Housing careers and the Great Recession

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A R T I C L E   I N F O

A B S T R A C T

This paper studies the housing careers of renters and homeowners before, during and after the Great Recession by using the concept of the housing ladder. Based on Dutch administrative data, we find that renters and homeowners were less likely to climb the housing ladder during the Great Recession than before and that these upward movement rates recovered to pre-recession levels afterwards. The negative recession effect was driven by a decreased probability of moving to privately owned housing. The decrease in the probability of house buying may be explained by low consumer confidence, housing price uncertainty and a limited supply of housing due to loss aversion.

1. Introduction

Households in many Organisation for Economic Co-operation and Development (OECD) countries, including the United States, were strongly affected by the Great Recession through various channels. The average nominal house price in countries in the OECD dropped by approximately 6 percent between 2007 and 2011, and unemployment peaked at 8.5 percent in the first quarter of 2010 (OECD, 2019). In the Netherlands, the average nominal house price dropped by approximately 16 percent between 2008 and 2013. Unemployment rose from 3.7 percent in 2008 to a peak of 7.4 percent in 2014 (Statistics Netherlands, 2020a).

Housing careers may have been affected by the Great Recession as well. The literature has typically focused on the residential mobility of homeowners, emphasizing that movement rates of homeowners decreased. The housing careers of renters are likely to have been affected differently by the Great Recession than those of homeowners, however. This may be primarily explained by differences in the nature of renting versus owning homes. Differences in credit constraints and other characteristic differences between renters and homeowners may be a source of differences in effects as well.[1] The effect of the negative house price shock on residential mobility is an example of a channel that may have resulted in differences in effects between renters and homeowners. Negative house price shocks affect the housing careers of homeowners

through factors such as the combination of negative equity and loss aversion (Henley, 1998; Genesove and Mayer, 2001; Ferreira et al., 2010; Bricker and Bucks, 2016; Steegmans and Hassink, 2018). Such factors are not relevant for renters.

This paper provides a descriptive study on housing careers in the Netherlands before, during and after the Great Recession, with a focus on the housing careers of renters. We aim to improve the understanding of how housing markets function and how the housing careers of renters and homeowners were affected by the Great Recession. Whereas other studies have focused on residential mobility, we investigate movements up or down the housing ladder as part of housing careers. A slowdown in housing careers may have negatively affected life-course events—like starting families and moving to larger family homes—as well as labor-market careers—like starting new jobs in areas with more jobs.

We conduct our empirical analysis using administrative micro-panel data provided by Statistics Netherlands for the 2007–2017 period. These data cover the entire Dutch population. The Netherlands is a relevant country to study because, like many other OECD countries, it was significantly impacted by the economic recession, and it simultaneously experienced both a severe decline in housing prices and an increase in unemployment in this period.

We estimate a multinomial logit model on movements along the housing ladder. Our evidence shows a strong decrease in movement rates up the housing ladder during the Great Recession for young renters

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and homeowners. Movement rates up the housing ladder recovered after the Great Recession. The recovery of movement rates, in general, is not in line with evidence from the United States, where movement rates have fallen steadily during the past three decades and have continued to decline since after the Great Recession (Koşar *et al.*, 2019).

Our results suggest that the residential mobility of renters was unaffected as long as renters preferred to stay in the rental segment. Young renters and homeowners who wanted to climb the housing ladder by buying a house were less likely to do this during the Great Recession than before. Low consumer confidence and uncertainty regarding housing prices may have induced young individuals to postpone or cancel their plans to buy houses. This is consistent with evidence provided by Dieleman and Everaers (1994). High asking prices due to negative equity and loss aversion on the part of sellers may have additionally prevented young renters and homeowners from buying and selling houses.

This paper contributes to three strands of literature. First, we study the housing careers of homeowners and renters. The effects of housing price drops on residential mobility has typically been studied for homeowners only (Henley, 1998; Ferreira et al., 2010; Bricker and Bucks, 2016; Steegmans and Hassink, 2018). The Great Recession may have affected residential mobility differently for renters than for homeowners, however.

Second, we use administrative data on house values and various demographic as well as socioeconomic characteristics to study residential mobility. The house value—the so-called WOZ value—is acquired for tax collection purposes, and it is based on the transaction prices of recently traded nearby houses with similar characteristics. The house value is available for all privately owned and rental houses on a yearly basis. House value data allow us to compare the positions of homeowners and renters on the housing ladder. This is vital for the set-up of our study. We apply house values in 2017 to all years to ensure that our comparison is not distorted by house price variation across time. Earlier papers on housing careers during economic crises (Dieleman and Everaers, 1994; Ho and Wong, 2009; Stoll, 2013) have relied on survey data excluding such information on rental house values.

Third, we use the concept of the housing ladder to study residential mobility before, during and after the Great Recession. The concept is intuitive and can be readily linked to demographic and labor-market developments, explaining how life-course events affect housing careers. The concept of the housing ladder has been previously applied in studies mainly focused on homeowners, such as those of Morrow-Jones and Wenning (2005), Ortalo-Magne and Rady (2006), Ho and Wong (2009), Bajari *et al.* (2013), and Banks *et al.* (2016). We consider housing consumption over the life-cycle as housing careers to ensure that changes in housing consumption were transitions along the housing ladder. Climbing the housing ladder may imply a move to larger houses or houses with a higher value. Life-course events that trigger changes in housing consumption include cohabitation, divorce, the birth of children and retirement.

The set-up of this paper is as follows. Section 2 discusses the theory behind the concept of the housing ladder. Section 3 describes the relevant Dutch institutional framework. Section 4 discusses the data. Section 5 explains the methodology, and Section 6 presents the estimates. In Section 7, we discuss correlations among various relevant macro indicators. Section 8 concludes.

2. Theoretical framework

2.1. The housing ladder

Housing consumption—the position of households on the housing ladder—is strongly driven by life-course events and labor-market careers. Ageing and life-course events trigger relocations and affect individuals' positions on the housing ladder. Couples who start cohabiting may move to larger dwellings, whereas couples who divorce may move to smaller dwellings (Feijten and Van Ham, 2010; Banks *et al.*, 2016). Couples who have recently had their first child or are about to have their first child may relocate to larger houses, which may have a garden or may be located in a more child-friendly neighborhood (Banks *et al.*, 2010; Rabe and Taylor, 2010). Later in life, mobility rates are low. Studies typically find that individuals move from privately owned houses to smaller rental dwellings later in their lives (Tatsiramos, 2006; Chiuri and Jappelli, 2010; Abramsson and Andersson, 2012; Angelini and Laferrère, 2012). After controlling for cohort, however, much of these effects disappear (Chiuri and Jappelli, 2010).

Housing tenure has a strong negative effect on residential mobility (Morrison, 1967; Land, 1969; Speare, 1970). This is highly related to the effect of changes along the demographic ladder on residential mobility. Individuals in their twenties and early thirties, who have typically been living in their dwellings for only a short period of time, are more likely to move than (settled) older individuals who have typically been living in their houses for longer periods of time.

Changes in labor force status, such as job changes and retirement, may trigger residential movements as well. Workers may relocate to areas with more ideal job opportunities (Greenwood, 1975; Bartel, 1979; Greenwood and Hunt, 1984; Böheim and Taylor, 2002). The evidence regarding the relationship between retirement and residential mobility is consistent with the evidence regarding movement behavior later in life. There is evidence for retirement triggering movements from homeownership to renting (Banks, Blundell and Tanner, 1998). Retirement may further positively affect the housing consumption of homeowners, in particular for those who own higher-valued dwellings (Ermisch and Jenkins, 1999; Gobillon and Wolff, 2011). Skilled-labor individuals, who moved towards high-quality business environments at the beginning of their working lives, may move towards high amenity areas upon their retirement (Chen and Rosenthal, 2008).

2.2. Housing ladders during recessions

Empirical studies on housing ladders during recessions are scarce. Ho and Wong (2009) study the Hong Kong housing market during the 1997 Asian financial crisis and the subsequent depression. The Hong Kong housing market consists of cheap public rental housing, expensive private rental housing and privately owned housing. The authors study the effect of a policy change that increased public housing rents. Their evidence suggests that an increase in public housing rent induced public housing renters to save less and simultaneously reduced the probability of these renters buying a house since down payments were required for buying houses. It is important to note that there were no down payments for buying houses in the Netherlands during our period of investigation.

Dieleman and Everaers (1994) find that, during the crisis of late 1970s to early 1980s, housing prices and housing transactions in the Netherlands dropped. Despite the decline in housing prices, the number of renters buying houses did not increase. The authors suggest that this may have been due to a combination of declines in income, high nominal interest rates and low consumer confidence.

Stoll (2013) studies the direction of movements along the housing ladder in the United States before and during the Great Recession. He finds

Table 1
Median house value in 2017 in €1000, by housing type

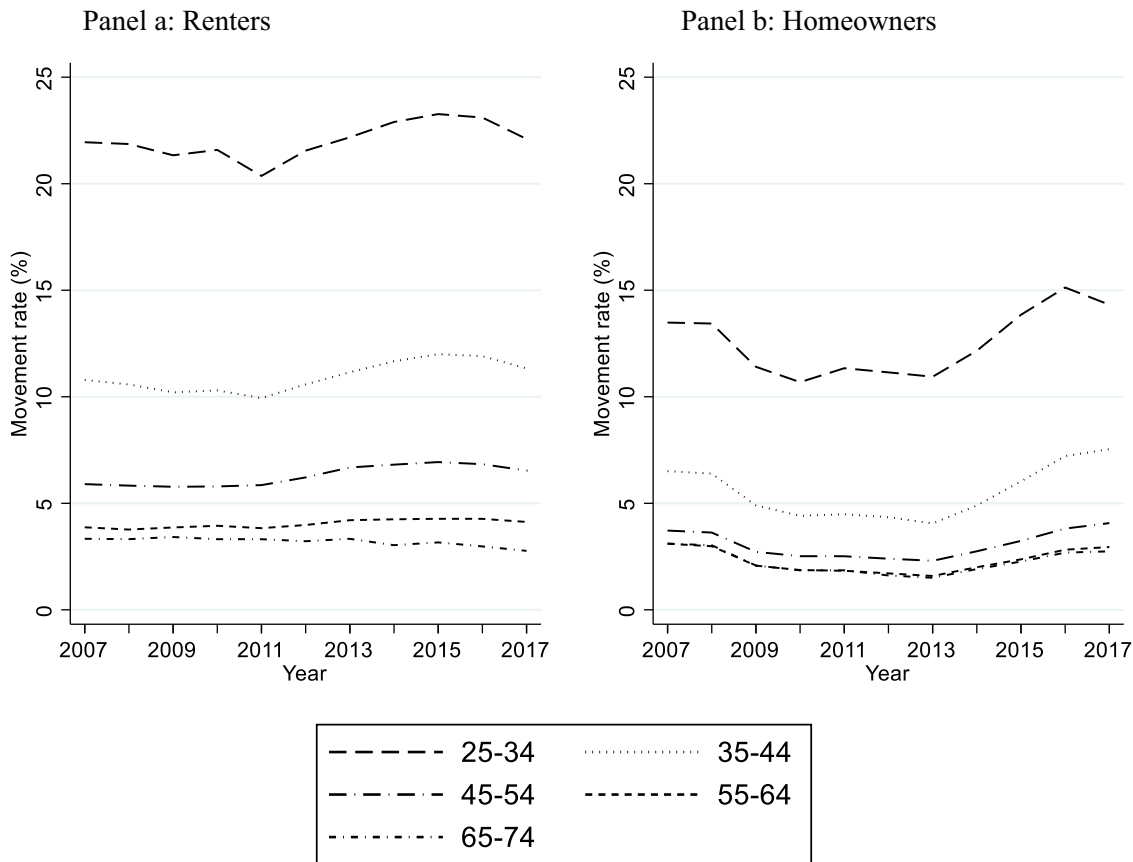| Housing type	Median house value in 2017 (in €1000)
Rental	
Social housing	135
Private sector	188
Privately owned	
Apartment	156
Terraced house	195
Corner house	204
Semi-detached house	224
Detached house	318

Figure 1. Movement rates for renters and homeowners, by age category

that the Great Recession boosted local movements to smaller dwellings, in particular among poor renters in areas with high unemployment. The Great Recession raised unemployment, resulting in income drops. Due to these income drops, certain affected households could no longer afford their housing and, therefore, moved to smaller dwellings.

Overall, the literature provides a certain degree of evidence on the interaction between recessions and careers in the housing market. It seems that there has been a negative effect of recessions on transitions from the rental to the owner-occupied sector (Dieleman and Everaers, 1994; Ho and Wong, 2009). In addition, recessions have led to a relative increase in movements down the housing ladder (Stoll, 2013). However, the empirical evidence is limited.

3. Dutch institutional setting

Roughly speaking, the bottom rungs of the housing ladder in the Netherlands consist of a substantial social housing sector. Social housing has had restricted access based on income and financial wealth since 2011, and it is meant to provide affordable housing to low-income households.[2] Higher on the housing ladder, there is private rental housing and low-end homeownership, and at the top of the housing ladder, there is high-end homeownership. In 2012, Dutch housing stock consisted of approximately 56 percent owner-occupied housing, approximately 12 percent of private sector rental housing and approximately 30 percent of dwellings rented from housing corporations (Statistics Netherlands, 2017). 95 percent of the dwellings rented from housing corporations concerned social housing during the period of investigation.

We measure positions on the housing ladder using house values in 2017. We verify to what extent and floor surface area were positively associated. Based on information from a large representative survey of Dutch rental dwellings in 2017, we perform a simple linear regression with the logarithm of floor surface area as the dependent variable and only the logarithm of the house value in 2017 as the independent variable. We find that a one percent increase in house value was associated with a 3.6 percent increase in floor surface area.[3] This effect is statistically significant at the one percent level and was similar for social and privately rented housing. Based on the rental survey data and additional house transaction data, Table 1 shows that larger types of privately owned housing had higher median house values.

The transaction costs for buying houses may have induced residential mobility being lower for homeowners than for renters. These transaction costs include taxes and other costs and, in total, generally speaking, were between 6 and 10 percent during the period of observation. Details on other institutions relevant to mobility along the housing ladder can be found in the Appendix.

4. Data

We use administrative micro panel data administered by Statistics Netherlands for the period from 2007–2017. These data cover the entire range of individuals and houses registered in the Netherlands. We select observations from individuals in the 25–74 age category. We do not consider younger individuals since individuals in the 18–24 age category were very mobile and were rarely homeowners. Neither do we

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[2] Kattenberg and Hassink (2017) study the effect of rent control in social housing on residential mobility in the Netherlands.

[3] This panel survey includes about 378,000 rental dwellings and is administered by Statistics Netherlands. The corresponding R-squared for the regression is 99.7 percent.
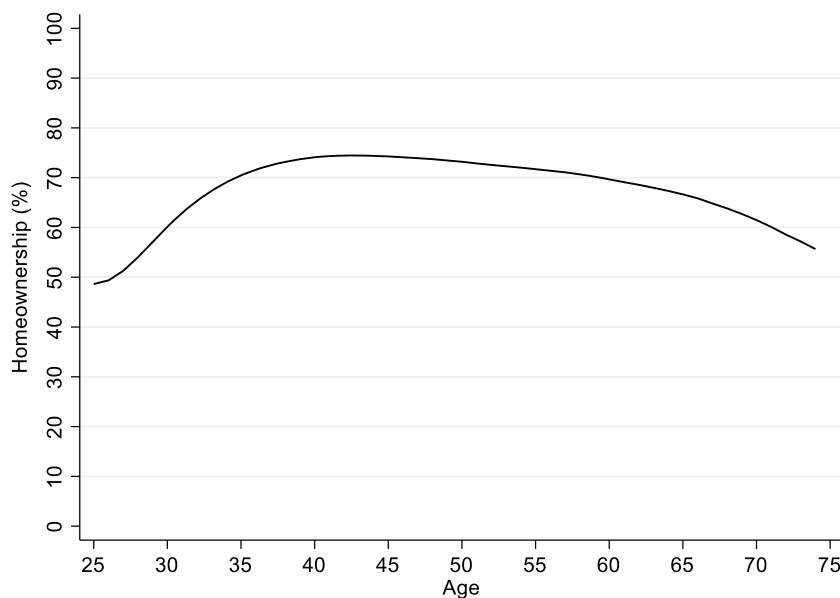
Figure 2. Fraction of individuals living in privately owned houses (in percentages), by age

consider older individuals in the 75 or older age category, which constitute a selective group that was likely to have moved to elderly homes or other types of housing with additional health care provisions. For individuals that moved multiple times during the calendar year, we only include the first movement in our sample to ensure that we have one observation per individual per year. Our dataset includes information on whether housing was privately owned or rented, the house value, household composition, income and wealth of the household, personal socioeconomic characteristics and demographic characteristics.

Figure 1 shows that movement rates were generally lower for older individuals, both for renters and homeowners. This is in line with evidence from OECD countries, including the United States (Ferreira et al., 2010), Britain (Clark and Huang, 2003) and the Netherlands (Helderman et al., 2004). The movement rates of renters were higher than those of homeowners, reflecting the relatively flexible nature of renting.[4]

Figure 1a shows that the movement rates for renters experienced a minor drop during 2011, followed by a strong and flattening increase afterwards. The pattern is consistent with the Great Recession possibly negatively affecting movement rates among homeowners through a drop in home equity combined with loss aversion. Figure 1b shows that movement rates for homeowners dropped severely in 2009 and only started recovering after 2013. Thus, the Great Recession did not seem to influence the movement rates of renters.

Figure 2 reflects the housing careers of individuals. The fraction of individuals living in privately owned houses increased from the youngest ages in our sample until around age 40. In these years of their lives, individuals typically start their labor-market career, start cohabiting, get children and—if possible—start living in larger houses. The figure shows a decrease in homeownership for later ages. As in line with previous evidence from the Netherlands and other OECD countries, there was no clear downsizing in terms of homeownership during old age. Lower rates of homeownership of the elderly are mainly due to birth-cohort effects (Chiuri and Jappelli, 2010).

We use house value as an indicator for the position on the housing ladder. The Dutch government annually determines the house value for each house in the Netherlands. This is done because various regulations, such as maximum social housing rents and income tax for homeowners, depend on these house values. The house value is based on transaction

prices of recently traded houses with similar characteristics, such as location and size. We apply house values in 2017 to the corresponding houses in all years since house values are sensitive to time-varying market conditions. House values of rental dwellings may be overestimated, as they are based on transactions of similar privately owned houses. Privately owned houses are likely to be of a higher quality than rental dwellings because they are more well-maintained (Shilling et al., 1991).

Table 2 describes the main characteristics for renters and homeowners who moved in the year of observation and those who did not move. The number of movers was hardly higher among homeowners than among renters although over twice as many individuals lived in privately owned houses compared to rental dwellings. The houses of homeowners had, on average, higher values than those of renters. This is in line with our description of the housing ladder with (social) rental dwellings being at the bottom of the housing ladder and privately owned housing, in general, being higher on the housing ladder. Compared to renters, homeowners had larger households on average and had higher household incomes and higher financial non-housing wealth. Individuals who moved up the housing ladder moved from houses with lower values compared to individuals who moved down the housing ladder. Renters mainly moved to other rental dwellings, and homeowners mainly moved to other privately owned homes.

Figures 3–5 depict the probability of movement along the housing ladder by age. Movements up the housing ladder are defined as a transition to a new dwelling that had at least a ten percent higher value relative to the old dwelling. The horizontal moves on the job ladder had an upward or downward change of the value of ten percent at maximum. For the movements down the job ladder, the new dwelling had at least a ten percent lower value.

Figure 3a shows a clear drop in movement rates in the early crisis years for young renters, suggesting that the crisis made certain renters postpone or cancel climbing the housing ladder. Figure 3b shows a decline for homeowners in the movement rate during the crisis years. The patterns of Figure 3a and b are likely to be related since homeowners who moved up the housing ladders left dwellings in the lower segment. These empty dwellings may have been occupied by the starters in the housing market. For renters, as seen in Figures 4 and 5, there was no clear pattern during the crisis and an increase in downward movements after the crisis. For homeowners, the downward movement rates indicates a negative crisis effect and a strong increase to a level above the pre-crisis level.

Figures on movements towards rental and privately owned dwellings may provide insight into why movements up the housing ladder became less frequent during the Great Recession. Figure 6 shows that the

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[4] As discussed in Section 3, buying a house involves high transaction costs. Renting a house does not involve such transaction costs.

Table 2
Descriptive statistics

Descriptives for renters and homeowners who did not move during the year of observation

| | Renters | | Homeowners | |
	Mean	St. dev.	Mean	St. dev.
Age	49.71	14.41	49.47	12.63
Female	0.53	0.50	0.49	0.50
No Dutch etnicity	0.32	0.47	0.13	0.34
Married	0.43	0.50	0.70	0.46
Number of household members	2.25	1.28	2.88	1.26
Active in labor force	0.50	0.50	0.72	0.45
Household income (at t-1)	48	44	91	84
Household wealth excluding housing	30	1,461	145	2,969
House value	168	219	267	160
N	30,970,473		70,243,225	

Female, married, no Dutch ethnicity, active in the labor force, movement to privately owned dwelling and movement to rental dwelling are dummy variables with value 1 if the condition in the variable name is met and 0 otherwise. (Deflated) Household income (at t - 1) is measured in €1000 with 2015 as reference year. House values are values of the house an individual lives in on January 1st and are measured in €1000. House values of 2017 are applied to corresponding houses in all years.

Descriptive statistics for renters who moved during the year of observation

| | Movement upwards | | Horizontal movement | | Movement downwards | |
	Mean	St. dev.	Mean	St. dev.	Mean	St. dev.
Age	37.08	11.85	40.21	13.68	39.27	13.81
Female	0.50	0.50	0.49	0.50	0.48	0.50
No Dutch etnicity	0.32	0.46	0.34	0.47	0.34	0.47
Married	0.29	0.45	0.29	0.45	0.22	0.42
Number of household members	2.21	1.21	2.25	1.28	2.03	123
Active in labor force	0.73	0.44	0.64	0.48	0.63	0.48
Household income (at t-1)	57	48	52	43	52	48
Household wealth excluding housing	29	342	19	168	24	497
House value	136	70	169	95	255	276
Movement to privately owned house	45	50	27	44	22	42
Movement to rental dwelling	55	50	73	44	78	42
N	1,743,179		606,968		1,013,689	

Descriptive statistics for homeowners who moved during the year of observation

| | Movement upwards | | Horizontal movement | | Movement downwards | |
	Mean	St. dev.	Mean	St. dev.	Mean	St. dev.
Age	39.65	10.83	41.67	13.30	41.61	14.41
Female	0.49	0.50	0.48	0.50	0.49	0.50
No Dutch etnicity	0.15	0.36	0.16	0.37	0.15	0.35
Married	0.53	0.50	0.44	0.50	0.32	0.47
Number of household members	2.87	1.27	2.76	1.27	2.68	1.29
Active in labor force	0.88	0.33	0.79	0.41	0.76	0.43
Household income (at t-1)	97	107	88	74	97	85
Household wealth excluding housing	141	1,248	107	633	154	1,660
House value	198	98	229	117	312	211
Movement to privately owned house	88	32	77	42	60	49
Movement to rental dwelling	12	32	23	42	40	49
N	1,633,146		532,284		1,377,873	

probability of movement to a privately owned house dropped severely during the Great Recession for homeowners and young renters. This is consistent with the earlier finding that renters and homeowners became less likely to buy homes during the Great Recession. Figure 7 shows a steady increase in the share of renters and homeowners that moved to rental dwellings during the Great Recession. For renters, the increase stopped in 2013. One possible explanation for these patterns is that certain individuals who wanted to buy a house substituted moving to a privately owned house with moving to a rental dwelling.

5. Methodology

We estimate a multinomial logit model to verify whether the patterns in the previously discussed figures would continue to hold when accounting for various relevant covariates.[5] We estimate the model on a random sample of 2,000,000 observations drawn from the population dataset as studied in the previous section.[6] Our statistical model allows for multiple outcomes. No movement is the baseline outcome in the model. There are three alternative outcomes that correspond to the transitions presented in Section 4 and Figures 3–5—an upward movement, a horizontal movement and a downward movement along the housing ladder.

The independent variables of interest in our model are year dummies and year dummies interacting with the dummy for living in a privately owned house. The year dummies capture developments in house prices and between-year variation for other variables not included as independent variables. We allow these year effects to differ across age. We include variables on various demographic, socioeconomic and financial characteristics, as seen in Table 2, and all these variables interacted with the dummy variable for living in a privately owned house as independent variables in our model as well. We control for demographic and

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[5] As a robustness check, we estimate a multinomial logit model with the base outcome no movement, the alternative outcomes movement to privately owned dwellings and movement to rental dwellings as well. They show year effects for renters and homeowners consistent with those in Figures 6-7.

[6] We take a large random sample from the population dataset as estimating marginal effects for the whole population dataset is very time-consuming. The results based on the large sample are likely to be very similar to marginal effects based on the population dataset.

Panel a: Renters   Panel b: Homeowners
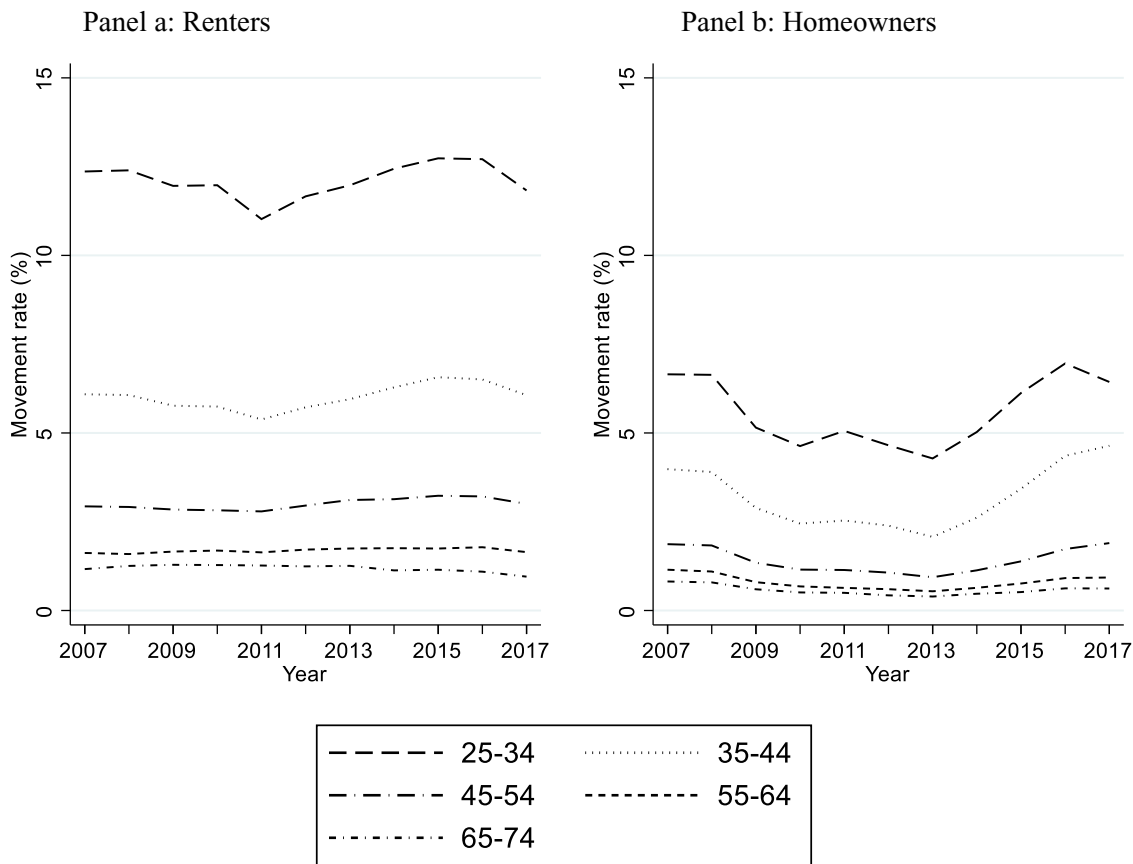
Figure 3. Probability of movement up the housing ladder (in percentages) for renters and homeowners, by age

employment characteristics since housing careers correlate with demographic and employment careers. House value indicates the position on the housing ladder and is an important explanatory variable for the direction of movement along the housing ladder.

6. Results

We present the average marginal effects for the most relevant variables of our multinomial logit model (See Table 3). The marginal effects for the crisis year dummies were negative and significant at the one percent level for movements up the housing ladder and mostly insignificant for horizontal and downward movements.[7] This confirms that renters in the 25–34 age category experienced a temporary drop in the movement rate up the housing ladder and that their horizontal and downward movement patterns were, in general, stable during the Great Recession, as observed in Figures 3a–5a as well. The estimates indicate that the probability of moving up the housing ladder was 0.4 percentage points lower in 2010 and 2011 than in 2007 for renters in the 25–34 age category. The drop in upward movement rates for renters during the Great Recession is consistent with the drop in rates of movement towards privately owned housing, as seen in Figures 6a and 7a. There was a crisis in the market for privately owned houses, with owners being less willing to sell their houses and move up the ladder compared to before. Starters did not benefit from the low housing prices by buying houses, perhaps due to price uncertainty and a lack of consumer confidence.

The marginal effect estimates on interactions between the year dummies and the homeownership dummy show that homeowners in the 25–34 age category experienced a significant drop in movement in all

directions during the Great Recession and that movement rates recovered afterwards. This is in line with the patterns presented in Figures 3b–5b. Furthermore, it confirms our hypothesis on the mobility effects of loss aversion and negative equity. The negative effects on upward movement rates are stronger for homeowners than for renters. The probability of moving up the housing ladder was 0.8 percentage points lower in 2010 and 0.6 percentage points lower in 2011 than in 2007 for homeowners in the 25–34 age category.

7. Macro indicators

Correlations between key macroeconomic indicators and movement rates could provide improved insight into the mechanisms underlying the effects. Table 4 shows that house prices were positively and significantly—at the one percent level—correlated with movement rates of homeowners.[8] This finding implies an association between a house price decline and a decline of the movement rate for homeowners, and it is consistent with an effect through loss aversion.

In contrast, housing prices were not correlated with the movement rate of renters. This may be explained by the positive effect of a lower house price on the willingness to buy a house, which was fully mitigated by the negative effect of house price uncertainty. Consumer confidence and the willingness to buy were positively and significantly correlated with moves to privately owned houses by renters. Renters who wanted to buy houses may not have had the confidence to do so during the Great Recession, and they may have partly postponed such movements until

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[7] We do not apply a Bonferroni correction for multiple hypothesis testing explicitly, but from the p-values in Table 3 it is clear that our statements on significance of marginal effects also hold after applying such correction.

[8] We do not apply the Bonferroni correction as we believe it is overly conservative in this setting with limited statistical power as even factors with intuitively strong links turn out insignificant after such correction. We apply a low significance level instead.
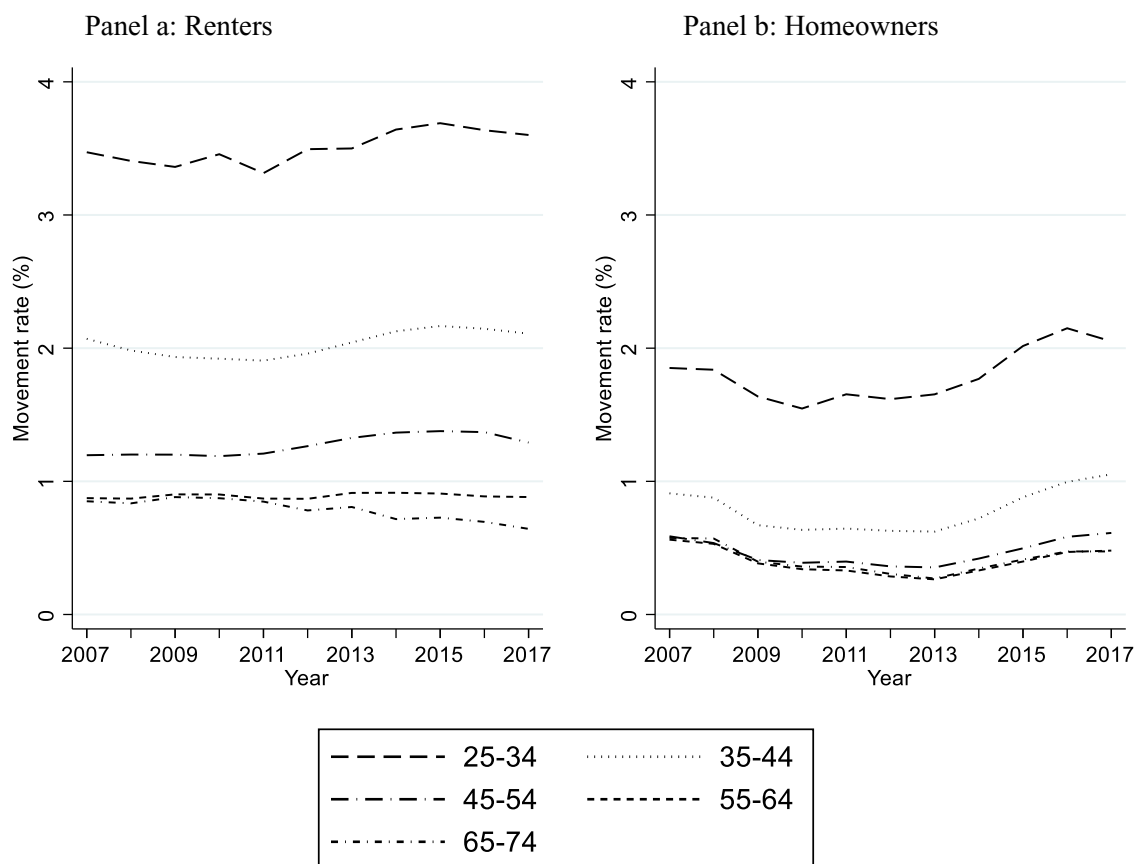
Figure 4. Probability of horizontal movement on the housing ladder (in percentages) for renters and homeowners, by age

the recession was over.

8. Conclusion

We study movements along the housing ladder before, during and after the Great Recession by using Dutch administrative data. The Great Recession was characterized by strong decreases in house prices in many OECD countries, including the Netherlands. This study aims to improve our understanding of how the housing careers of renters and homeowners were affected by the Great Recession. Differences between renters and homeowners are of particular interest to us.

We use the intuitive concept of the housing ladder to study housing careers. Data on house values for all houses in the Netherlands, both rental and privately owned, allow us to study movements along the housing ladder for renters and homeowners. House values are based on recent transaction prices of similar nearby located traded houses.

We estimate a multinomial logit model on transitions along the housing ladder and find that the probability of moving up the housing ladder dropped for young renters and homeowners during the Great Recession. Additional evidence suggests that this drop was due to a decrease in the probability of movement towards privately owned housing. Conditions to buy a house and climb the housing ladder were favorable for renters, in particular, including conditions such as low-interest rates and decreased housing prices. However, low consumer confidence, housing price uncertainty and a limited supply of housing due to owners at the higher rungs of the housing ladder not moving may have prevented renters and homeowners from buying houses and moving up the housing ladder. Our result on renters is in line with the evidence and explanation on renters provided by Dieleman and Everaers (1994) regarding the crisis during the late 1970s, to early 1980s as

well as regarding recovery movement rates after the Great Recession. Our evidence on homeowners is consistent with earlier evidence suggesting that house price drops may reduce the residential mobility of homeowners through negative equity and loss aversion (Henley, 1998; Ferreira et al., 2010; Bricker and Bucks, 2016; Steegmans and Hassink, 2018).

We have to take several differences into account between housing markets in the Netherlands and a majority of the other OECD countries when generalizing our results to other OECD countries and similar future recessions. First, no down payments were required for buying houses in the Netherlands during the period studied. This made credit constraints for starters on the housing market less likely to be an issue in the Netherlands than in a majority of other OECD countries. Lower credit constraints for starters are likely to translate into higher moving rates for starters. Second, approximately 30 percent of the housing stock in the Netherlands consisted and still consists of social housing. This is high compared to other OECD countries. Residential mobility for individuals living in social housing may have been different than for those living in private rental housing. Individuals in social housing may have been less likely to move out of rental housing because they faced lower rents than those renting similar houses on the private market, for instance.

CRediT authorship contribution statement

Wolter Hassink: Conceptualization, Funding acquisition, Writing - review & editing. **Jochem Zweerink:** Conceptualization, Methodology, Software, Validation, Formal analysis, Writing - original draft, Writing - review & editing, Visualization.
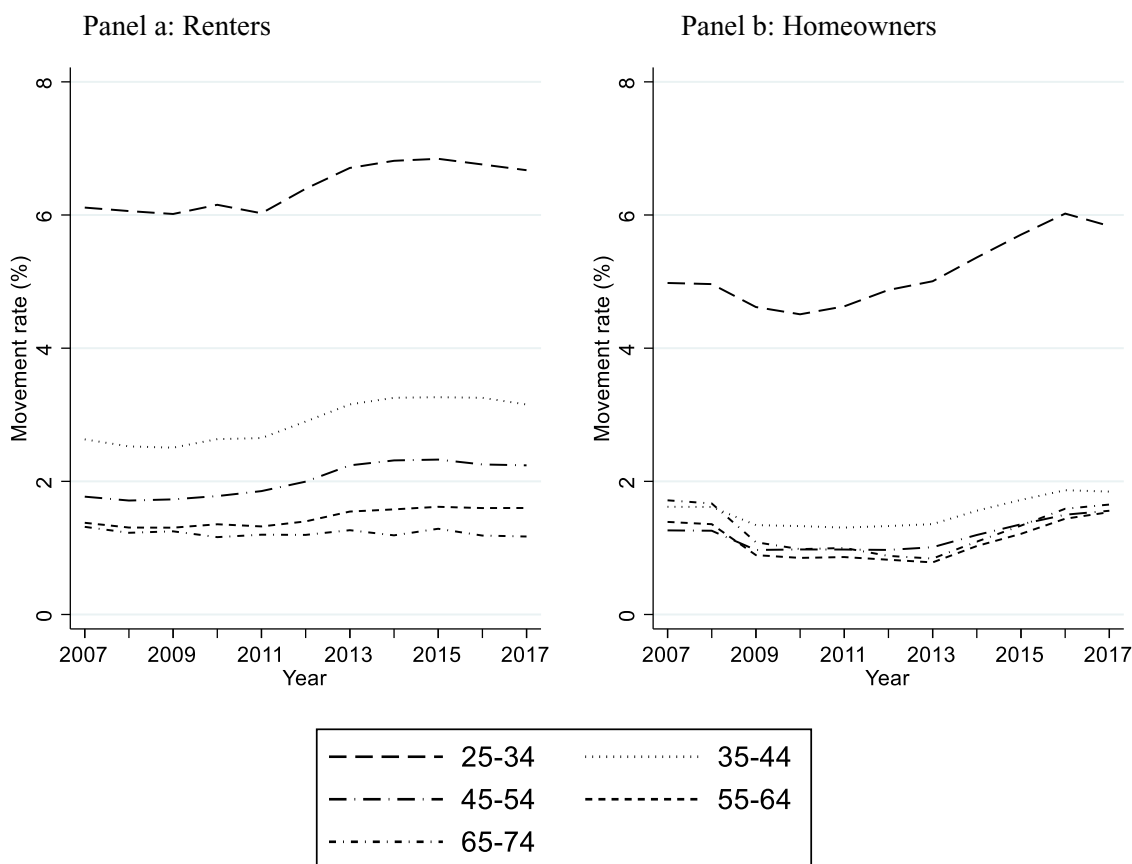
Panel a: Renters

Panel b: Homeowners

Figure 5. Probability of movement down the housing ladder (in percentages) for renters and homeowners, by age

Acknowledgements

Appendix—Institutional setting

Social housing

Accessibility

Social housing is subsidized housing with low rents.[9] The maximum rent for social housing was 664 euros per month in 2012. The maximum rent for social housing may be lower than that amount depending on house-specific characteristics. Social housing has restricted access. Households can only be considered for social housing if their income lies below a certain threshold level. This income threshold was about 34,000 euros in 2012.

Subsidy for social housing rent

Tenants whose monthly rents do not exceed the maximum social housing rent are eligible for rent subsidy if their income and wealth lie below certain thresholds.[10] The level of rent subsidy was 65 percent of the difference between the rent and 365 euros in 2012 and 75 percent of

this difference in earlier years.[11] Income and wealth thresholds depend on age and household composition. The income threshold was approximately 30,000 euros for couples in the 23–64 age category and slightly lower for singles in the 23–64 age category and couples and singles aged 65 or older in 2012. The wealth threshold was 21,000 euros for households in the 23–64 age category and without children in 2012.

Private sector rent

Rents of private sector housing in the Netherlands are liberalized and can take any value.

Privately owned housing

Maximum mortgage regulation

Households willing to buy homes were not required to make down payments during the period under study. The maximum amount these households could borrow through a mortgage was 130 percent of the execution value before 2012. The execution value was 90 percent of the market value of the bought house. Households were allowed to have mortgages up to 106 percent of the market value underlying the mortgage in 2012, and, in the years after, this maximum mortgage level decreased by one percentage point of the market value of the house per year.

The mortgage behavior code introduced in 2007 was more restrictive. This code roughly states that a maximum of 25–29 percent of the relevant test income may be spent on mortgages.[12] The method of

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[9] These rents are monthly rents excluding energy, water, internet, etc.
[10] A lower maximum rent applies for individuals in the 18-22 age category. This is not relevant for our study, as we only consider individuals in the 25-74 age category.

[11] This implies that the maximum monthly net rent for households in social housing who were eligible for rent subsidy was 470 euros in 2012.
[12] The maximum percentage of the test income that was allowed to be spend on mortgages is increasing in test income.
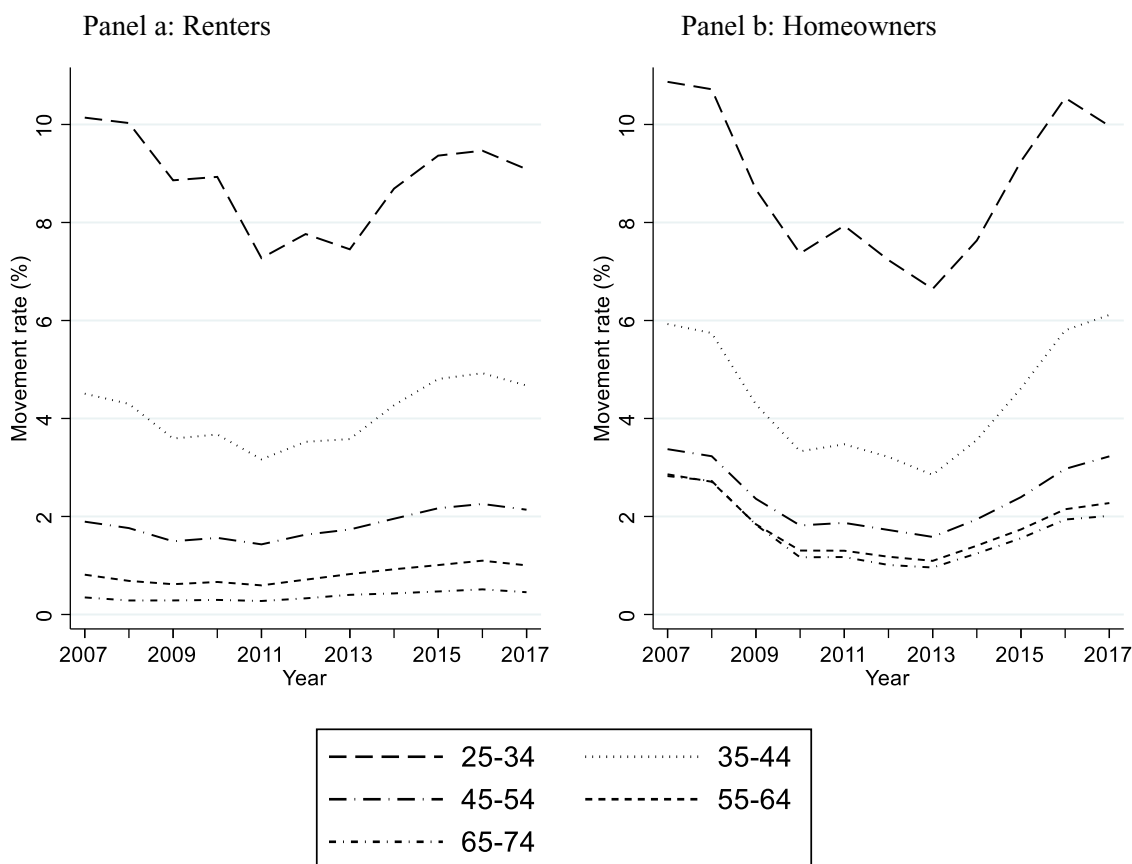
Figure 6. Probability of movement to privately owned houses (in percentages) for renters and homeowners, by age

calculating the test income varies across banks. The test income depends, among other things, on wage income and whether individuals have fixed employment contracts. In the case of one-member households with fixed employment contracts, the test income typically equals the gross wage income.

Mortgage insurance

The national mortgage guarantee enables house buyers to insure themselves against remaining debt in the case of a default and forced sale. House buyers with housing costs lower than a certain threshold, which was 350,000 euros in 2009, can take the national mortgage guarantee, and the costs of such a guarantee are one percent of the mortgage value. The net costs of the national mortgage guarantee are low for those who take the national mortgage guarantee due to fiscally beneficial rules and mortgage interest rate cuts. It has become more popular to take the national mortgage guarantee since the start of the Great Recession. 84,000 home buyers took the national mortgage guarantee in 2008, and 137,000 home buyers took the national mortgage guarantee in 2011 (NHG, 2015).

Taxes and subsidies

Owner-occupied housing is subsidized via a fiscal arrangement that allows homeowners to deduct mortgage rent payments from their taxable income. These mortgage rent payments can typically be deducted from taxable income at marginal tax rates of 42 and 52 percent depending on the income level. This fiscal arrangement aims to promote homeownership. As of 2008, mortgage products without redemption were offered to allow lenders to maximally benefit from the mortgage rent reduction facility. As a response to the Great Recession and, related, the increased default of mortgage payments, the Dutch government implemented a significant reform on January 1st, 2013 to promote the paying-off of mortgages. One element of this reform was that individuals

with mortgages without redemption could no longer deduct mortgage rents from their taxable income. This made a majority of individuals with mortgages without redemption convert their mortgages to other types of mortgages. In practice, linear and annuity mortgages are the only types of mortgages that have been used since the 2013 reform.

Another instrument used to promote homeownership is a tax-free donation from parents to pay for their children's houses. Parents are allowed to donate up to 50,000 euros per child tax-free, once, if this money is used to buy a house or to pay a mortgage to completion. The 2013 reform temporarily increased this threshold to 100,000 euros.

There are taxes on homeownership as well. Firstly, the taxable income of homeowners is increased by a fraction of the estimated value of a house. This fraction was typically 0.55 percent during the period studied. Secondly, the first residents of new houses must pay value-added tax (VAT). VAT was 19 percent until October 1, 2012 and 21 percent afterwards. On top of VAT, there are other transactions costs such as notary costs. For existing housing, buyers do not have to pay VAT but have to pay a house transfer tax. This tax was six percent of the transaction price before taxes until June 15, 2011 and two percent afterwards. The total transaction costs for existing houses were, on average, approximately ten percent until 2011 and approximately six percent afterwards.

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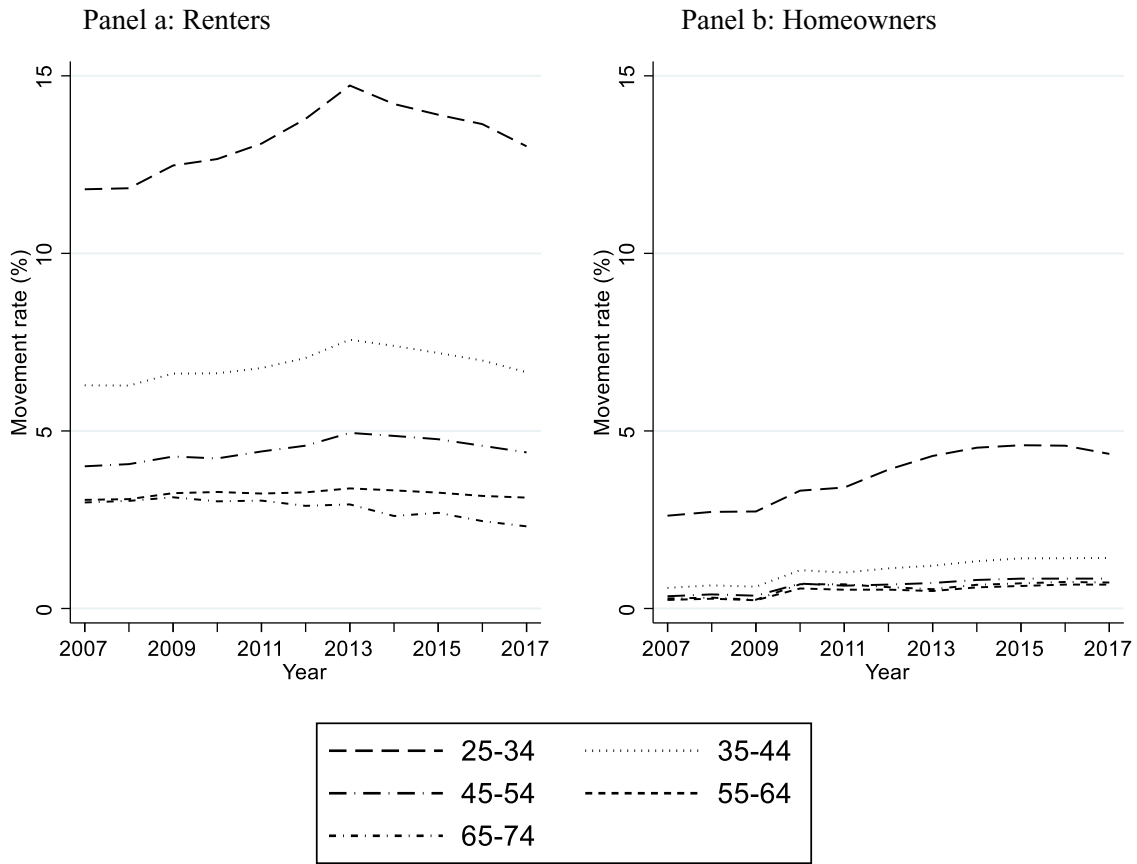Banks, J., Blundell, R., Tanner, S., 1998. Is there a retirement saving puzzle? Am. Econ. Rev. 88 (4), 769–788.

Panel a: Renters

Panel b: Homeowners

Figure 7. Probability of movement to rental dwellings (in percentages) for renters and homeowners, by age

Table 3

Multinomial logit model, average marginal effects

Base outcome: no movement											
Movement upwards				Horizontal movement				Movement downwards			
Year dummies	Marg. ef.	St. err.	P-val.	Year dummies	Marg. ef.	St. err.	P-val.	Year dummies	Marg. ef.	St. err.	P-val.
2008	0.000	0.001	0.750	2008	0.000	0.001	0.911	2008	0.000	0.001	0.891
2009	-0.002	0.001	0.163	2009	0.000	0.001	0.698	2009	-0.001	0.001	0.444
2010	-0.004	0.001	0.001	2010	0.000	0.001	0.887	2010	-0.001	0.001	0.478
2011	-0.004	0.001	0.000	2011	0.000	0.001	0.932	2011	-0.003	0.001	0.016
2012	-0.005	0.001	0.000	2012	0.000	0.001	0.829	2012	0.001	0.001	0.627
2013	-0.002	0.001	0.129	2013	0.001	0.001	0.065	2013	0.001	0.001	0.559
2014	0.002	0.001	0.041	2014	0.000	0.001	0.508	2014	0.001	0.001	0.389
2015	0.002	0.001	0.100	2015	0.002	0.001	0.028	2015	0.001	0.001	0.232
2016	0.004	0.001	0.001	2016	0.001	0.001	0.298	2016	0.002	0.001	0.025
2017	-0.002	0.001	0.054	2017	0.001	0.001	0.413	2017	0.000	0.001	0.828
Year dummies interacted with homeownership dummy				Year dummies interacted with homeownership dummy				Year dummies interacted with homeownership dummy			
2008	0.001	0.002	0.744	2008	-0.001	0.001	0.614	2008	0.001	0.002	0.459
2009	-0.007	0.002	0.000	2009	-0.002	0.001	0.093	2009	-0.001	0.002	0.457
2010	-0.008	0.002	0.000	2010	-0.003	0.001	0.018	2010	0.000	0.002	0.990
2011	-0.006	0.002	0.000	2011	-0.002	0.001	0.064	2011	0.001	0.002	0.463
2012	-0.007	0.002	0.000	2012	-0.004	0.001	0.000	2012	-0.002	0.001	0.127
2013	-0.012	0.002	0.000	2013	-0.003	0.001	0.009	2013	-0.003	0.001	0.087
2014	-0.013	0.002	0.000	2014	-0.003	0.001	0.013	2014	0.000	0.001	0.832
2015	-0.004	0.002	0.007	2015	-0.001	0.001	0.287	2015	0.002	0.001	0.264
2016	-0.001	0.002	0.497	2016	0.000	0.001	0.714	2016	0.000	0.001	0.884
2017	0.002	0.002	0.237	2017	-0.001	0.001	0.413	2017	0.002	0.001	0.146
Homeownership	-0.022	0.002	0.000	Homeownership	0.001	0.001	0.282	Homeownership	0.005	0.001	0.000
Base probability 25–34 y/o renters in 2007	0.129			Base probability 25–34 y/o renters in 2007	0.033			Base probability 25–34 y/o renters in 2007	0.059		
N	2,000,000			(large random sample from population dataset as described in Table 2)							

Table 4

Correlations macroeconomic indicators with movement rates

Variables	(1)	(2)	(3)
(1) Consumer confidence	1.00		
(2) Willingness to buy	0.91*	1.00	
(3) House price	0.55	0.79*	1.00
(4) Movement rate for renters	0.48	0.20	-0.24
(5) Movement rate for homeowners	0.74*	0.87*	0.77*
(6) Movement rate to privately owned houses for renters	0.81*	0.74*	0.38
(7) Movement rate to privately owned houses for homeowners	0.60	0.82*	0.79*
(8) Movement rate up the housing ladder for renters	0.51	0.29	-0.16
(9) Movement rate down the housing ladder for homeowners	0.65	0.85*	0.81*

* indicates significance at the one percent level. The macroeconomic indicators consumer confidence, willingness to buy and house price were obtained from Statistics Netherlands (Statistics Netherlands, 2020b, Statistics Netherlands 2020c).

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