The dynamisation and subsequent vulnerability of the Dutch owner-occupied sector. An analysis of 1986-2012

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Abstract – This article investigates the backgrounds to changing residential mobility of Dutch owner-occupiers from 1986-2006 and during the 2008-2018 crisis. The Oaxaca-Blinder decomposition is used to disentangle the main factors at work. Households of all age groups and family types have become more mobile in 1986-2006, with the highest increase amongst the youngest age groups. Nonetheless, ageing of owner-occupiers has dampened the growth between 1986 and 2006, because older owner-occupiers usually move less frequently than younger age groups. Had this ageing process not taken place, the overall increase in mobility would have been much higher (about 3.5 percentage points) than the 1.4 percentage point observed. The overall compositional effect remains negative despite a shift from traditional families with children towards more singles and couples without children, who are more mobile. During the crisis of 2008-2012, high residential mobility rates amongst the young age groups took a sharp negative turn. Combined with their increased presence among owner-occupiers, this implies that the contemporary Dutch owner occupied sector is more vulnerable to economic shocks.

JEL Classification: R21, R31
Keywords: residential mobility, owner-occupation, housing systems

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The Dutch owner-occupied housing sector has grown substantially in the past three decades, from about 45% of all dwellings in the mid-1980s until nearly 60% in 2015 (Statistics Netherlands, 2016). The start of the Global Financial Crisis in 2008 marked a stabilisation of the proportion of owner-occupiers. In absolute terms, the Dutch owner-occupied sector doubled from about 2.1 million units in 1986 to 4.2 million units in 2012. As a result, the characteristic Dutch housing career, where households trade up in a number of consecutive steps from smaller to larger dwellings, increasingly takes place in the owner-occupied sector. Whereas in the 1980s, typical housing careers commenced with a couple of steps in the rental sector before households entered into owner occupation, the contemporary housing career usually starts in the rental sector, but it continues in the owner-occupied sector at a much earlier stage in the life cycle (Feijten & Mulder, 2002; Mulder & Wagner, 1998). Today, an increasing proportion of households even starts their housing career in the owner-occupied sector. As Dutch housing careers have become more focused on the owner-occupied sector, the composition of the population of owner-occupiers has drastically changed. Whereas the owner-occupied sector was dominated by families with children (around 60%) in the 1980s, this share has declined to less than 40% in 2012. At the same time the Dutch population has aged and the large cohort of baby boomers, who were the first generation of "new home owners" in the 1970s and 1980s, are currently in their late fifties and early sixties (see for example Blijie *et al.*, 2013; Helderman, 2004). Many baby boomers are currently empty nesters, also impacting on a higher share of households without children in their household.

There is a general agreement that housing careers of contemporary Dutch owner-occupiers involve more residential moves and therefore more dynamism exists in the individual housing histories of new generations of owner-occupiers. However, the question arises whether the proportion of all owner-occupiers that recently moved around 2005, differs much from the proportion of recent movers in the 1980s. The motivation for a more detailed investigation emanates from the fact that alongside an influx of more young, dynamic households in the owner-occupied sector, the potential effects of demographic ageing should not be overlooked. For instance, simply because older owner-occupiers have a lower propensity to move than their younger counterparts, ageing of a significant share of owner-occupiers has the potential to negatively affect the overall percentage of owner-occupiers that have moved recently. In this article, such factors are referred to as "compositional effects". We explicitly state that compositional changes, such as population ageing, have the potential to negatively affect the overall percentage of owner-occupiers that have moved recently. Another main factor to take into account is that population cohorts behaviour can change over time, i.e. "behavioural effects"[1]. For instance, contemporary (older) owner-occupiers may have a higher chance of having moved recently than their counterparts of the 1980s, which would materialise into more dynamism in the owner-occupied sector.

We also aim to investigate a second theme that is related to the particular evolution of the Dutch owner-occupied housing market. As indicated, contemporary Dutch households enter the owner-occupied sector at a younger age, on average, than their counterparts in the 1980s. While Dutch households of the 1980s usually lived in a rental dwelling for a prolonged time before buying a single-family dwelling for long time residence, today a sequence of relatively short residences in an owner-occupied apartment is not unusual for young households. High leverage (mortgaged loans) among young households has become a characteristic of the new dynamic market, which has the potential to make it more vulnerable to economic crises than the "traditional system". The main argument behind this is that the sequences of residential moves in the earlier life course can be obstructed, because of the risk of a remaining debt (Van der Heijden *et al.*, 2011). We aim to investigate in more detail the vulnerability of the contemporary Dutch owner-occupied housing system during the recent crisis of 2008-2013.

The article is organised as follows. The next section provides the theoretical backgrounds to the typical Dutch owner-occupied housing market and compares it to some other countries. Then section 3 elaborates on the quantitative methodology and the data which are used. In section four we present the results and section five reflects on the main findings.

1. We rather not use "cohort effect" because it might refer to either behavioural or compositional effects or both.

Theoretical backgrounds

In this literature review, we first deal with a more detailed description of the formation of a "dynamic" owner-occupied sector in the Netherlands as opposed to the more "static" system in several other countries. Did mobility in the owner-occupied sector increase as a result of changes in the behaviour of owner-occupiers? We draw on the Structure of Housing Provision approach as developed in the late 1980s by researchers who analysed variations in international housing systems. Then we continue with an overview of the relation between household characteristics and mobility. This will assist in analysing the effects of changing demographic composition on mobility in the Dutch owner-occupied sector. These insights are based on the research schools that link residential mobility (and migration) to the career and life course perspective.

The Dutch owner-occupied housing market in an international perspective: Static versus dynamic

From the early 1980s and onwards, international variations in housing systems in the Western World sparked interest in the academic community. It led to detailed comparative analysis of housing policy systems (for example Boelhouwer & Van der Heijden, 1992), while explanations of differences in tenure status across countries were put forward referring to national political ideologies and welfare regimes, with the most notable contributions by Kemeny (1992, 1995, 2006). Another branch of research focused more on an analysis of the way that housing is provided. This body of research became known as the Structure of Housing Provision (SPH) approach, which investigated the role of all (social) actors involved in housing provision (Ball *et al.*, 1988; Martens, 1990; Barlow & Duncan, 1994). As such, the SPH approach has provided detailed overviews of those political-economic structures that finance, subsidise and build dwellings in the different tenures. It departs from the idea that there are no universal ways of housing provision and all national systems need to be scrutinised individually. Based on the work of Ball *et al.* (1988) and Martens (1990), Van der Heijden *et al.* (2011) propose two ideal-typical systems in the owner-occupied sector. The first one is a system with a relatively low degree of mobility in the owner-occupied sector. This is connected to an owner-occupied housing provision practice where prospective home owners buy a plot of land and hire an architect and subcontractors to design and build the dwelling; hence the term "self-provided" or self-commissioned housing. In most cases this involves building detached dwellings on plot of land. In case the household needs more space, a move is often not necessary because the house can be modified. In sum, new construction is targeted primarily towards first time buyers and a great part of the household's housing career can take place within one single dwelling. As a consequence, housing careers in the owner-occupied sector will involve only one or two moves. In this kind of market, owner-occupied dwellings are regarded as consumer goods. Because household mobility is rather low and housing construction in the owner-occupied sector is largely targeted towards first time buyers, the influence of economic trends on the housing market will be relatively limited. Such systems of owner-occupied housing provision are found in Germany, Belgium and France (Barlow & Duncan, 1994; Van der Heijden *et al.*, 2011). Based on the relative immobility in these owner-occupied sectors, Van der Heijden *et al.* (2011) refer to "static" owner-occupied housing systems. However, we need to emphasize that this does not by any means assume that all static systems are similar. The structure of the Belgian and the German owner-occupied housing system can both be characterized as "static", but the overall housing system in Germany is dominated by private rental and families move to their detached dream house when they are in their late thirties, whereas Belgians often start in a self-provided (or renovated) detached dwelling at a much younger age.

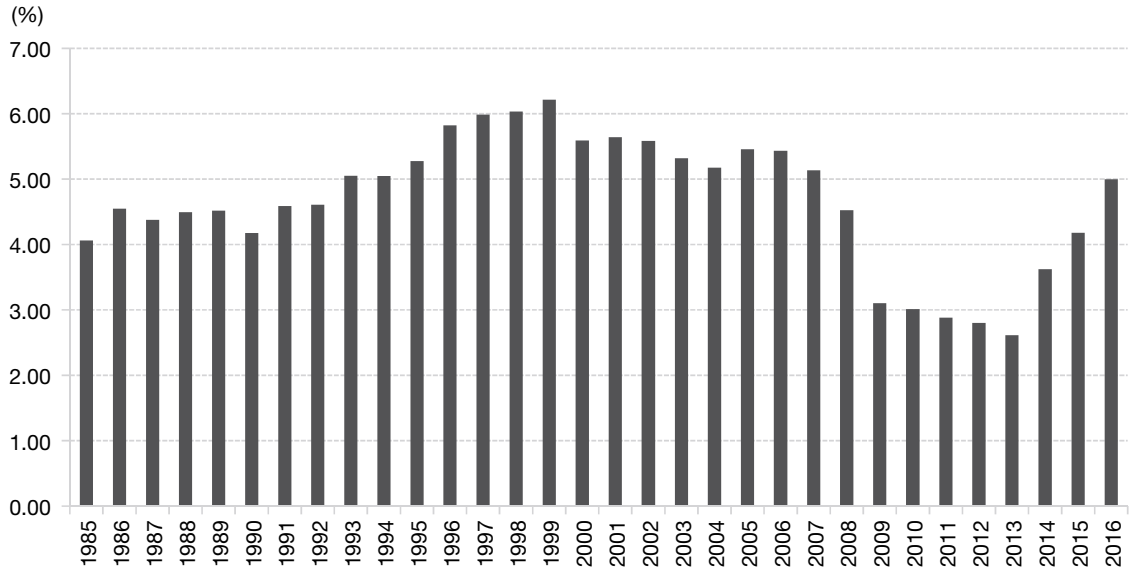
In the second system, the dynamic owner-occupied market, there is much more mobility of owner-occupiers, which can be linked to a specific form of owner-occupied housing provision. The provision of new owner-occupied housing takes place through speculative developers, who buy land, draw up a housing plan, commence building and sell the dwellings; hence speculative developers. They mostly build dwellings at the upper end of the market, where the margins are greater, because affluent consumers tend to buy more spacious dwellings with more luxury materials and equipment. The newly constructed dwellings are mostly bought by people who move in from a smaller existing owner-occupied dwelling. Thus, via upward mobility on the "housing

ladder" in existing owner-occupied dwellings, the construction of new dwellings at the upper end of the market ultimately results in an existing dwelling becoming available for a first-time buyer at the lower end of the market (Van der Heijden *et al.*, 2011). This process leads to relatively high levels of mobility and a large number of transactions of existing owner-occupied dwellings.

Van der Heijden *et al.* (2011) argue that it is likely that a dynamic owner-occupied system is sensitive to economic cycles because it relies on households who already own a good dwelling to move to a larger, more expensive property. In case of economic prosperity, many households who reaped the economic benefits from such an upturn may aim to make another step onto the housing ladder and buy another, more spacious and/or luxury dwelling. Rising house prices, or the expectation of further increases in the price of owner-occupied dwellings, stimulates the demand for such properties and fuels the number of transactions, because it can lead to a high return on investment. During an economic downturn, however, mobility can be severely affected because households anticipate on downward house prices, so they delay their move. As a result, fewer dwellings are sold, mobility decreases and eventually house prices will fall. Especially the upper end of the market will be hit hard. The declining demand from households that normally make a "luxury" move to a newly constructed dwelling at the upper end of the market, impacts on investment decisions by speculative housing developers. Housing production in the owner-occupied sector will decrease substantially and the remaining production will be targeted more to first time buyers.

The owner-occupied housing markets of the UK and the Netherlands are dynamic in character. In the Netherlands the formation of this dynamic system started during the 1970s, when increasing prosperity allowed new middle classes to access the owner-occupied market and the share of owner-occupied housing within the Dutch housing stock increased from around 40% in the mid-1980s to 55% in 2005 (Ministerie BZK, 2010). In the mid-1980s, the starting point of our research (because of data availability), there were already signs of more dynamism (housing ladders) and this developed further during the 1990s and 2000s. The period from the mid-1980s until the start of the economic crisis in 2008 was characterized by rising house prices and increasing numbers of transactions of existing dwellings (Ministerie BZK, 2010). This increase in the number of transactions can partly be explained by the growth of the owner-occupied sector. But even when we correct for this growth by looking

Figure I
Transactions of existing owner-occupied dwellings as a percentage of the stock of owner-occupied housing in the Netherlands, 1985-2016.



Source: CBS (Statistics Netherlands); Kadaster; NVM; authors' calculations.

at the percentage of existing owner-occupied dwellings that was sold per year (Figure I), it is clear that mobility increased since the mid-1980s until the start of the economic crisis in 2008. During the crisis mobility fell sharply but since 2014 the owner-occupied housing market is recovering from the crisis.

During the economic crisis, housing production in the Netherlands fell from nearly 80,000 dwellings in 2008 to less than 50,000 dwellings in 2013 (Statistics Netherlands). Within the production of owner-occupied housing, the focus of housing developers changed from the more expensive dwellings to cheaper dwellings, targeted towards first time buyers (Figure II). In recent years, the focus has changed back, towards the production of more expensive dwellings again.

The question is whether the dynamisation of the Dutch owner-occupied housing system has been caused by changes in the behaviour of owner-occupiers, in the sense that they have become more mobile through time. For instance, it addresses the question to what extent older households behaved differently in the 1980s than older households in the 2000s.

Another main question is whether the growth and dynamisation of the Dutch owner-occupied sector been caused by an influx of specific household types who are more mobile than traditional owner-occupiers (i.e. families with children). If this is the case, the increase of residential mobility might be explained by a greater presence of these new groups on the market for owner-occupied housing. We will discuss the relation between household characteristics and residential mobility in the next section.

Residential mobility and the life course

In the past two decades, researchers have accumulated a vast body of literature on residential mobility. From the early 1990s the residential mobility literature has used the sociological notion of life courses (see for example Mulder, 1993; Mulder & Hooimeijer, 1999; Feijten & Mulder, 2002). It acknowledges that household change/events and employment careers strongly relate to housing careers. Whereas the traditional household and employment careers were highly predictable in the post war era, they have become more fragmented in the recent decades and this reflects in more diverse housing careers (Beer & Faulkner, 2011). Despite this fragmentation, it is still possible to identify a number of relatively standardised household and housing careers,

Figure II
Transactions of newly build owner-occupied dwellings by price segment in the Netherlands, 2005-2017

Source: Monitor newly build dwellings (Neprom, NVB).

but there are now also many more individualised trajectories. For instance, Clark *et al.* (2003), using detailed longitudinal datasets for the USA, found that about 75% of all housing careers fall within 11 (standard) trajectories, while the other 25% are much more diverse. For the Dutch situation, such studies have not been performed, due to lack of long time longitudinal data, but there is a substantial body of literature on cross sectional data and this clearly shows that propensities to move vary by household characteristics. In case the demographic make-up, i.e. household characteristics of the Dutch owner-occupiers change, this may partly explain changes in residential mobility. In other words, are changes in the overall propensity of home owners mobility explained by "compositional effects"? For the Dutch (and other) context, the main findings are that age is negatively related to the propensity to move. Furthermore, household characteristics are relevant. The literature shows that family-couples with children often have relatively small chances to move as they are often in a stable phase of the life course (see for example Helderman *et al.*, 2004). Indeed, decisions of residential moves may be difficult to make since they involve all the family. For singles, such decisions are easier made. Income can be regarded as another important factor in residential mobility. For those that wish to trade up within the owner-occupied sector to another larger dwelling, sufficient income is an important condition. There is also a theoretical relation between educational levels and the propensity to move. Those households with higher education might have a much broader geographical search field because their employment search field is also broader than less educated people for whom it may be difficult to find adequate jobs locally (Green & Shuttleworth, 2015).

In the Netherlands, home ownership has increased and a larger part of the entire housing career of households now takes place in the owner-occupied sector. Many young single households now live in owner-occupied apartments, rather than in a rental apartment. Also, older people who move out of a (large) single family dwelling, now live in an owner-occupied apartment. Given the variation on the propensity to move by household characteristics, this demographic transformation of the last decades in the Dutch owner-occupied sector may well have impacted on residential mobility in this sector.

Similar to Cooke (2011), we will analyse both the compositional and behavioural effects on residential mobility among Dutch home owners over the long run. In a second step, we turn to the short-term effect and investigate the mechanisms that lead to the massive decline of mobility within the typical Dutch "dynamic" housing market during the last crisis.

Methodology

The first objective of this article is to investigate to what extent the more dynamic housing careers of the new generations that entered the Dutch owner-occupied sector materialise into significantly higher rates of recent moves of the total population of owner-occupiers. As elaborated in the introduction, two main factors are at play here: composition and behaviour. While an influx of more "dynamic" households, such as young people in the early phases in their housing career, might have caused a larger proportion of recent moves amongst the population of owner-occupiers, demographic ageing of a large group of owner-occupiers may have had a dampening effect. These are the compositional effects as a result of changes in the composition of the population of owner-occupiers. The second main factor that might influence the proportion of households that recently moved, relates to changes in behaviour. For instance, the cohorts of older households of the 1980s may well have been much less mobile than their "modern" counterparts of the early 2000s. Furthermore, younger households who currently move into the owner-occupied sector often opt for relatively short residences in apartments, while their counterparts of the 1980s usually bought a single-family dwelling with the intention of a long-time residence.

A much-used method in economics to disentangle compositional and behavioural effects is the so-called "Oaxaca-Blinder" decomposition method. It was designed to explain gender and racial wage differences by using micro level data (Blinder, 1973; Oaxaca, 1973). The method can also be used for the analysis of change over time, using cross-sectional micro level data at two points in time. Of course, different points in time need to have sufficient distance because, most often, the composition of a population does not change a great deal over the shorter run, even over ten years. Over the past four decades, statistical agencies in several countries have accumulated

a series of cross section micro databases on housing and residential mobility. This now offers the possibility to perform an analysis over a longer period of time. Examples are an analysis of long distance migration trends in the USA (Cooke, 2011) and the tenure shift in New Zealand (Bourassa & Shi, 2017), but such studies are still rare. However, one drawback of the Oaxaca-Blinder method is that it is only fit for using micro level data and it cannot include external effects such as fluctuations in the GDP and or interest rates[2]. Changes in external effects when comparing data from different years may affect the behavioural component, then making it difficult to characterize long-term trends of residential mobility (cleared of external factors). Therefore, we need to carefully select two databases in times that compare in terms of overall economic development (Box).

As mentioned earlier, the second objective of this study is to explore in more detail the vulnerability of the contemporary (particular) Dutch owner-occupied sector to economic crisis (Van der Heijden *et al.*, 2011). Here we just compare a cross section from around 2005 with the era shortly after the start of the crisis. The composition of the population will not have changed much in such a short time, so comparing two separate regression models in order to investigate which household types were most affected in terms of residential mobility can be regarded as sufficient.

We now turn to the presentation of the Oaxaca-Blinder method. As indicated we will investigate the entire proportion of owner-occupiers that moved in the past two years. This proportion is denoted as Y. We want to separate, in the difference between the proportions having moved in the past two years between 1986 and 2006, whether this is related to changes in the composition of the population of owner-occupiers and/or to changes in their behaviours. Y is estimated separately for 1986 and 2006; X is a vector of observable

2. *This will be clear when the method is presented.*

Box – **Data and variables**

The Dutch national institution responsible for statistics (Statistics Netherlands) has been conducting a housing survey every three to four years since 1981 (National Housing Demand survey, *WBO*, before 2006, then Netherlands' Housing survey, *WoON*). The data include detailed information on housing and household characteristics. It also provides information on the previous dwellings of recent movers, whether the household intends to move, and housing preferences. In the article, residential mobility refers to "recent moves", that is, residential moves occurred within the two past years for households who are owner-occupiers at the time of survey. The data are based on household interviews, but since 2006, more information has been added from register data. This has improved the information on household income but also created some problems for comparisons with previous datasets.

The first part of the analysis aims to disentangle compositional and behavioural effects of the change in residential mobility of home owners in the long run. Here we need to find two years that are comparable in terms of economic circumstances (see the section on methodology). We are aware that it is impossible to find a perfect match in terms of economic situation. However, we assess that the economic background is quite comparable between the data of 1986 and 2006. In both periods the Dutch economy (and house prices) was recovering after an economic slowdown and GDP growth reached levels between 2% and 3%. The notion of "recent moves" referring to moves occurred in the past two years, so the 1986 data refer to residential moves occurred in 1984-1985; for the 2006 dataset, it refers to moves occurred in 2003-2004 because the year 2005 was not fully covered.

Selecting the years was less complicated for the second part of the analysis. We used the data from 2006 and compare it with the data from 2012, when the economic crisis had resulted in a massive decline of housing transactions in the owner-occupied sector (see also Van der Heijden *et al.*, 2011).

The analysis retains the main household characteristics that the literature has regularly found to have significant effects (age, household type, income) on mobility. We use age groups rather than the continuous age variable (age of the household head) because it can be more informative on the behaviour of cohorts over time. For the household income, we had the problem of the change in data collection in 2006. Therefore, we constructed income quintiles (based on the income distribution of the entire household population) rather than use the detailed income values. This also avoids to have to adjust for inflation. Furthermore, the 1986 database only provides net household incomes, while the later databases contain disposable incomes. Some caution is thus needed, but using quintiles improves the comparability to a great extent.

characteristics (structure by age group, household type and income), β is the vector of the estimated coefficients, that is, the effect of given characteristics on having moved, analysed as related to behaviour.

The difference, between 1986 and 2006, in the estimated probability of having moved can be written as follows:

$$\bar{Y}_{2006} - \bar{Y}_{1986} = \left(\alpha + \hat{\beta}\bar{X}\right)_{2006} - \left(\alpha + \hat{\beta}\bar{X}\right)_{1986}$$

Without going into the details of the mathematical elaboration, this is developed into the final form of the Oaxaca-Blinder decomposition (see Jann, 2008):

$$\begin{aligned}\bar{Y}_{2006} - \bar{Y}_{1986} = &\left(\bar{X}_{2006} - \bar{X}_{1986}\right)\hat{\beta}_{1986} \\ &+ \bar{X}_{1986}\left(\hat{\beta}_{2006} - \hat{\beta}_{1986}\right) \\ &+ \left(\bar{X}_{2006} - \bar{X}_{1986}\right)\left(\hat{\beta}_{2006} - \hat{\beta}_{1986}\right)\end{aligned}$$

The first part corresponds to the compositional effect, where the effects of changes in the population structure (composition) are calculated keeping behaviours (the β-parameters) constant. The second part represents the behavioural effect, that is, the effect of changes in the β-parameters, calculated keeping the population structure constant. The third part corresponds to interaction effects, or in other words, it shows whether changes in the population structure correlate with changes in behaviour. However, interactions can be quite complicated to interpret in these particular models. As such, a first step is to investigate whether the interaction effects are relevant at all and if not (which they are often), we proceed with a model without an interaction term.

Furthermore, we estimate a linear probability model rather than a commonly used logistic regression model. An overriding motive for many researchers to use a logistic regression model is that it avoids predicted outcomes potentially falling outside the 0 to 1 dichotomy. But the use of logistic regressions as soon as the dependent variable is a binary variable has been increasingly debated (see e.g. Hellevik, 2009). The main advantage of the linear probability model is the ease of interpretation, which is certainly relevant in our study with the Oaxaca-Blinder decomposition method, because it produces more complex output in the form of both compositional and behavioural effects.

A second main drawback of the linear probability model is that variance is related to the value of the independent variable(s). This implies heteroscedasticity, which can lead to biased standard errors and p-values. While we are mainly interested in the coefficients' patterns and do not aim to find a strong model to be used for scenario building or as input for other models, we need to know the precision of the estimated coefficients and their statistical significance. At any rate, heteroscedasticity has no consequence on the predicted coefficients, but the tests of significance may be affected (see for instance Hellevik, 2009). A common way of dealing with heteroscedasticity is to construct weights (i.e. larger weights for smaller predicted values and vice versa[3]) and run a Weighted Least Squares (WLS) regression. The drawback is that such weights potentially change the estimated coefficients of the original model. Our approach is to estimate WLS models in order to investigate whether the significant predicted values are not too much influenced by heteroscedasticity and if so, we will warn about this.

Finally, we use a deviation model for the categorical variables. Indeed, with categorical variables, one of the categories must be omitted (the reference) to avoid collinearity. However, the choice of the reference category may affect the estimation of behavioural effects in the Oaxaca-Blinder detailed decomposition (cf. Jann, 2008). Using a deviation model (where the sum of the coefficients is constrained to zero and the coefficients are expressed as a deviation from the mean effect) avoids this.

Results

As mentioned earlier in the introduction, the percentage of owner-occupiers increased rapidly from the 1980s and onwards (Table 1). The rental sector declined in relative terms but remained stable in absolute terms at 3.0 million dwellings. The main factors behind the increase of owner-occupation were a change in the policy focus from widespread support of the (social) rental sector with large scale building programs, towards the owner-occupation sector. Whereas "brick & mortar" and operations subsidies for social rental dwellings

3. *In fact, the database already includes a weight factor.*

were virtually abolished in the 1990s, owner-occupiers were able to benefit from a very generous tax relief on paid mortgage interest. Under these conditions, the private rental sector, which did not benefit from any government support, has not been considered a viable alternative for many households. Furthermore, changing household preferences, as a result of increasing prosperity, focused more on single family (terraced) houses with gardens. In the last decade, Dutch governments have increasingly restricted access to the (affordable) social rental sector because they fear that it creates an unbalanced playing field for market parties, especially those parties that invest in the private rental market. At the same time, there is still a great unbalance between the unsubsidized private rental sector and the heavily fiscally stimulated owner-occupied sector, which either draws or pushes many households into owner-occupation.

As our main objective is to analyse the change in the proportion of owner-occupiers that recently moved, we first give an overview of this change. Overall, Table 2 shows that the percentage of recently moved owner-occupiers has increased from 1986 to 2006, but it is not dramatically higher. With regard to the shorter term, where the backgrounds to the sensitivity of the Dutch owner-occupied system to a (housing) crisis will be investigated, the main indicator in Table 2 is quite straightforward. The percentage of recent moves in the owner-occupied sector has declined by about 30%. In fact, the decline is greater, when compared to the transaction levels at the height of the real estate boom in 2007 (Figure 3).

As a first step towards the Oaxaca-Blinder decomposition, Table 3 gives information on the changing composition of the population of owner-occupiers. As mentioned in the introduction, the dominance of traditional families with children has altered drastically in favour of single persons, couples and single parent households. Ageing of the Dutch population is also visible in the data for owner-occupiers 1986 and 2006. With regard to income distributions in the owner-occupied sector, 1986 and 2006 show a somewhat striking difference. Overall, home ownership has become more concentrated in the middle classes (quintiles 3 and 4), while the lowest quintile shows a marked decline. However, it needs to be noted that owner-occupation levels have increased among all household types, except for the very lowest income quintile. So, for young households (20-34), the percentage of owner-occupiers increased from about 35% to nearly 50% and for the age groups between 35 and 65 it increased from nearly 50% to

Table 1
Tenure structure of Dutch households

(In %)

	1986	2006	2012
Owner-occupied	43	56	59
Rental	57	44	41
Total	100	100	100
Total (units)	5,284,747	6,800,576	7,140,758

Coverage: Households living in private homes (excluding special types of housing such as houseboats).
Sources: CBS (Statistics Netherlands), Housing surveys WBO 1986, WoON 2006; authors' calculations.

Table 2
Households that recently moved*

(In %)

	1986	2006	2012
In the owner-occupied sector	10.7	12.1	8.5
In the rental sector	19.6	15.7	19.1
Total	15.8	13.7	12.8

Coverage: Households living in private homes (excluding special types of housing such as houseboats).
Sources: CBS (Statistics Netherlands), Housing surveys WBO 1986, WoON 2006, 2012; authors' calculations.

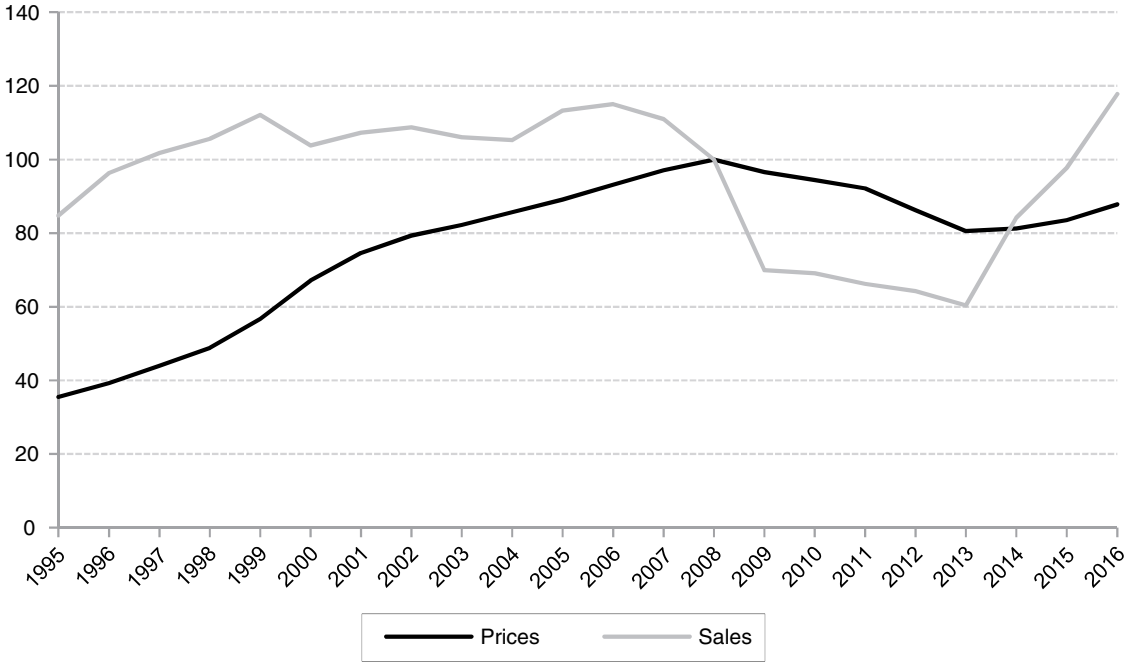
well over 60%. The same applies to single person and single parent households who still have relatively low chances of being home owners (circa 33%), but it has definitively increased. An increase is also visible for the other household types and currently a vast majority of couples (65%) and couples with children (75%) is owner-occupier.

Although we argued earlier that many young (dynamic) people have turned to the owner-occupied sector, thereby possibly raising the proportion of recent moves, the percentage of young people in the entire owner-occupied population has declined. In fact, the large cohorts of households aged 35-44 in the 1980s, including baby boomers, are now ageing and form a major share of the population of owner-occupiers in the age group 55-64. Furthermore, there is now a much higher share of non-traditional family households, who are expected to be more mobile. However, some couples (without children) and single person households increasingly belong to the age groups above 55 years empty nesters who are usually less mobile. These general shifts in the structure of the population of owner-occupiers are thus compositional factors that can give some clue as to how residential mobility amongst owner-occupiers has changed. Behavioural changes are addressed in the next section.

Analysing mobility changes between 1986 and 2006

The results of the Oaxaca-Blinder decomposition of the overall change in recently moved owner-occupiers, can be somewhat complicated to interpret without having some basic understanding of the behavioural changes for different household characteristics. For a general overview of the changes in the behaviour per household characteristic, we run separate linear regression models for the probability to move per household characteristic for the years 1986 and 2006. Note that this is a deviation model, where the sum of the coefficients for the categories per variable is equal to zero. We highlight the largest changes in Table 4. Overall, both regression outcomes confirm that there is a negative relation between age and the propensity to move. The results also confirm that households without children have higher propensities to move. With regard to income, there is no clear pattern while the coefficients are also not significant. Such findings confirm the expectation from the theoretical framework

Figure III
House prices and transactions in the Netherlands (index 2008 = 100), 1995-2016



Sources: CBS (Statistics Netherlands).

that on the one hand, a shift towards more non-family households (no children) in the owner-occupied sector potentially has a positive impact on the overall mobility level of owner-occupiers, while demographic ageing will have a negative impact.

A comparison of the estimated coefficients in the two models shows an overall increase of the chances to have moved in the past two years for virtually all household characteristics. This is visible in the rather large change in the constant, whereas most of the changes in the coefficients of the household characteristics do not "compensate" for this. The probability of having moved may have decreased for some combinations of characteristics (e.g. the association of the 65-75 age group and the type of household living alone) but, for most household profiles, an increase is visible.

As discussed earlier, a main concern regarding linear probability models is the possibility of unrealistic outcomes below 0 or above 1. Table 4 shows that such an outcome may be true for a couple of household profiles, but such households are quite rare in practice. Furthermore, alternative estimations with logistic regression models gave comparable patterns in coefficients and significance levels. For an additional check, the main results of the Oaxaca-Blinder linear decomposition will be compared to the results of the logit decomposition as proposed by Fairlie (2005).

Tables 3 and 4 already provide some indication on the drivers of the overall change in owner-occupiers mobility; this is further analysed now with the Oaxaca-Blinder decomposition. The overall probability to move as estimated by the model is 10.25% in 1986 and increases to 12.63% in 2006 and this increase is significant (Table 5). The decomposition shows that compositional changes in the population of owner-occupiers had a negative impact on the probability to move. This is in line what

Table 3
Household characteristics of Dutch owner-occupiers

(In %)

	1986	2006	2012
Household type			
Single person	15	20	22
Couple (without children)	25	35	35
Couple with children	57	41	39
Single parent	3	4	4
Total	100	100	100
Age group			
20-34	22	16	14
35-44	30	27	23
45-54	21	25	26
55-64	18	20	24
65-75	9	12	13
Total	100	100	100
Income quintiles (based on quintiles of all households)			
Quintile 1 (lowest)	12	7	6
Quintile 2	13	13	14
Quintile 3	19	20	22
Quintile 4	24	28	27
Quintile 5 (highest)	32	32	31
Total	100	100	100
Total owner-occupiers	2,132,316	3,778,335	4,214,420

Coverage: Owner-occupier households (private homes excluding special types of housing such as houseboats).
Sources: CBS (Statistics Netherlands), Housing surveys WBO 1986, WoON 2006; authors' calculations.

was already suspected based on Table 3. The behavioural effect is positive and explains the general increase of the probability of Dutch owner-occupiers to move[4]. This also confirms the patterns revealed in Table 4. A further comparison of these results with a decomposition using estimates from a logistic regression (Fairlie) shows similar general results, with a negative parameter of -1.15% for the composition part and +3.57% for the behavioural part.

These first findings are further explored in the detailed Oaxaca-Blinder decomposition, which calculates the effects for each individual variable (see Table 6). Overall, demographic ageing has a negative effect on recent moves (-0.0236, all ages). This is visible for all the age categories, which is consistent with the evolutions shown in Table 3 on compositional change. Although higher proportions of younger people turn to the owner-occupied sector, the percentage of younger, more mobile owner-occupiers has substantially declined. This has a negative impact on the overall proportion of owner-occupiers that moved recently, because young owner-occupiers have higher chances of moving than their older counterparts (cf. also Table 4). The negative impact of demographic ageing on residential mobility is partly offset by a positive impact of changing household characteristics (+0.0116). The main contribution comes from the relative decline of couples with children. This confirms the general assumption that a weaker domination of traditional, "immobile" family households in the Dutch owner-occupied sector lead to an overall increase in mobility. With regard to income quintiles, the structural effects are mostly not significant.

4. As indicated in the methodology section, we first tried a decomposition model with interaction effects (third part of the Oaxaca-Blinder equation). The model with interactions gives little added value and will only be shortly discussed.

Table 4
Linear regression of owner occupiers probability to have moved in the previous two years

	1986		2006		1986-2006
	β-parameter	p-value	β-parameter	p-value	Difference coefficients
20-34	0.166	0.000	0.245	0.000	0.079
35-44	0.023	0.000	0.038	0.000	0.015
45-54	-0.033	0.000	-0.051	0.000	-0.017
55-64	-0.070	0.000	-0.106	0.000	-0.037
65-75	-0.086	-	-0.126	-	-0.040
Single person	0.041	0.000	0.015	0.001	-0.026
Couple (no children)	0.027	0.000	0.035	0.000	0.008
Couple with children	-0.046	0.000	-0.048	0.000	-0.002
Single parent	-0.022		-0.002		0.019
Quint1	-0.016	0.024	-0.007	0.269	0.009
Quint2	0.005	0.375	0.006	0.173	0.001
Quint3	-0.011	0.026	-0.004	0.268	0.007
Quint4	0.002	0.675	-0.006	0.079	-0.008
Quint5	0.020	-	0.011	-	-0.009
Constant	0.100	0.000	0.136	0.000	0.036
F-value	143.477	0.000	401.269	0.000	-
R-square	0.092	-	0.126	-	-
N	19,855	-	26,779	-	-

Note: Significance levels must be taken with caution in linear probability models (due to heteroscedasticity). The results from alternative WLS estimations (not reported) show that the household type might be not significant. Note that with the deviation model, the coefficients of the last category are calculated separately for each categorical variable (the sum of the coefficients being equal to zero).
Coverage: Owner-occupier households (private homes excluding special types of housing such as houseboats).
Sources: CBS (Statistics Netherlands), Housing surveys WBO 1986, WoON 2006; authors' calculations.

We now turn to the behavioural effects. First of all, the constant indicates a general trend towards more mobility (+0.0359). The coefficients per household characteristic show that the variation around this constant is quite small, which indicates that the proportion of recent movers has increased across the board. Although in our analysis we cannot distinguish between new entrants (first time buyers) and those who move within the sector, this overall dynamisation is a clear sign of the formation of housing ladders, where households move from smaller to larger dwellings and, at a later age, move "back" to an apartment. The particularly large coefficient for young households also supports the general idea that young people enter the sector at a younger age and move much more frequently within the sector during this phase of life. The only parameter for which a somewhat smaller increase (keeping in mind the intercept) is visible is for single person households. Even though we control for age and income, this might still be a sign of more heterogeneity within the population of single households, who are not only young and with lower incomes, but increasingly are elderly single. With regard to income the change is not significant for any of the quintiles.

In a preliminary analysis we also estimated a model with interaction effects $\left(\bar{X}_{2006} - \bar{X}_{1986}\right)\left(\hat{\beta}_{2006} - \hat{\beta}_{1986}\right)$, but this did not add much information. At best, it shows one significant interaction between a decline in the percentage of young households (20-34) and a strong increase of the mobility behaviour, but we do not assume any causal effect. The fact that the overall proportion of younger owner-occupiers declines is related to demographic ageing, while the increase of mobility "just" relates to their aforementioned earlier entry in the sector and more subsequent moves.

One last remark must be made with regard to the behavioural effects of the youngest age group (20-35). The positive behavioural effect shown in Table 6 for this group is related to entrance into the owner-occupied sector at a younger age, and higher chances to move onwards within the owner-occupied sector before the age 35. In case both the age of entry into the sector and the chance to move within the sector before age 35 had remained unchanged between 1986 and 2006, there would be no behavioural effect. However, in such a scenario there is still a possibility that the parameter for the behavioural effect shows a change resulting from short term changes in the size of birth cohorts. For instance, a (sudden) decline of a birth cohort will materialise in a smaller influx from the rental sector or from parental homes. This will subsequently lead to a smaller proportion of recently moved young households in the owner-occupied sector. If birth rates are stable or only gradually change, behavioural effects should just be interpreted as changes in the age of entry into the owner-occupied sector and different chances to move within the owner-occupied sector before the age of 35. In the Dutch case, there was a drastic decline of births from 1970-1975 (from around 240,000 to 170,000), which has the potential to materialise in a negative behavioural effect. After 1975, birth rates stabilised. It needs to be noticed that many of the 1970-1975 generation were already in the owner-occupied sector in around 2005, but the sudden decline in this cohort may have had a negative impact on the proportion of young households that moved within the sector (before age 35). This combination of a

Table 5
Oaxaca-Blinder decomposition of owner-occupiers probability to move in the previous two years 1986 versus 2006 (general effects)

	Probability to move (%)	Standard Error	p-value
Prediction model 1986	10.25	0.00236	0.000
Prediction model 2006	12.63	0.00248	0.000
Difference	2.38 (pct. points)	0.00342	0.000
Decomposition of change			
Composition (structure)	-1.19	0.00142	0.000
Behaviour	3.57	0.00354	0.000

Reading note: The change in the estimated probability to move of 2.38 pct. points between 1986 and 2006 results from a negative effect of changes in the structure of the population (-1.19 pct. points) and a positive effect of changes in behaviour (3.57 pct. points).
Coverage: Owner-occupier households (private homes excluding special types of housing such as houseboats).
Sources: CBS (Statistics Netherlands), Housing surveys WBO 1986, WoON 2006; authors' calculations.

possible negative impact on the behavioural effect and the increase in the actual estimated effect of the parameter (cf. Table 6) supports the idea that young households have become more dynamic.

Vulnerability of the system? Changing mobility of owner-occupiers 2006-2012

We now turn to an analysis of the crisis period. The main topic of interest here is to investigate how the crisis affected the contemporary Dutch owner-occupied housing market. Again we memorise that more households spend a larger part of their housing career in the owner-occupied sector. Whereas in the mid-1980s the owner-occupied sector was dominated by "static" family households, there are now more households that start their housing career in a small owner-occupied dwelling and subsequently make a couple of moves on the housing ladder after (or during) household and income changes. The literature also mentions that a crisis can significantly obstruct these moves on the housing ladder as a result of income-employment uncertainty and negative equity. With regard to the latter point, it must also be mentioned that young Dutch households were able to take out as much as 130% of the value of the dwelling. Buying a highly leveraged apartment with the intention of moving on after a few years certainly poses a risk of negative equity. Furthermore, according to the theoretical framework, it can be expected that those households that are already well housed, but who in principle consider moving to a more luxury dwelling, may put those ambitions on the longer run during a crisis.

These general expectations seem to hold to a great extent with regard to age when comparing regression models of 2006 and 2012. First of all, the intercept indicates an overall

Table 6
Detailed Oaxaca-Blinder decomposition for owner occupiers probability to move in the previous two years 1986 versus 2006

	Compositional effects $\left(\bar{X}_{2006} - \bar{X}_{1986}\right)\hat{\beta}_{1986}$		Behavioural effects $\bar{X}_{1986}\left(\hat{\beta}_{2006} - \hat{\beta}_{1986}\right)$	
	Coefficient	p-value	Coefficient	p-value
20-34	-0.0144	0.00	0.0149	0.00
35-44	-0.0013	0.00	0.0044	0.03
45-54	-0.0019	0.00	-0.0039	0.00
55-64	-0.0044	0.00	-0.0065	0.00
65-75	-0.0015	0.00	-0.0047	0.00
Total age	-0.0236	-	0.0041	-
Single person	0.0011	0.00	-0.0038	0.02
Couple (no children)	0.0033	0.00	0.0023	0.25
Couple with children	0.0072	0.00	-0.0010	0.82
Single parent	0.0000	0.34	0.0007	0.16
Total household type	0.0116	-	-0.0018	-
Quint1 (low)	0.0002	0.29	0.0009	0.31
Quint2	-0.0001	0.23	0.0002	0.87
Quint3	-0.0001	0.11	0.0014	0.33
Quint4	-0.0001	0.32	-0.0022	0.21
Quint5 (high)	0.0001	0.13	-0.0028	0.18
Total income	0.0001	-	-0.0026	-
Constant	-	-	0.0359	0.00
Total*	-0.0119	0.00	0.0357	0.00

Note: cf. Table 4.
Coverage: Owner-occupier households (private homes excluding special types of housing such as houseboats).
Sources: CBS (Statistics Netherlands), Housing surveys WBO 1986, WoON 2006, 2012; authors' calculations.

decline of residential mobility (see Table 7). This decline is even higher for households below 45 years and especially for those under 35. The overall decline is somewhat lower for those above 45. With regard to household type, the only change of interest is the parameter for single person households. It is positive, but small. For income quintiles, the change is positive and quite strong for the lowest quintile, while it is negative and rather low for the highest quintile(s).

This positive change for the lowest income quintile sparks some extra interest because it was discussed among housing market experts during the crisis. One debate revolved around the issue of highly leveraged young households who were virtually locked up in their dwelling because of negative equity, while another focused on the possibilities for first time buyers. Whereas falling house prices might provide opportunities for first time buyers, credit

Table 7
Linear regression of owner-occupiers probability to move in the two previous years

	2006		2012		2006-2012
	β-parameter	p-value	β-parameter	p-value	β-parameter change
20-34	0.245	0.000	0.217	0.000	-0.028
35-44	0.038	0.000	0.019	0.000	-0.019
45-54	-0.051	0.000	-0.042	0.000	0.009
55-64	-0.106	0.000	-0.085	0.000	0.021
65-75	-0.126	-	-0.109	-	0.017
Single person	0.015	0.001	0.007	0.049	-0.007
Couple (no children)	0.035	0.000	0.038	0.000	0.003
Couple with children	-0.048	0.000	-0.045	0.000	0.003
Single parent	-0.002	-	0.000	-	0.002
Quint1	-0.007	0.269	0.009	0.071	0.016
Quint2	0.006	0.173	0.008	0.039	0.002
Quint3	-0.004	0.268	-0.010	0.001	-0.006
Quint4	-0.006	0.079	-0.011	0.000	-0.003
Quint5	0.011	-	0.004	-	-0.007
Constant	0.136	0.000	0.107	0.000	-0.029
F-value	401.269	0.000	491.629	0.000	-
R square	0.126	-	0.130	-	-
N	26,779	-	36,235	-	-

Note: cf. Table 4.
Coverage: Owner-occupier households (private homes excluding special types of housing such as houseboats).
Sources: CBS (Statistics Netherlands), Housing surveys WBO 1986, WoON 2006, 2012; authors' calculations.

Table 8
Original housing sector of recently moved owner occupiers (in the previous two years)

(In %)

Origin	1986	2006	2012
From parent/student house	34	22	33
From rental house	40	30	29
From owner-occupied house	26	48	38
Total	100	100	100

Coverage: Owner-occupier households (private homes excluding special types of housing such as houseboats).
Sources: CBS (Statistics Netherlands), Housing surveys WBO 1986, WoON 2006, 2012; authors' calculations.

restrictions self-imposed by mortgage lenders[5] or government policies to restrict high loan-to-value ratios could become problematic for potential first-time buyers to benefit from house price declines. However, the actual moves of first time buyers into the owner-occupied housing market indicated that there was actually no strong decline (Boumeester *et al.*, 2015).

Rather, the results presented in Table 7 suggest that the mobility of low-income households has not been as affected by the crisis as might have been expected. It appears there is a distinction between first time-buyers, who had better opportunities to buy a dwelling and existing young owner occupiers, who were 'stuck' in their dwelling because of high leverage. A limitation here is that we cannot take into account their residential origin in our models: this information is only available for households that have moved recently (in the previous two years).

For those who moved in the previous two years, Table 8 shows a marked increase between 2006 and 2012 of the percentage of first time buyers coming from their parents' home or from a student dwelling, while the share of first time buyers coming from a rental dwelling remains more or less the same. Owner-occupiers' mobility within this sector dramatically declines. It gives substance to the idea of Van der Heijden *et al.* (2011), that a more dynamic home ownership sector with much mobility on the housing ladder can be seriously affected by a crisis. Table 8 also shows that in 1986, before the expansion of the owner-occupied sector. The percentages of first time buyers from the rental sector were also high, while mobility within the owner-occupied sector was much lower, suggesting a more static system, dominated by families who did not move much.

* *
*

The first part of this article investigated how mobility levels in the Dutch owner-occupied sector changed in a context where this sector grew substantially, both as a proportion of the entire housing stock and in absolute size. Our main assumption was that the Dutch owner-occupied sector can be characterised as "dynamic" (Van der Heijden *et al.*, 2011) and that its dynamisation is visible since the mid-1980s. The backgrounds to this assumption have been under investigated. There is room to explain the dynamisation through a changing composition of the owner-occupiers population, i.e. an influx of dynamic (young) household in the owner-occupied sector. In addition, behavioural changes might also have played a role, for instance older people in the 1980s being less mobile than the contemporary older population. We used the Oaxaca-Blinder method, to disentangle the compositional and behavioural effects. Overall, there has been an increase in mobility through changing behaviour of owner-occupiers from 1986 to 2006. There is remarkable little variation by household characteristics on this part, although it can be said that younger owner-occupiers are more mobile than before. Changes in the composition of the household structure in the owner-occupied sector had a negative impact on mobility. Although we expected more mobility because of an influx of younger households, overall ageing of the (owner-occupied sector) population is responsible for this negative compositional effect. However, the change towards a more diversified composition in terms of household types somewhat counterbalances this ageing effect. In fact there was a marked decline in the share of traditional, less mobile, family households.

In the second part of the study, we aimed to connect to the hypothesis that the changing structure of the owner-occupied sector population might also make it vulnerable to an economic downturn. Households in dynamic owner-occupied markets make several moves on the "housing ladder" during their housing career, in contrast to less mobile systems. During a crisis, the process stops and the entire system can come to a halt, further affected by the withdrawal of speculative developers from the market for new construction. There was previously little information as to how this decline plays out at the household level and we aimed to fill this gap. Which household types are more vulnerable to a crisis? The analysis shows that especially the younger households moved less. This may be partly due to the fact that many young Dutch home owners have high debt and did not wish or were unable to move after the decline in house prices. However, the overall pattern in 2012 still shows that young

5. *See for instance the work of Fostel and Geanakoplos (2008).*

households have the highest mobility rates. In fact, many young home owners who entered the owner-occupied market as (low income) first time buyers, benefited from house price declines.

Here we have investigated the developments in the Netherlands. In order to gain more insights into the evolution and mechanisms of static and dynamic housing markets, similar research would be needed in other countries. First of all it might be interesting to investigate how other dynamic home ownership systems, such as the UK and the USA, relate to the Netherlands. A comparative analysis of such dynamic markets static systems, such as Belgium, Germany and possibly France (see Barlow, 1992) is another avenue for future research. □

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