The impact of house prices on duration of residence in Dutch social housing

Thesis MSc Spatial, Transport & Environmental Economics

Abstract

This study investigates the extent to which the household lifecycle is obstructed by increasing house prices. Previous literature finds the need households experience to become homeowners. House prices rose on COROP region level from €232.720 on average in 2012 to €365.871 in 2021. The average unfinished duration of residence in social housing increased from 14.2 years in 2012 to 15.3 years in 2021. Results indicate a one percentage increase in house prices is associated with a 0.413% increase in duration of residence in social housing in 2012. A one percentage increase in house prices is associated with a 0.638% increase in duration of residence in social housing in 2021.

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1. Introduction

The substantial Dutch social housing stock serves as a valuable outcome for many low- and medium income households in The Netherlands, as shown in Table 1. As of January 1st, 2023, the maximum rent that can be charged for social housing is €808,06. With house prices rising over the last years (CBS Statline, n.d.), the importance of this section of the rental market is endorsed once again.

Table 1: Distribution of housing types in the Netherlands, 2021

	Amount of houses	*Relative share (%)*
Owner occupied housing	4.416.000	57,39
Regulated rental housing	2.587.000	33,62
Unregulated rental housing	603.000	7,83
Unknown and other housing	90.000	1,16

Source: CBS (2022)

According to Capital Value (2023), The Netherlands deals with a housing shortage of 325.000 houses in 2023, a number that is still rising. The Dutch government plans on building 900.000 new houses before 2030, two thirds of this number should be affordable rental and owner-occupied housing. (Ministerie van Algemene Zaken, 2023). Increasing costs of construction, complicated legislation and high land prices are named as hindering factors in new construction. Besides new construction, the adjustment of the social housing policy from the start of 2024 should make rental houses more accessible for medium income households. New regulation implies that the threshold for which houses are regarded as social houses shifts from 141 to 187 points, which roughly translates to a new maximum rent of €1100. The maximum rent that can be charged for such residences is based on the number of points it accumulates. Points are mainly granted based on property value. The government expects that 90% of rental properties will belong to social housing because of the tightened regulation, making most rental housing affordable (Ministerie van Algemene Zaken, 2022). The upcoming changes in the regulated rental market have received a lot of criticism. The earlier mentioned construction target is believed to be under pressure, especially in the short run. Bani (2023) on behalf of ING Research expects projects to be delayed or cancelled and new construction projects need renegotiation of land prices to make up for lower yields.

Within the existing stock of housing, misallocation forms a problem. According to a NOS study in which 191 out of the 352 municipalities participated, most municipalities point out how the lack of movement of elderly from bigger to more suited smaller houses is the driving force behind the Dutch housing crisis (Van Der Parre, 2021). A substantial part of elderly is believed to live in rather large dwellings which would be more suitable for younger families. Increasing the availability of houses

meeting demands of older people could start a *chain of moving* of households in various life phases, causing better allocation of houses across the country (Van Der Parre, 2021).

On the Dutch rental market, corporations check the income eligibility of households before signing a contract for a social housing unit. Households can exceed the income threshold over time, the eligibility is rarely checked by corporations. It is not uncommon for these households to remain living in their social housing unit. This form of misallocation is estimated to apply to between 6% and 7% of renters of social housing (Aedes, n.d.). Corporations have mixed feelings about this situation. Higher overall income promotes the livability of neighborhoods, but social houses should be occupied by households who need it most (Aedes, n.d.). When house prices in the neighborhood are high, buying a house could be unattainable. If the step from living in an affordable rental house to buying a house is large, the option of remaining in regulated rental housing could be more attractive, obstructing the overall residential mobility of the housing market. The aim of this paper is to find out how house prices affect the duration of residence in social housing over space in The Netherlands. Besides this, other factors potentially influencing the social housing tenancy duration will be evaluated. Although work has been done on duration of residence on the housing market in the United States, there seems to be a knowledge gap in the literature. Studies about duration of residence on the Dutch (social) housing market do not appear in existing literature. The research question of this paper is as follows:

"How do house prices affect the duration of residence in social housing in The Netherlands?"

For answering this research question, the survey data of Woononderzoek Nederland 2012 and 2021 (hereinafter referred to as 'WoON2012' and 'WoON2021', respectively) will be used. These datasets contain information about Dutch residents, the amount of rent they pay and the number of years they have lived in their current house, amongst other variables. Additionally, information of Statistics Netherlands (CBS) about house prices will be used.

Before the analysis of the data, some concepts on residential mobility, the household lifecycle and background on the Dutch housing market will be given to provide context of the paper. The household lifecycle and corresponding literature formulate household needs and dissatisfactions. The context on the Dutch housing market explains how these needs might not be satisfied. Descriptive statistics and visualizations summarize the data. Next, the results of the regressions are presented and interpreted. Limitations of the study are discussed followed by a conclusion of the paper.

2. Literature review

Before analyzing the data at hand, some concepts need further explaining. First, the household life cycle will be conceptualized. After this, the mismatch between household needs and the current Dutch housing market will be explained.

2.1 Residential mobility and the household life cycle

Yang (2009) investigated housing- and non-housing consumption of households over the life cycle. General findings are that the non-housing consumption over the life cycle is hump shaped. Households tend to spend the most in the middle-aged stage of life. Housing consumption increases until the age of 60, after which the curve flattens out. The patterns of non-housing consumption (hump-shaped) and housing consumption (increasing until 60) are different. The author argues that the difference is due to factors like borrowing constraints, transaction costs of moving and leisure. Homeownership has the advantages of providing direct utility (by owner-occupying) and its use as collateral.

On average, the younger agents in Yang's study (2009) earn less than the middle-aged and elderly agents. For younger agents, renting is more attractive. This group hopes to face a future income shock and saves up for a down payment. In Yang's study (2009), the fraction of homeowners increases until the middle-aged stage, after which the homeownership rate stays level. Elderly tend to keep the same level of housing consumption, limiting the frequency of housing transactions, which come at a cost. Yang (2009) suggests that heterogeneity in house prices is one of the factors in explaining the existence of high-income renters. Because, households living in cities might not be able to afford buying a house even though their income is above average.

The household lifecycle explains the need households experience for residential mobility induced by dissatisfaction with the current residence (Clark & Onaka, 1983). Certain shocks in the lifecycle of a household can induce the mobility rate. Three types of moves are distinguished. Dissatisfaction with current housing can result in an adjustment move. Characteristics about neighborhood, the housing unit or tenure type are possible causes of dissatisfaction. Dissatisfaction with tenure type could be the wish move into the owner-occupier market. Induces moves are associated with formation and disappearance of households, multiple housing adjustment needs and/or changes in employment. Forced moves are typically involuntary moves, caused by uncontrollable situations (Clark & Onaka, 1983).

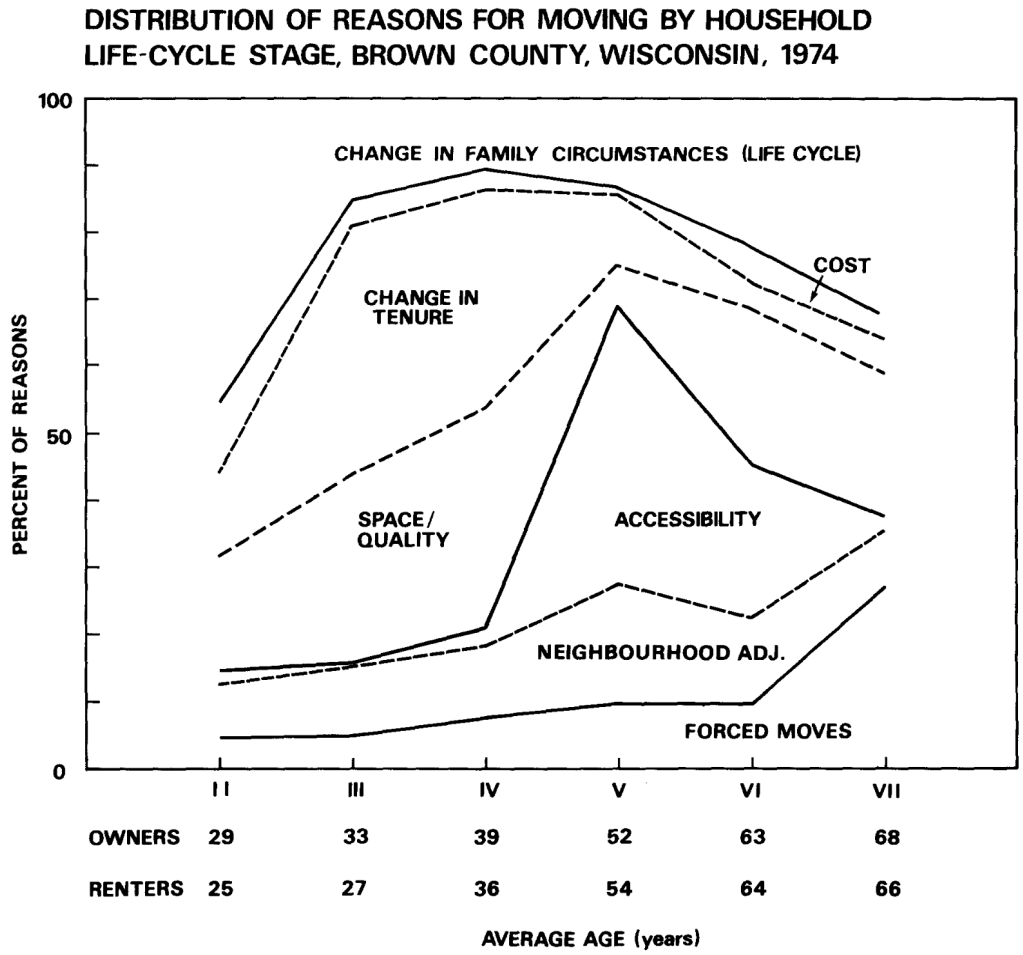

Figure 1: Distribution of reasons for moving by age and tenure. (Source: McCarthy (1976) in Clark & Onaka (1983))

The type of move as well as the frequency of moving changes over the lifecycle of the household. Different stages of the lifecycle are associated with different motives of moving, the paper shows the different needs over the life cycle of the households. Across all age groups, housing unit adjustment moves are most present. Clark & Onaka (1983) start from the early years, stating that reducing cost of housing, change in tenure, amount of space and quality of the house are important drivers of residential mobility. In earlier stages of life, chances are that the household income is lower and household expansion could still take place later in life. The middle section of the household life cycle is mostly represented by couples with younger children. This comes with different needs for housing. Change in the size of the house, adjustment in tenure and quality of the house are listed as most frequently appearing reasons of moving, with reducing costs less emphasized (Clark & Onaka, 1983). Later, quality of the neighborhood and accessible locations are relatively more demanded by households. A bigger house is usually not wanted by older people, they would rather move to a more accessible and adjusted living space. Note that household preferences and life cycle trends like average age of household formation have changed since the Clark & Onaka (1983) study.

2.2 Excess demand for social housing

The attractiveness of regulated rental houses might be a reason to postpone buying a house. As mentioned before, cutting costs is an important reason to move for younger households. Also, saving up for a down payment could be a reason to rent in earlier life stages. These age groups might be interested in social housing. When unit size and quality of the housing is also attractive, households in later life cycle stages might want to stay in the social housing units.

The attractiveness of social housing residences can cause excess demand as found by previous literature. This work mainly concentrates on the rental market in the United States. Geyer & Sieg (2013) reason from the perspective of supply side restrictions, they find evidence for excess demand and point out how households can move out of public housing on a voluntary basis. This excess demand can lead to misallocation of the houses. Where Clark & Onaka (1983) introduced the needs for types of housing across different stages of the household life cycle, Glaeser & Luttmer (1997) indicate the misallocation of the existing stock of regulated rental houses, not meeting the earlier mentioned needs. Wrong price setting, rationing and the restricted mobility of households are presented as causes.

Excess demand and misallocation of the housing stock can be causes and results of inefficient residential mobility of households, making it relevant to investigate duration of residence in social housing. Especially when keeping in mind the societal goal of regulated rental housing. Strict surveillance of household eligibility can reduce misallocation of social housing. Increasing the stock of regulated rental housing can make sure the demand for affordable housing is met.

2.3 Duration of residence in rental housing

Reasoning from the concept of changing needs over time, some factors could be hindering the household life cycle and its matching moves. If certain needs are unattainable, households might stay in their current residence. Examples are change in tenure, unit size and quality of the house. The previous section paid attention to the attractiveness and excess demand for social housing. Now, duration of residence in rental- and social housing will be investigated.

Previous studies have shed light on duration of residence in rental housing. A much-used method in investigating tenancy duration is the proportional hazard model. The model estimates the probability that the rental contract is terminated at a certain point in time. Deng et al. (2002) applied the proportional hazard model to examine duration of residence in the US rental housing market. Relatively short durations of residence were found for the rental segment of the market, with the median duration between one and two years. Some of the results are interesting when studying regulated rental housing and public housing. The share of public housing positively affects tenant turnover and thus negatively correlates with duration of residence. An explanation for this could be

that a larger *safety net* in terms of the social housing stock increases chances of returning to social housing, making households less hesitant to move out. The opposite effect was found for regulated rental houses, a larger share of this type of rental unit increases the average duration of residence. Furthermore, increasing house prices are found to reduce duration of residence in rental housing. The same effect was found for low mortgage interest rates (Deng et al., 2002). A possible explanation for this is that lower mortgage interest rates make buying a house more accessible for households now living in rental housing, driving up the prices of houses.

Bahchieva & Hosier (2001) investigated drivers behind the occupancy duration of households in public housing in New York City. The data set was retrieved from the New York City Housing Authority, which is a corporation providing social housing. Using a hazard model, they find various durations of residence for different household types in different areas of the city. The authors use exit rates to determine the probability of leaving the public housing unit for every additional year they occupy the house. Public housing is much wanted in New York City because of the market conditions. Free market rental houses and owner-occupied houses are not accessible for many households, making social housing very attractive. The median duration of residence is measured for three age groups, this number varies between 15 and 23 years. This number is substantially higher than the median value of between one and two years found by Deng et al. (2002), although they studied the whole rental housing market in the US. Deng et al. (2002) also found the share of public housing to negatively correlate with the duration of residence, making the results even more contradictory with the median values found by Bachieva & Hosier (2001). The data used for the Bachieva & Hosier (2001) study only contains low-income households, they lack affordable alternatives on the free market. This could explain the long duration of residence found by this study. General findings are that income, demographics and housing characteristics determine duration of residence.

(Gyourko & Linneman, 1989) found a positive effect between rent-controlled housing and tenancy duration. The households want to keep hold of their lower rent dwelling. They reason from the perspective of renter's benefits, which describe the difference of rent paid in rent-controlled housing and free market rent. Ault et al. (1994) question the econometric reasoning used by Gyourko & Linneman (1989). After refining the method, they also conclude that rent control is associated with longer tenancy duration.

Munch & Svarer (2002) look at the Danish private rental market. Their findings indicate that rent controlled rental housing leads to lower household mobility. In their analysis, a household living in a rent-controlled unit has a tenancy duration up to six years longer than the tenancy duration of a household in an unregulated counterpart.

2.4 Social housing in The Netherlands

To emphasize the relevance of the study, some more explanation on the Netherlands' social housing system is needed. The most recent iteration of the *Woningwet* (the Dutch housing laws) states that housing corporations should provide affordable housing for low-income households (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2021). The concrete execution of this law entails that a minimum of 85% of the corporation's housing stock should be social housing. For social housing, the corporations cannot ask more than €808,06 on a monthly basis. The income threshold of a single household to be eligible for social housing is €44.035. This threshold is €48.625 for multi-person households (Ministerie van Algemene Zaken, 2023). Although most regulated rental housing is provided by corporations, several social housing units are rented out by private owners (CBS, 2022). From the perspective of the corporation's social task, this makes the question about duration of residence in social housing relevant. Households exceeding eligibility criteria could be withholding a -for example- younger couple in a different life cycle stage from living in a social housing unit. Investigation of house prices its impact on duration of residence will be worked out in the next sections.

Previously discussed literature investigated housing markets with different characteristics. The Dutch housing market has a large share of public housing. With 33,62% of the housing stock, The Netherlands has the largest regulated rental housing stock in Europe in 2020 followed by Austria, Denmark and the UK (OECD, 2022). Analyzing duration of tenancy in The Netherlands might lead to different conclusions in terms of relation and magnitude than previously mentioned studies.

In line with Geyer & Sieg (2013) and Glaeser & Luttmer (1997), excess demand for Dutch social housing is emphasized by waiting lists. NOS (2021) published a study about 212 municipalities, indicating an average waiting time of seven years for social housing in The Netherlands. The most attractive municipalities in the Randstad area have even longer waiting times. In Amsterdam, for example, the average waiting time is 13 years and one month.

2.5 Challenges on the Dutch housing market

To give possible explanations for households to remain living is social housing, some context on the overall Dutch housing market is relevant. Besides the relatively large share of social housing (34%), the market is made up out of about 58% owner-occupied housing and about 8% unregulated rental housing. Over the last years, house prices have increased dramatically, as shown in figure 2. Highlighted are 2012 and 2021, to show the difference between the house prices at the time of conducting the WoON surveys used in the analysis part of this study.

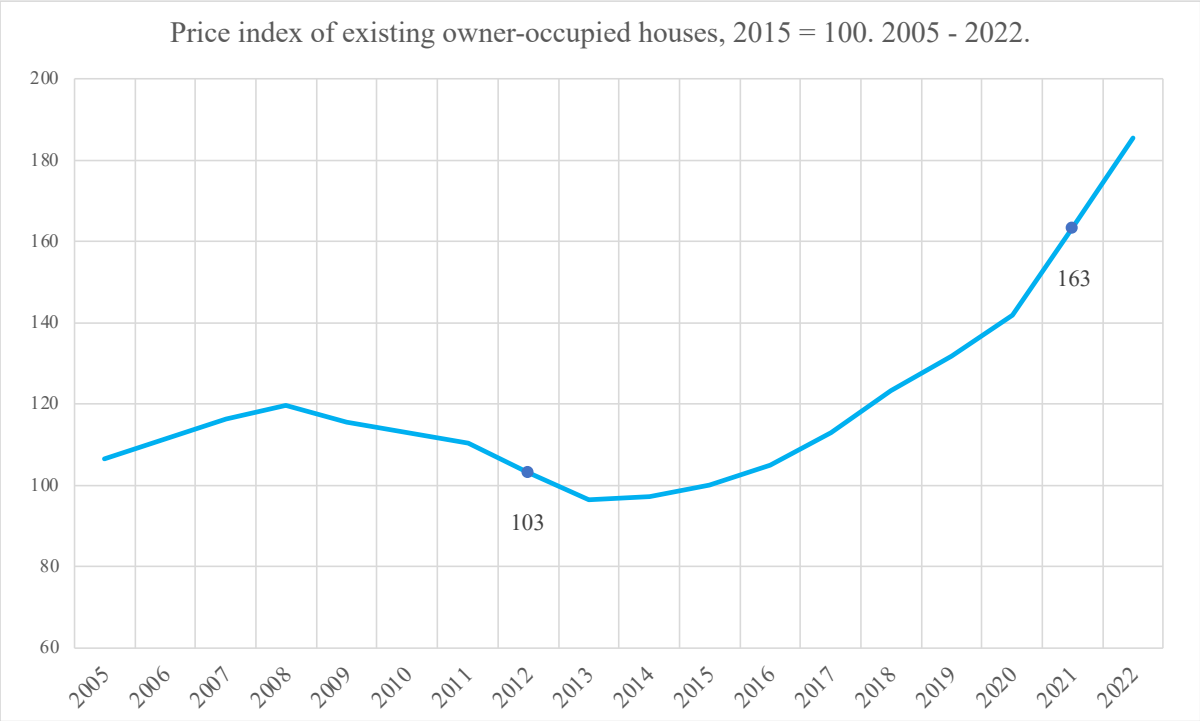

Figure 2: Price index of existing owner-occupied dwellings. Source: CBS Statline (n.d.).

In making the step from social housing to buying a house, households need to consider the change in costs associated with buying compared to renting. In social housing, rent and additional costs regarding utilities make up the monthly costs. The purchase of a house is usually for a large part financed by a mortgage. Monthly costs consist of repayment, interest and utilities. Owner-occupying is encouraged on the Dutch market by several measures. The *Nationale Hypotheekgarantie* (National Mortgage Guarantee) provides a safety net for houses purchased under €405.000, covering potential residual debt after selling the house. Another example is the possibility to deduct mortgage interest from taxes. Measures like these contribute to the trend in Figure 2. Although house prices might have seen a slight decrease over the last few quarters, the interest component of the monthly costs increased. This resulted in an initial setback in housing affordability (De Nederlandsche Bank, 2023). With the increasing income level as a response to inflation, De Nederlandsche Bank (2023) expects the affordability of houses to increase for starters on the housing market. The average gross income of a first-time buyer household in 2022 was €67.500. The maximum mortgage this household could take out against a 4% mortgage interest rate is €312.000. This amount is €120.000 lower than the average transaction price in 2022. This would only make 3,4% of the houses in the buyer market accessible for starters (De Nederlandsche Bank, 2023).

In 2023, the housing shortage is expected to be 325.000 (Captial Value, 2023). This number is expected to grow to 400.000 in 2025. Postponement of construction and decreasing granting of building permits are listed as causes (Capital Value, 2023). On the demand side, population growth because of ageing and immigration contribute to the housing shortage.

To solve the housing market problems, a national construction plan was presented in 2022 by the Dutch government. Increasing the construction rate to 100.000 on a yearly basis from 2024 onwards should fill the gap between supply and demand. The number of new houses should accumulate to 900.000 by 2030 (NOS, 2022). Two thirds of the planned construction will be affordable rental and owner-occupied housing. This is to ensure that low- and medium income households stand a better chance on the housing market and increase residential mobility. After years of liberalization on the Dutch housing market, the government wants to take responsibility for the needs of the middle-class. Not only by encouraging newly constructed housing, but also by various regulations within the existing stock of housing, ensuring the affordability for medium income households. Hochstenbach (2023) shows how the government opted for liberalization after the global financial crisis, to re-regulation in more recent years. Restricting buy-to-let in certain areas, exempting starters from transfer tax and the expansion of rent regulation are examples of warranting housing affordability.

2.6 Hypothesis

Based on the discussed literature and the Dutch housing market context, the following hypothesis is formulated to answer the research question:

Higher house prices lead to a longer duration of residence in social housing in The Netherlands.

Keeping in mind the current shortage of 325.000 houses, the 2030 construction target, long waiting lists for social housing and high house prices, households might find it interesting to remain living in social housing. Other households might experience the need to move into the owner-occupier market, but simply cannot afford to buy a house. When eligibility of households is not monitored, the choice of moving out is up to the households. Rising mortgage interest rates makes moving out of the rental market seem even less attainable.

Little work has been done on the relationship between house prices and duration of residence in social housing. Deng et al. (2002) focused on the whole rental market in the United States, including the free market rental housing. Their findings indicate that higher house prices lead to shorter duration of residence in the rental market. Including free market rent makes the step between renting and buying smaller, since the unregulated rents are higher. Only looking at regulated rental housing makes the gap between buying and renting much larger, this makes it more attractive to remain in social housing.

3. Analysis

With the duration of residence in social housing as the variable of interest, the analysis starts off with visualizing the tenancy duration in social housing over space. COROP areas are used as they are the most refined unit of measurement in the available datasets. These areas are smaller than provinces but larger than municipalities, initially created for statistical analysis. The 40 COROP areas are based on the nodal principal in which a larger city is linked to commuting areas (CBS, n.d.). In testing the hypothesis, COROP areas will be used.

To test the hypothesis, the relation between duration of residence and house prices will be studied by using OLS. Here, the duration of residence in social housing is the dependent variable. House prices are the independent variable. A positive relationship is expected in all specifications of the regression equation. As mentioned by Yang (2009), younger households opt for renting to accumulate wealth to become homeowners. Higher house prices are expected to contribute to longer periods of time required to progress in the household lifecycle. The model without control variables is specified as follows:

$$\ln(Duration\ of\ Residence) = \beta_0 + \beta_1 \ln(House\ price) + \varepsilon \quad (1)$$

A log-log specification is chosen to better interpret the results. The equation can be interpreted as an elasticity. Average transaction prices of houses per COROP area are linked to the observations. The result of the analysis should indicate the effect of a 1% increase in house prices on the duration of residence in social housing. Higher house prices are expected to be associated with longer terms of tenancy in social housing.

House prices are not the only deciding factor in the tenancy term of households, quality characteristics of the dwelling as well as the cost component could influence households' decisions. Leaving out these contributing factors increases the chance of omitted variable bias. To reduce omitted variable bias, some other factors potentially influencing the duration of residence in social housing are added to the model in equations (2), (3) and (4). Floor space area and the number of rooms are expected to positively correlate with the duration of residence, since higher values of these variables make the residence more attractive. These variables are seen as the space and quality component of household needs described by Clark & Onaka (1983).

$$\ln(Duration\ of\ Residence) = \beta_0 + \beta_1 \ln(House\ price) + + \beta_2 \ln(Floor\ space\ area) + \beta_3 \ln(Number\ of\ rooms) + \varepsilon \quad (2)$$

The amount of rent paid by the household is a good indicator of costs, added in equation (3). This variable is one of the more emphasized reasons to move by younger households, as described by

Clark & Onaka (1983). The relationship between rent and duration of residence is expected to be negative, with higher costs assumed to be unpleasant.

$$\ln(Duration\ of\ Residence) = \beta_0 + \beta_1 \ln(House\ price) + \beta_2 \ln(Floor\ space\ area) + \beta_3 \ln(Number\ of\ rooms) + \beta_4 \ln(Rent) + \varepsilon \quad (3)$$

Income is expected to negatively correlate with duration of residence in social housing. Households have more possibilities of moving into the owner-occupier market when income rises, taking out a mortgage becomes more accessible. Also, the unregulated rental market becomes attainable. β_6 estimates the coefficient of the dummy variable *Age*, which is divided into seven brackets. In areas with a large share of elderly, social houses might be occupied by older people for a large part. If the social housing unit is comfortable and affordable, there might not be an incentive to move into the buyer market. Simultaneously, waiting lists with younger households might not exist because of the demographic composition of the area. Controlling for such situations makes the house price coefficient more reliable. A positive relationship between age and duration of residence is expected.

$$\ln(Duration\ of\ Residence) = \beta_0 + \beta_1 \ln(House\ price) + \beta_2 \ln(Floor\ space\ area) + \beta_3 \ln(Number\ of\ rooms) + \beta_4 \ln(Rent) + \beta_5 \ln(Income) + \beta_6(i.Age) + \varepsilon \quad (4)$$

When investigating house price increases in specific COROP areas, observations are not independent of the other observations in the dataset, because one value for house prices is used per COROP area. The observations in the dataset are clustered over space into different COROP areas. For the estimation the equations, clustered standard errors will be used in all specifications of the regression to allow for correlation between the different observations within the clusters and make the results more reliable.

4. Data and descriptive statistics

4.1 Data

The results of the WoON2012 and WoON2021 surveys conducted under Dutch residents serve as the primary data used for investigating the term of residence in regulated houses and its drivers. In 2021, The survey was held under 46.658 Dutch households. The data collection period took place between August 2020 and September 2021. In 2012, the survey was held under 69.339 Dutch households. The data collection took place between September 2011 and May 2012. Duration of residence is measured as the number of years a household has been living at their current address up until the point of taking the survey, the term *unfinished duration of residence* will be used to indicate the dependent variable.

Earlier work has pointed out this limitation about durations that arise with survey data. Kiefer (1988) shows how durations between two points of taking the survey are underrepresented in the data. This is known as *length-biased sampling*. In this study, households entering social housing after 2012 and leaving social housing before 2021 aren't represented. Also, as described before, *right-censored spells* cause this study to use unfinished duration of residence. The residence period after taking the survey is not considered.

Average sales prices of houses for every COROP area in Q2 2012 and Q2 2021 are retrieved from CBS (2021). The average sales prices are linked to the observations of the WoON studies on COROP level.

Following the hypothesis, higher unfinished durations of residence in social housing are expected in the regions where house prices are high. Using the WoON data, a first visualization of the duration of residence in social housing can be made.

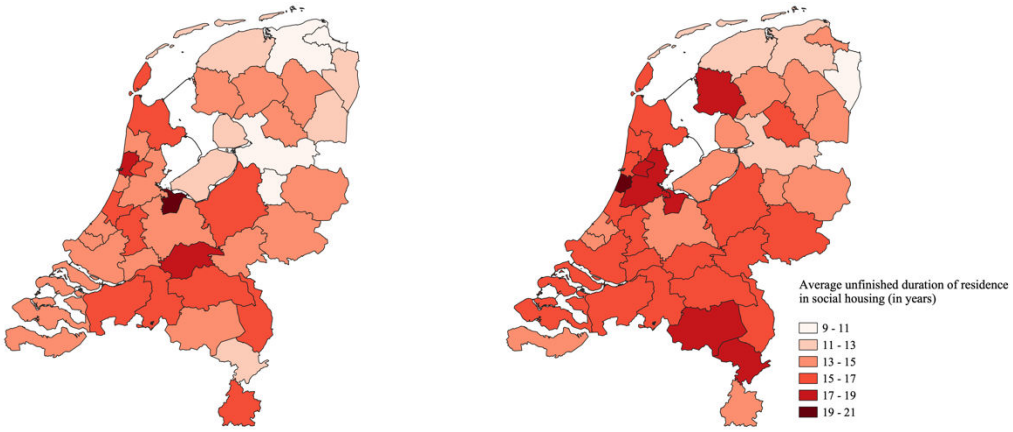

Figure 3: Average unfinished duration of residence in social housing in The Netherlands by COROP region. Source: WoON2012 (left) and WoON2021 (right), edited by author.

The average unfinished duration of residence in social housing increases from 14.2 years in 2012 to 15.3 years in 2021. Especially regions in the western- and southern parts seem to have higher durations of residence as can be seen in Figure 3. Over time, the shades of red have become darker in most COROP areas, indicating longer durations of residence in social housing. Surprisingly, *Het Gooi en Vechtstreek* has a shorter average duration of residence in social housing in 2021 compared to 2012. The highest average value in 2021 can be found in *Agglomeratie Haarlem* (19.8 years). Also, the regions *Het Gooi en Vechtstreek* (18.7 years), *Groot-Amsterdam* (17.3 years) and *Zaanstreek* (17.2 years) fall within the darker shades of red. Because of the location, the attractiveness of these regions is not surprising. The regions *Zuidwest-Friesland* (17.4 years) and *Midden-Limburg* (18.3 years) have, based on their distance from the four major cities, unexpectedly high values of tenancy duration. Note that with only 92 observations for households living in social housing, the sample is relatively small for *Midden-Limburg*, which may influence the results. Using the house price transaction data, a similar pattern is expected for house prices.

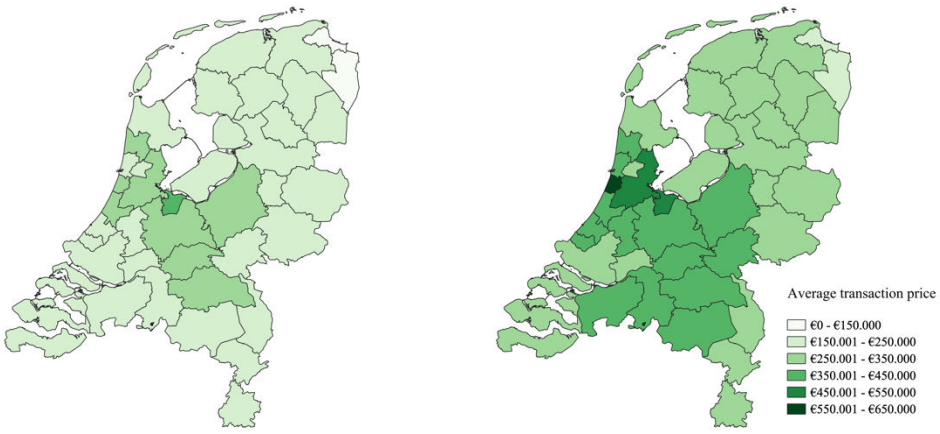

Figure 4: Average transaction price of houses in Q2 2012 (left) and Q2 2021 (right) in the Netherlands by COROP region. Source: CBS (2021), edited by author.

The average COROP transaction price of houses increases from €222.800 in Q2 2012 to €346.230 in Q2 2021. The highest Q2 2021 average transaction price can be found in *Agglomeratie Haarlem* (€568.000). While the pattern repeats itself for the *Agglomeratie Haarlem* region in Figure 4, *Midden-Limburg* (€307.600) and *Zuidwest-Friesland* (€297.700) seem to have less attractiveness in the owner-occupier market. Also, *Groot-Amsterdam* (€512.500) and the *Gooi en Vechtstreek* (€550.00) are still in the upper brackets, regarding the average transaction price for houses.

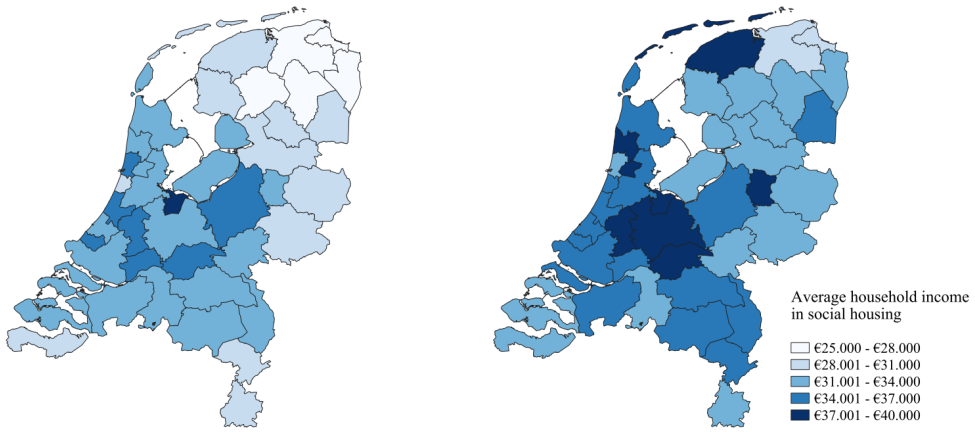

Figure 5: Average household income in social housing in The Netherlands by COROP region. Source: WoON2012 (left) and WoON2021 (right), edited by author

Figure 5 shows the income pattern of households living in social housing. The average social housing household income increases from €32.485,27 in 2012 to €34.684,88 in 2021. Note that over the years the social housing income threshold increased. *Zaanstreek* (€39.019), *Noord-Friesland* (€38.998) and *Zuidwest-Overijssel* (€38.107) stand out as COROP areas with high average household incomes in 2021. The average social housing household income was the highest (€38.197) in *Het Gooi en Vechtstreek* in 2012. This number decreased to €37.680 in 2021.

4.2 Descriptive statistics

To get an overview of the data, some descriptive statistics will be given. The used variables for the analysis are listed, with the relevant characteristics. Some data cleaning precedes the analysis. Negative values for income are removed and the variables *socialhousing*, *duration* and *houseprice* are created.

Table 2: Descriptive statistics of WoON2012 survey data and CBS data

Variable	*Description*	*N*	*Mean*	*St. Dev.*	*Min*	*Max*
duration	*Unfinished duration of residence in years*	60,365	14.77608	13.16154	0	93
houseprice	*Average transaction price of houses in Q2 2012 per COROP*	69,339	232720.2	31193.13	146,700	354,800
OppTBin	*Net usable area in* m^2	60,211	118.0897	73.81489	8	975
Kamers	*Number of rooms*	60,211	4.3697	1.637667	1	84
khuuri	*Basic rent*	21,830	471.8373	202.2958	0	4,100

brutohh	*Gross income*	69,148	55257.27	43725.18	13	1,364,710

The 2012 social housing rent threshold of €664,66 was used to split the rental houses in the dataset into unregulated rental houses and social housing. Out of the 21.830 rental houses, 19.849 are considered social housing.

Table 3: Descriptive statistics of WoON2021 survey data and CBS data

Variable	*Description*	*N*	*Mean*	*St. Dev.*	*Min*	*Max*
duration	*Unfinished duration of residence in years*	46,658	16.05517	13.9111	0	90
houseprice	*Average transaction price of houses in Q2 2021 per COROP*	46,658	365870.9	68249.33	207,900	568,100
gebruiksopp	*Net usable area in m^2*	46,658	129.9605	99.81827	10	2,700
kamers	*Number of rooms*	40,940	4.426673	1.726753	1	57
khuur	*Basic rent*	13,404	657.5294	292.5795	0	4,590
brutohh_r	*Gross income*	46,621	73986.28	68807.2	0	1,373,423

The 2021 social housing rent threshold of €752,33 was used to split the rental houses in the dataset into unregulated rental houses and social housing. Out of the 13.404 rental houses, 10.553 units are considered social housing. Regressions on duration of residence are run on the 10.553 social housing observations. The average overall unfinished duration of residence was lower in 2012 compared to 2021. In the datasets, house prices on average were substantially lower in 2012 (€232.720) compared to 2021 (€365.871). The first observations of the datasets look to be in line with the hypothesis.

To illustrate the misallocation of rental houses, Table 4 shows the households living in social housing but earning more than the social housing threshold, and households eligible for allowance for rent, living in the unregulated rental market. Misallocation based on rent to income ratio's increased for the two listed scenarios from 2012 to 2021.

Table 4: Misallocation of rental houses (numbers as a percentage of the total Dutch rental market).

	WoON 2012	*WoON 2021*
Households living in unregulated rental market and income below the social housing threshold.	8,37%	10,83%
Households living in social housing and income above the social housing threshold.	7,55%	7,67%

Source: WoON2012 and WoON2021

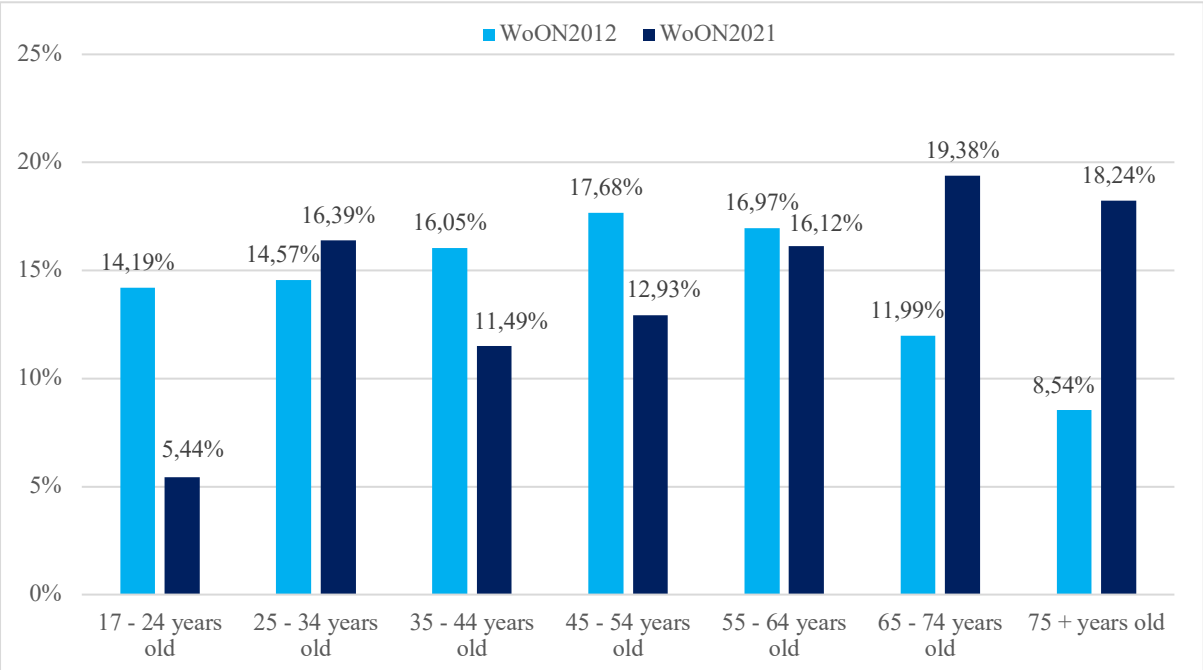

Figure 6: Age distribution in social housing in 2012 compared to 2021. (Source: WoON2012 and WoON 2021, edited by author)

Figure 6 shows the age distribution in social housing in 2012 compared to 2021. The 17–24 year old's group was more pronounced in 2012. The middle section of age groups is more represented in the 2012 data. A larger relative share of 65+ households is present in the 2021 social housing data. In 2012, the social housing units seemed to be distributed towards the younger- and middle-aged groups. In 2021, the distribution clearly shifted, putting the emphasis on the older age groups.

5. Results

Table 5 shows the results of the regression analyses performed on the WoON2012 data. The dependent variable is unfinished duration of residence in social housing. For all regressions, clustered standard errors were used. Without control variables, a one percent increase in house prices leads to a 0.354% increase in duration of residence in social housing. This result is statistically significant at the 1% level. This result shows the positive relation between house prices and tenancy duration in social housing. Note that the constant is not statistically significant in this specification. In the second specification of the model, the space and quality components are added. Floor space area correlates negatively with duration of residence in social housing. This result is statistically significant at the 10% level. In this specification, number of rooms is an important indicator of longer tenancy terms in social housing. In equation (3), rent was added to the equation. This is considered as the cost component for households. Higher rents result in shorter durations of residence in social housing. In the fourth equation, income and a dummy variable for age were added. Controlling for income, and age because of demographic composition, shrinks the house price coefficient compared to the third equation. A possible explanation for the income coefficient could be the positive income shocks households experience later in life, having lived in the social housing unit for multiple years.

Table 5: Regression table duration of residence, WoON2012

Dependent variable: ln(Duration of residence).				
	(1)	*(2)*	*(3)*	*(4)*
ln(House Prices)	0.354**	0.449***	0.521***	0.413***
	(0.155)	(0.163)	(0.170)	(0.105)
ln(Floor Space Area)		-0.0483*	-0.00196	-0.0299**
		(0.0251)	(0.0231)	(0.0135)
ln(Number of rooms)		0.939***	1.018***	0.717***
		(0.0372)	(0.0426)	(0.0382)
ln(Rent)			-0.430***	-0.754***
			(0.0670)	(0.0418)
ln(Income)				0.228***
				(0.0177)
Age				
17-24 years old				0
				(.)
25-34 years old				0.566***
				(0.0291)
35-44 years old				1.127***
				(0.0484)

45-54 years old				1.529***
				(0.0364)
55-64 years old				1.845***
				(0.0378)
65-74 years old				2.012***
				(0.0347)
75 and older				2.068***
				(0.0274)
Constant	-2.233	-4.350**	-2.937	-2.950**
	(1.922)	(2.015)	(2.185)	(1.231)
Observations	19792	19792	19505	19490
Robust clustered standard errors by COROP	Yes	Yes	Yes	Yes
Standard errors in parentheses (p<0.1 ** p<0.05 *** p<0.01)*				

Table 6 shows the results of the regressions with WoON2021 data. Without control variables, a one percent increase in house prices leads to a 0.418% increase in duration of residence in social housing. This result is statistically significant at the 1% level. This result shows the positive relation between house prices and tenancy duration in social housing. Other variables were added in a similar way as the previously discussed WoON2012 regressions. Control variables regarding the characteristics of the housing unit floor space area and number of rooms, added in the second specification, positively impact duration of residence in social housing, meeting the expectation from the analysis section. Results are statistically significant at the 1% level for all specifications. An increase in rent leads to shorter durations of residence in social housing. Equation (4) shows similar patterns as the 2012 regression results, except for floor space area.

Table 6: Regression table duration of residence, WoON2021

Dependent variable: ln(Duration of residence).				
	(1)	*(2)*	*(3)*	*(4)*
ln(House Prices)	0.418***	0.719***	0.825***	0.638***
	(0.108)	(0.131)	(0.157)	(0.0696)
ln(Floor Space Area)		0.276***	0.450***	0.135***
		(0.0403)	(0.0557)	(0.0371)
ln(Number of rooms)		0.667***	0.700***	0.465***
		(0.0449)	(0.0590)	(0.0579)
ln(Rent)			-0.882***	-0.964***
			(0.142)	(0.0757)
ln(Income)				0.106***
				(0.0204)

Age				
17-24 years old				0
				(.)
25-34 years old				0.656***
				(0.0835)
35-44 years old				1.142***
				(0.101)
45-54 years old				1.542***
				(0.123)
55-64 years old				1.848***
				(0.116)
65-74 years old				2.092***
				(0.110)
75 and older				2.243***
				(0.107)
Constant	-3.151**	-8.986***	-5.576***	-3.673***
	(-1.380)	(-1.714)	(-1.652)	(0.956)
Observations	10500	10500	10265	10248
Robust clustered standard errors by COROP	Yes	Yes	Yes	Yes
*Standard errors in parentheses (** p<0.1 ** p<0.05 *** p<0.01)				

Across most life cycle stages, as explained by Clark & Onaka (1983), space and quality of the house is considered an important factor in the decision to move. If space and quality is regarded as sufficient in the current dwelling, this might lead to households remaining to live in social housing. These households might not monitor the owner-occupier market for opportunities as they are satisfied with their current house.

Regression results for both points in time show differences in magnitude. In 2021, average house prices were higher. The average COROP transaction price of houses used in this study increased from €222.800 in 2012 to €346.230 in 2021. The effect on duration of residence in social housing as a result of a marginal increase in house prices is higher for every specification of the regression in 2021 compared to 2012. Even though income and the amount of rent paid rose, regression (4) accounts for these effects. Escalation in house prices slows down residential mobility in the social housing market. The house price coefficient shows an effect of bigger magnitude in 2021, rising from 0.413 to 0.638.

Starting from the regression results of equation (4) in Table 6, a 10% increase in house prices in the most expensive COROP region *Agglomeratie Haarlem* would mean that the average unfinished duration of residence in social housing goes up from 19.8 years to 21.1 years. Note that municipalities within *Agglomeration Haarlem* are amongst the wealthiest in The Netherlands. The intermediate step of living in social housing, following the household lifecycle, might not be as essential for all of these households. The COROP region getting the least attraction in the buyer market is *Delfzijl en*

omgeving, where a 10% increase in house prices is associated with an increase of unfinished duration of residence in social housing from 13.1 years to 13.9 years. Even though the increase in absolute terms is lower in *Delfzijl en omgeving*, the societal impact might be higher here. Income levels in this region are lower compared to *Agglomeratie Haarlem*. Accessibility to social housing could be valued differently in this area. Early in the household lifecycle, inhabitants of the *Delfzijl en omgeving* region could rely more on affordable rental housing. Results of Table 5 and Table 6 could have different interpretations on societal level depending on the region they are applied to.

6. Discussion & conclusion

6.1 Discussion

In this study, effects of house price increases on the duration of residence in social housing were measured, not considering mutations in housing stock. Long spells of tenancy under the attractive conditions of social housing are not undesirable. Reasoning from household life cycle theory, younger households would like to become homeowners over time. Also, younger households desire an affordable option to build financial assets for down payments. Within the existing stock of social housing, the duration of residence increased between 2012 and 2021. Also, the age distribution of people living in social housing has seen a shift to the older age categories. The introduction mentioned how corporations do not evict ineligible households. With reallocation not being a realistic nor desirable solution, construction could serve as an outcome. 250.000 of the planned 900.000 newly constructed houses should be social housing built by corporations according to government plans. The yearly construction to reach this target is under pressure (RTL Nieuws, 2023). A lack of affordable building land and suitable locations to build are amongst the bottlenecks of the building process. The association of the Dutch corporations is in favor of increasing the amount of building plans to reach the construction target (Aedes, 2023). To make land more affordable for corporations, taxing the value increase of land could be a solution (Baggerman, 2022). Changes in land use plan to allow residential building can cause land prices to go up. This incentivizes speculation with land. Speculation with land will be reduced when introducing a tax on value increases of land, pushing prices of land down. This can be a step in the right direction towards the construction target because corporations can obtain more affordable land. A bigger social housing stock will improve the chances of starters on the housing market by reducing waiting times and improving the residential mobility.

Throughout the study, the duration of residence in social housing up until the point of taking the survey was used as dependent variable. Neumann (1999) distinguishes flow samples from stock samples. This study's duration of residence in social housing data is sampled from the stock of households. This leaves the data with *right-censored spells* as defined by Kiefer (1988). Besides this, households could have lived in more than one social housing unit. Duration of residence in social housing up until the point of taking the survey would be longer in this case. Completed duration of residence would give the most accurate results. Usually, these types of limitations are dealt with by applying econometric models as explained by Neumann (1999). All observations for this study display unfinished duration of residence, making the comparison equal across all observations.

The expansion of the regulated rental market, starting in January 2024 could influence residential mobility twofold. Increased affordability of mid rent units can make medium income households move out of 141 point-units quicker. Delay in construction can put extra pressure on the owner-

occupier market, discouraging households to leave social housing. Outcomes of this study could substantially differ after introducing new regulation.

Other variables not considered in this study could also influence the duration of residence in social housing. For example, rising mortgage interest rates could change the affordability of houses, making the move from social housing to the buyer market harder. Within the boundaries of the study, the relevant variables have been added to the regression equations.

6.2 Conclusion

Considering the housing shortage and enormous waiting list for social housing on the Dutch housing market, questions can be asked about residential mobility and the allocation of the existing housing stock. Starting from the concept of household lifecycle; housing dissatisfaction and corresponding needs are formulated. The literature consensus (Yang (2008); Clark & Onaka (1983)) discloses how households build up their housing stock over the lifecycle. Looking at Figure 6, the distribution of household ages in social housing has shifted. Older households have gotten more prominent over the last years, this could indicate lower chances of younger households entering social housing, obstructing their previously described needs. The 17-24 year old group in 2021 is substantially lower compared to 2012, showing that the representation of this group decreased. This could be a result of older households prolonging their stay in social housing rather than moving into the owner-occupier market. For many households, renting in earlier stages of life serves as an opportunity to build up financial assets to become homeowners later. Rent caps are particularly interesting for this group, lower rents leave more room to save up for a down payment. Changing needs for house characteristics play a part in the decision to move. In both datasets, the floor space area is smaller on average in social housing than in the rest of the housing market. Also, the average number of rooms is much larger in unregulated rental houses and owner-occupied houses. Assessment of the quality characteristics suggests homeownership satisfies these needs better. The research question investigates the extent to which this household lifecycle is obstructed by increasing house prices by extended terms of tenancy in social housing. The hypothesis states that higher house prices lead to longer durations of residence in social housing in The Netherlands. Results indicate that a one percentage increase in house prices is associated with a 0.413% increase in duration of residence in social housing using the 2012 data, controlling for floor space area, number of rooms, rent, income and age. In a similar way, one percentage increase in house prices is associated with a 0.638% increase in duration of residence in social housing using the 2021 data. A marginal increase in house prices in 2021 leads to a bigger addition in tenancy term than in 2012, slowing down residential mobility at a higher pace. Interpretation of results can vary over space, where regions with lower average income might be more dependent on affordable rental housing in earlier stages of life. Further work on the topic focused on the corporation housing stock. As mentioned before, the lack of

attention for this variable is a limitation of this research. Additions to the housing stock of corporations and its implications on waiting times and duration of residence in social housing could be valuable additions to the literature. Also, looking into the changes in duration of residence in social housing after the introduction of the new rent regulation starting January 2024 could grant interesting results.

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