line with the findings of Galster & Hesser (1981) and Lovejoy et al., (2010). Although there is no question of multicollinearity, this result can be explained by the fact that crime figures are visible in advance. As a result, home seekers can reject a home in certain neighborhoods where a high degree of crime occurs. Another explanation may be that fewer homes may become available in good neighborhoods, because current tenants do not leave their houses in these neighborhoods.

No significant result for urbanity has been found. However, the log odds would indicate that the more dense a neighborhood is, the more likely it is that a social tenant is less satisfied with the neighborhood. This would suggest that social tenants are more likely to be dissatisfied in a higher urban environment. This, as well, corresponds with the findings in the literature, stating that a higher level of urbanization impact the level of residential satisfaction negatively and is explained by negative externalities such as noise, pollution and congestion (Hur & Morrow-Jones, 2008).

In model 3, variables representing demographic characteristics have also been added. The Psuedo R2 increases to 9.4 %. As well as for satisfaction with the dwelling, none of the added variables are significant for satisfaction with the neighborhood. The relative importance of waitingtime decreases, although the result is not significant. Adding more variables to the model results in less and less significant variable waitingtime. Age makes a positive contribution to neighborhood satisfaction, which was also found in the literature of Morris & Winter (1978), Galster & Hesser (1981) and Lu (1999).

These findings provide an answer to the question if there is an effect of waiting time on satisfaction with the neighborhood. The conclusion is the same as for satisfaction with the dwelling. The null hypothesis states that there is no association between waiting time and satisfaction with the neighborhood. The results of the Ordered Logistic Regression Model of satisfaction with the neighborhood show no significant results for the independent variable. There is no credible evidence that there is an association between waiting time and satisfaction with the neighborhood, however, there is also no proof that there is no association between waiting time and satisfaction with the neighborhood. Thus, we fail to reject the null hypothesis. Waiting time is not a relevant explanatory factor for satisfaction with the neighborhood. It can be concluded that when it comes to satisfaction with the neighborhood, other factors are more important in explaining satisfaction with the neighborhood than waiting time.

Table 6 shows the results of the Mann-Whitney test, which is preformed to test for differences between the satisfaction with the neighborhood of social renters who have refused a dwelling

offered and renters who have not refused a dwelling offered. Literature has shown that being able to refuse a dwelling offered would actually ensure that tenants are more satisfied with the neighborhood (Fitzpatrick & Pawson, 2007; English 1979). The test was performed by splitting the population into two sub-samples, namely a group that refused (ref = yes) and a group that did not (ref = no). The test shows a p-value of 0.4782 which is bigger than all the significance levels (1%, 5% and 10%), therefore, we fail to reject the null hypothesis. Although, according to the literature, there would be a difference between the groups, whereby the group of home seekers who refused an assigned dwelling (ref = yes) would have a higher degree of satisfaction with the dwelling than those who did not refuse an assigned dwelling (ref = no), no evidence that supports this expectation has been found in this study.

**Table 5: Ordered Logistic Regression on "Satisfaction with neighborhood"**

	Model 1				Model 2				Model 3			
	Log Odds	Standard Error	95% confidence interval		Log Odds	Standard Error	95% confidence interval		Log Odds	Standard Error	95% confidence interval	
Waitingtime_In	0.0663893*	0.0396866	-0.0113951	0.1441737	0.0497377	0.0411394	-0.0308941	0.1303695	0.0367293	0.04165	-0.044904	0.1183622
Social cohesion					0.5314115***	0.0482714	0.4368013	0.6260217	0.5171939***	0.04896	0.4212382	0.6131497
Safety					-0.6893723***	0.0602640	-0.8074875	-0.5712571	-0.7107219***	0.06071	-0.829705	-0.591739
Urbanity					-0.0486250	0.0417539	-0.1304612	0.0332111	-0.026913	0.0424	-0.11002	0.0561939
Age									0.1196794***	0.0301	0.0606862	0.1786726
Hhcompos (base= one-person)												
Pair									0.1322812	0.18614	-0.232543	0.4971052
Pair + Child(ern)									-0.1009304	0.37808	-0.841945	0.6400838
1-parent family									-0.2867966	0.2484	-0.773655	0.2000618
Non-family household									-0.0060698	0.34073	-0.673887	0.6617478
hhsize									-0.0615985	0.12134	-0.299411	0.1762142
Observations	1448				1447				1447			
LR Chi2	2.80				283.31				313.87			
Prob > Chi2	0.0944				0.0000				0			
Pseudo R2	0.0008				0.0816				0.0904			

Note: The dependent variable is Waitingtime\_In. \*, \*\*, \*\*\* are significant at 10%, 5% and 1% respectively.

**Table 6: Mann-Whitney Test – Satisfaction with neighborhood VS. Refusals**

Ref	Observations	Rank sum	Expected
Yes (refuser)	387	180960.5	183631.5
No (non-refuser)	561	268865.5	266194.5
Combined	948	449826.0	449826.0
Z	-0.709		
Prob >  z	0.4782		

Note: Variable ref indicates whether or not an individual has refused a dwelling offered. Ho: sneighborhood(ref==Yes) = sneighborhood(ref==No).

## 6. DISCUSSION & RECOMMENDATIONS

When looking at the available data for the variable waiting time, it is noticeable that the WoOn Survey only has data on the waiting time of respondents who indicated that they had moved to their home no more than two years before completing the survey. No information is available on respondents who have lived in a house for some time, but who were also registered for it at a housing association before moving to the house. As a result, the sample studied may not accurately reflect the total population, which has affected the validity of the study. In addition, this may explain the insignificant results on the association between waiting time and residential satisfaction. In addition, the data does not contain a question that measures overall residential satisfaction. As a result, it has not been possible to speak of residential satisfaction, but only satisfaction with the dwelling and satisfaction with the neighborhood separately.

All analyzes show that if there is a check for house-specific or neighborhood-specific matters, the variable waitingtime does not become significant. This means that if the effect were there at all, the effect would be very small. A significantly larger database would be needed to measure the effect.

This research has been carried out on a national scale and makes it possible to make generalizations for this as well. The downside to this, however, is that the results do not provide a profound perspective. For example, it is known that waiting time can differ per region or per city. The perception of what a long waiting time is therefore differs per region or city and has not been taken into account in this study. Other individual reasons, which can be varied, also explain why certain respondents are or are not satisfied with their dwelling or living environment.

The scientific recommendation for follow-up research is to have more data, that is to say, not only respondents who have been in social rented housing no more than 2 years before completing the survey. In addition, it is recommended to use data that measures overall residential satisfaction so that only one regression is sufficient and more accurate measurements can be made. This way, the reliability and validity of the research can be increased, which also increases the chance of finding significant results. In addition, it is recommended to include information about the perception of the length of the waiting time in follow-up research. Finally, there is a need for panel data that reflects on the effects of waiting time on residential satisfaction over time. This makes it possible to measure the effects over time and what the effect is of a possible shorter or longer average waiting time.



## 7. CONCLUSION

The focus of this research is on the relationship between the waiting times for public housing and the residential satisfaction of social tenants. The main question of this study is: “*To what extent does waiting time for public housing influence the residential satisfaction of social rental tenants in The Netherlands?*”

The literature review showed that no research has yet been conducted into the effect of waiting time for public housing on the residential satisfaction of social tenants. Although there are studies that map local, regional or national waiting times, the effect that waiting time has on something has not been included in studies. The literature does show that if people have the opportunity to wait for a suitable social rental house, they will be more satisfied with their home (English, 1979; Clapham & Kintrea, 1986). A longer waiting time would therefore have a positive effect on residential satisfaction. According to the literature, if people are diligently looking for a home, they are more inclined to accept a dwelling that fails to meet the housing demands, which results in lower satisfaction (Niner, 1989). The literature on residential satisfaction describes it as a measure of the disparity of the current and preferred neighborhood and housing situation of a household (Galster, 1987; Galster & Hesser, 1981). The joint conclusion from the literature research is that residential satisfaction is related to the dwelling and neighborhood context and to the individual characteristics of the household (Amérigo & Aragonés, 1997; Lu, 1999; Galster & Hesser, 1981). These factors were therefore included in this study, with characteristics of the dwelling, the neighborhood and demographic characteristics as control variables that have emerged from the literature. Since residential satisfaction includes satisfaction with both the dwelling and the neighborhood, the method of measuring residential satisfaction is critical in empirical analyses since it has an immediate impact on the results (Lu, 1999). The general residential satisfaction is not measured in the dataset used for this study; therefore, this study contains two dependent variables: satisfaction with the dwelling and satisfaction with the neighborhood. This study provides understandings concerning the residential experience that can be applied to assess the success of housing programs and allocation systems.

It should be clear that this study cannot make statements about general residential satisfaction, but only satisfaction with the dwelling and satisfaction with the neighborhood separately from each other. Ordinal Logistic Regressions were conducted to study the relationship between the waiting time and satisfaction with the dwelling or satisfaction with the neighborhood. For the regression of satisfaction with the dwelling, housing characteristics and demographic characteristics were included as control variables. For the regression of satisfaction with the

neighborhood, neighborhood characteristics and demographic characteristics were included as control variables. Based on the Ordinal Logistic Regressions performed, no positively significant association can be found between waiting time and satisfaction with the dwelling as well as waiting time and satisfaction with the living environment. The null hypotheses, stating that there is no association between waiting time and satisfaction with the dwelling and stating that there is no association between waiting time and satisfaction with the neighborhood, cannot be rejected in favor of the alternative hypotheses stating that there is an association. There is no credible evidence that there is an association between waiting time and satisfaction with the dwelling or neighborhood, however, there is also no proof that there is no association between waiting time and satisfaction with the dwelling or neighborhood either. However, both models show a positive association, but this is not significant. Both models are built up step by step and show that the more variables are added to the model, the lower the relevant contribution of waiting time to satisfaction appears. In other words, waiting time certainly has an influence on satisfaction with the dwelling as well as satisfaction with the neighborhood, but there are other factors that determine this satisfaction more strongly. Subsequently, it was investigated whether differences can be observed when looking at the effect of refusing an offered home on satisfaction with the dwelling or the neighborhood. For this purpose, a Mann-Whitney test was conducted, which was not able to show a significant relationship between the number of refusals and satisfaction with the neighborhood or the dwelling. The Mann-Whitney test indicates that the level of satisfaction with the dwelling or neighborhood is not significantly different based on the number of refusals. Thus, refusing an offered home would not lead to a higher level of satisfaction with the dwelling or neighborhood.

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# APPENDICES

## Appendix I: Operationalization variable 'Waiting time'

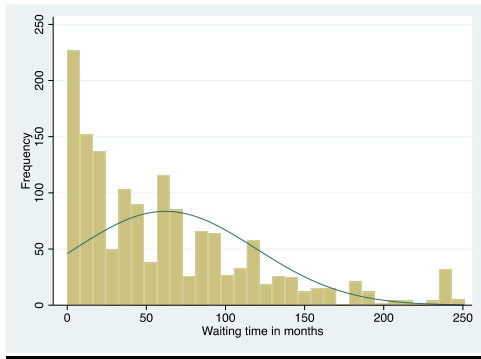


Figure 2 Histogram Waiting Time

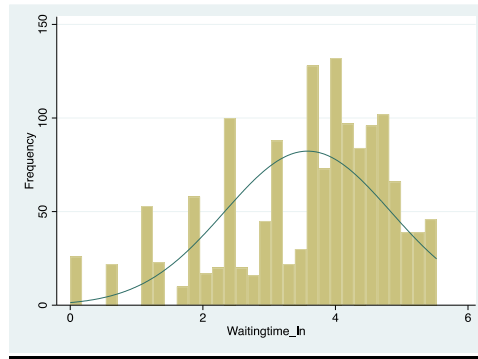


Figure 3 Histogram Waiting Time natural logarithm transform

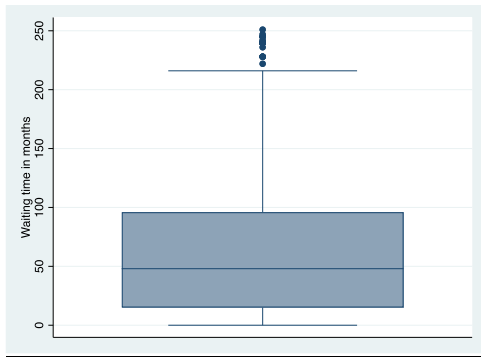


Figure 4 Boxplot Waiting Time

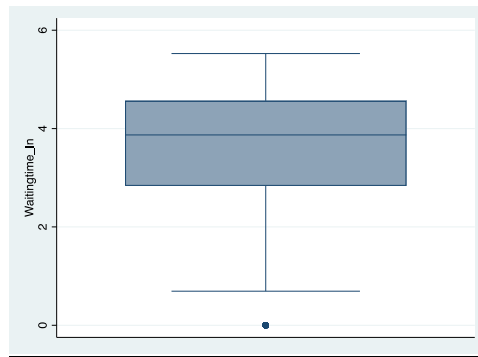


Figure 5 Boxplot Waiting Time natural logarithm transform

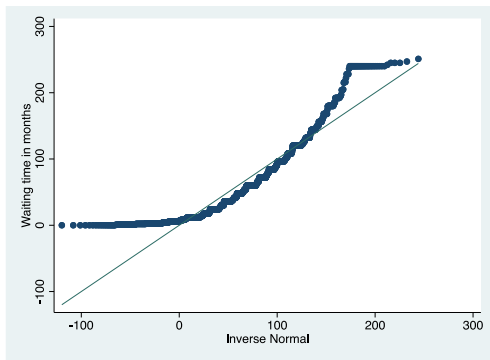


Figure 6 Q-Q plot Waiting Time

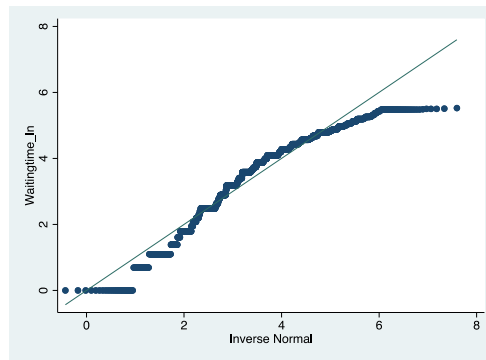


Figure 7 Q-Q plot Waiting Time natural logarithm transform



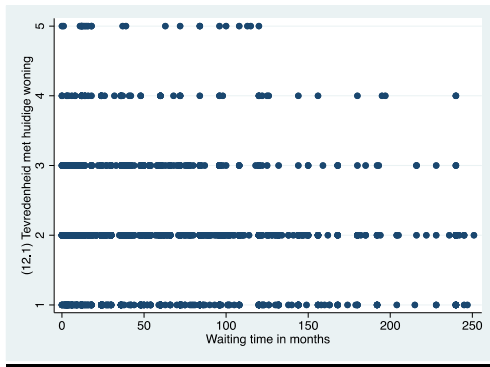


Figure 8 Scatterplot Waiting Time

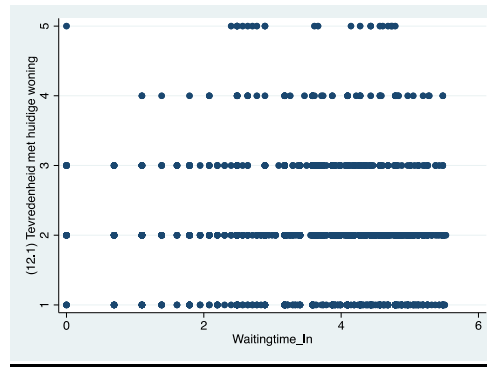


Figure 9 Scatterplot Waiting Time natural logarithm transform

Table 7: Shapiro-Wilk W test for normal data

Variable	Observations	W	V	Z	Prob>z
Waitingtime	1470	0.87752	109.742	11.814	0.00000
Waitingime~n	1452	0.94054	52.685	9.964	0.00000

## Appendix II – The spearman correlation matrix

**Table 8: Spearman correlation matrix Satisfaction with dwelling**

	sdwelling	Waitingtime~n	sqm	rooms	typedw	buildi~d	smaint~e	age	hhcompos	hhsze
sdwelling	1.0000									
Waitingime~n	0.0631	1.0000								
sqm	0.0900	0.0996	1.0000							
rooms	0.0377	0.1409	0.7014	1.0000						
typedw	-0.0124	0.0249	0.5075	0.4398	1.0000					
buildingpe~d	-0.2090	-0.0179	0.0433	0.1597	0.1625	1.0000				
smaintenance	-0.3807	-0.0558	0.0328	0.0302	0.0374	0.2981	1.0000			
age	0.1490	0.1691	0.1200	0.0552	-0.0856	-0.1880	-0.1893	1.0000		
hhcompos	-0.0585	0.0322	0.4149	0.4703	0.2577	0.0906	0.0534	-0.1124	1.0000	
hhsze	-0.0457	.0456	0.4558	0.4993	0.2873	0.0622	0.0532	-0.0887	0.9371	1.0000

**Table 9: Spearman correlation matrix Satisfaction with neighborhood**

	sneigh~d	Waitin~n	social~n	safety	urbanity	age	hhcompos	hhsze
sneigh~d	1.0000							
Waitingime~n	0.0509	1.0000						
social~n	0.2886	0.0094	1.0000					
safety	-0.2922	-0.0629	-0.0617	1.0000				
urbanity	-0.0957	0.0867	-0.11717	0.1320	1.0000			
age	0.1370	0.1679	0.1550	0.0304	-0.1598	1.0000		
hhcompos	-0.0413	0.0329	0.0442	-0.0193	-0.0422	-0.1115	1.0000	
hhsze	-0.0343	0.0464	0.0590	-0.0223	-0.0481	-0.0877	0.9370	1.0000

## Appendix III – VIF

**Table 10: VIF Collinearity Diagnostics – Satisfaction with dwelling**

Variable	VIF	SQRT VIF	Tolerance	R-squared
sdwelling	1.22	1.10	0.8197	0.1803
Waitingime_In	1.03	1.02	0.9697	0.0303
sqm	1.71	1.31	0.5863	0.4137
rooms	1.83	1.35	0.5455	0.4545
typedw	1.11	1.05	0.9044	0.0956
buildingperiod	1.20	1.09	0.8360	0.1640
smaintenance	1.28	1.13	0.7786	0.2214
age	1.14	1.07	0.8734	0.1266
hhcompos	2.45	1.57	0.4081	0.5919
hhsiz	2.54	1.59	0.3939	0.6061
Mean vif	1.55			

**Table 11: VIF Collinearity Diagnostics - Satisfaction with neighborhood**

Variable	VIF	SQRT VIF	Tolerance	R-squared
sneighborhood	1.24	1.11	0.8049	0.1951
Waitingime_In	1.04	1.02	0.9652	0.0348
socialcohesion	1.13	1.06	0.8860	0.1140
safety	1.15	1.07	0.8661	0.1339
urbanity	1.07	1.03	0.9362	0.0638
age	1.11	1.05	0.8995	0.1005
hhcompos	2.40	1.55	0.4165	0.5835
hhsiz	2.37	1.54	0.4218	0.5782
Mean Vif	1.44			

## Appendix IV – Brant Test

**Table 12: Brant Test for Parallel regression Assumption - Satisfaction with dwelling**

Variable	<i>Chi2</i>	<i>p&gt;Chi2</i>	<i>df</i>
All	65.02	0	27
Waitingime_In	1.19	0.755	3
sqm	7.98	0.046	3
rooms	5.28	0.152	3
typedw	2.17	0.538	3
buildingperiod	3.71	0.294	3
smaintenance	14.79	0.002	3
age	14.44	0.002	3
hhcompos	11.89	0.008	3
hysize	2.77	0.428	3

Note: A significant test statistic provides evidence that the parallel regression assumption has been violated

**Table 13: Brant Test for Parallel regression Assumption - Satisfaction with neighborhood**

Variable	<i>Chi2</i>	<i>p&gt;Chi2</i>	<i>df</i>
All	24.71	0.26	21
Waitingime_In	1.66	0.647	3
Socialcohesion	1.95	0.582	3
safety	7.27	0.064	3
urbanity	1.76	0.624	3
age	5.93	0.115	3
hhcompos	6.38	0.094	3
hysize	5.23	0.156	3

Note: A significant test statistic provides evidence that the parallel regression assumption has been violated