Moving intentions and the concentration of low-income people in the neighbourhood: A study on intended mobility of households in the Netherlands

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Abstract

This research analyses the concentration of low-income people in a neighbourhood as a driver of the moving intentions of households in the case of the Netherlands. Based on studies from other countries, higher concentrations of low-income people in a neighbourhood increase the probability that households have moving intentions. Sufficient concentrations cause physical and socioeconomic complications in a neighbourhood, influencing the satisfaction of other residents. Consequently, this drives selective residential mobility, resulting in more segregation and concentration in neighbourhoods which is an issue. As a result, it is of interest to understand if the concentration of low-income people in the neighbourhood drives moving intentions in the case of the Netherlands. This study uses multiple logistic regression models to analyse data from the Netherlands' Housing Survey, enriched with Dutch Central Bureau of Statistics data. The results of this study indicate that a 1-unit increase in the percentage of people with a low income in a neighbourhood results in the odds of intending to move being 1.008 times higher, holding all other variables constant. Moreover, this study reveals no significant difference in the moving intentions between households with the highest and lowest income due to the percentage of low-income people in a neighbourhood.

Keywords: intention to move, intended mobility, stated preferences, low-income neighbourhood, vulnerable neighbourhoods, deprived neighbourhoods

Disclaimer: "Master theses are preliminary materials to stimulate discussion and critical comment. The analysis and conclusions set forth are those of the author and do not indicate concurrence by the supervisor or research staff."

Contents

1. Introduction

1.1 Motivation

Sufficient concentrations of low-income people in the neighbourhood result in households leaving the neighbourhood. Households in low-income neighbourhoods experience three times as many disturbances from their direct neighbourhoods as the average Dutch citizen (Aedes, 2020). Additionally, 20% of residents in these neighbourhoods express fear of being disturbed or robbed within their neighbourhood, which is a considerable difference compared to the Dutch average of 6%. These negative effects result from a large concentration of lower-income people in these neighbourhoods. These lower-income people have more often psychiatric conditions, a mental disability, or are dependent on social welfare benefits (Clark & Coulter, 2015). Hence making it more likely that they stand alone, are in debt or are addicted. Therefore, these people are more prone to cause disturbances and nuisances in the neighbourhood. Consequently, the liveability in these concentrated low-income neighbourhoods declines, making that higher-income households leave (Bolt & Van Kempen, 2003).

However, whether lower-income households also aspire to move away from these low-income neighbourhoods remains unclear. Higher-income households can afford to relocate to more affluent neighbourhoods. Moving away from these low-income neighbourhoods can benefit the mover but has negative consequences for the neighbourhood. This selective residential mobility further concentrates and segregates low-income people, further increasing issues in the neighbourhood (Harris, 1999). Policymakers in the Netherlands often express concerns regarding this persistent trend in neighbourhoods (PBL, 2016). Therefore, to understand the ongoing concentration and segregation of neighbourhoods, it is of interest to examine if the concentration of low-income people in a neighbourhood is a driver of residential mobility for all residents in the case of the Netherlands. To estimate if low-income people also aspire to move due to the concentration of the neighbourhood, this research focuses on moving intentions instead of realised mobility.

1.2 Academic relevance

The literature examines the decision-making process of moving using either realised moves (revealed preferences) or moving intentions (stated preferences). Realised moves entail that households consider their utility framework in relation to the budget constraints (Lu, 1997; Bolt & Van Kempen, 2003). More specifically, within the utility framework, households aim to maximise the overall satisfaction regarding their housing and neighbourhood options. These options include factors such as location, housing size, amenities, safety, proximity to work and school quality. Higher-income households typically have less restrictive budget constraints, providing them more options when deciding where to live. However, determining what drives the decision-making process based on realised moves would overlook all households who lack resources to overcome budget constraints. Consequently, this study focuses on moving intentions rather than realised moves to examine whether lower-income households also aspire

to move (De Groot et al., 2008)[1]. This is crucial since only around a third of the respondents with moving intentions realise a move due to a lack of resources. Additionally, this focus gives direct insight in the drivers of moving intentions of households.

Drivers influencing the intention to move of households have been of great interest to researchers (Mulder, 1993; Lu, 1997; De Groot et al., 2008). Before a move, households undergo a decision-making process where an evaluation of the current living situation takes place. The decision-making process is stimulated due to the presence of a trigger or motive to move for the household (Mulder & Hooijmeijer, 1999). More specifically, a household is more likely to express moving intentions primarily due to certain (expected) changes regarding individual, household, housing, education and work trajectories, which influence needs and preferences regarding the current living situation (De Groot et al., 2008). Due to these changes, the current living situation does not satisfy in their (upcoming) needs. When the difference between the current and desired living situation becomes too large, the household experiences so-called residential stress. The most apparent response to residential stress is moving (Speare, 1974).

So, does the neighbourhood even matter on the intention to move of households? Neighbourhood characteristics are less influential compared to individual, household and housing characteristics (Permentier et al., 2009; Helderman & Mulder, 2007; Duque-Calvache et al., 2018). However, when neighbourhood characteristics change to a certain unsatisfactory level, households also experience residential stress (Lee et al., 1994). For instance, living in densely urbanised neighbourhoods leads to a higher probability of expressing moving intentions (Helderman & Mulder, 2007). Additionally, the concentration of low-income people in a neighbourhood, which is the research topic, also influences the intention to move (Harris, 1999; Mateyka, 2015). Matyeka (2015), operationalises this concentration as the percentage of people within a neighbourhood whose income is below a certain set threshold. The study indicates that an increased concentration of low-income people in a neighbourhood is associated with higher probability of expressing moving intentions. Negative neighbourhood effects, such as crime and vandalism, result from a significant concentration of low-income residents (Kleinhans et al., 2010; Bolt & Van Kempen, 2003). These effects influence the intention to move of households because they aspire to live in a neighbourhood that is better for their well-being, health, happiness and other outcomes (Andersen, 2008). The concentration of low-income people in a neighbourhood is therefore a good indicator in explaining the intention to move of households (Harris, 1999).

This research examines the unexplored association between the concentration of low-income people in a neighbourhood and the intention to move of households in the case of the Netherlands. This analysis is particularly relevant due to the presence of government interventions and social programs in

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[1] This research will analyse realised mobility to demonstrate that respondents face constraints regarding realised mobility compared to the intention to move. This is presented in Appendix C. A summary of the results from this analysis is observable in a footnote in chapter 4 Results.

deprived neighbourhoods in the Netherlands (Friedrichs et al., 2003). It is plausible that the underlying neighbourhood effects are, therefore, significantly lower in the Netherlands compared to earlier research in the United States (Mateyka, 2015). Consequently, the association between the concentration of low-income people in the neighbourhood and the moving intentions of households might be reduced or even non-existent.

Additionally, this research focusses on examining whether there is a significant difference in the moving intentions between the highest-income and the lowest-income households due to the concentration of low-income people in their neighbourhood. The literature estimates that income does not affect a household's moving intentions since they do not consider their resources and constraints (De Groot et al., 2008; Woo & Morrow-Jones, 2011). However, Clark & Coulter (2015) indicate that it becomes more likely that households living in deprived neighbourhoods have moving intentions when their income goes up. Therefore, different income groups might have different moving intentions. Distinguishing between these groups might provide further insight into the association between the concentration of low-income people in the neighbourhood and the moving intentions of households.

1.3 Research problem statement

The main aim of this research is to understand the association between the concentration of low-income people in a neighbourhood and the intention to move of households in the case of the Netherlands for the years 2006 and 2009. Similar research from other countries supports this expected association (Harris, 1999; Mateyka, 2015). Research will be done on the years 2006 and 2009 due to data availability and, consequently, the influence of the Global Financial Crisis on the intention to move of households (Dane et al., 2014). The research uses the following main research question to achieve the aim of filling the research gap in the literature:

"To what extent does the concentration of low-income people in a neighbourhood associate with the intention to move of households in the case of the Netherlands for the years 2006 and 2009?"

This research has the following sub-questions to answer the main research question:

1. "What does the literature say about the association between the concentration of low-income people in a neighbourhood and the intention to move of households?"

The study will address the first question by performing a secondary data analysis in the form of a literature review. Earlier research by Harris (1999) and Mateyka (2015) will form the starting point upon which this study will examine additional literature to facilitate a better understanding of the association and give insight into the drivers and methods. As mentioned in the academic relevance, various drivers influence the intention to move. It is essential to have insight into these factors to better understand the association between the concentration of low-income people in a neighbourhood and the intention to move.

2. "What is the association between the concentration of low-income people in a neighbourhood and the intention to move as determined through a multiple logistic regression using household- and neighbourhood-level data from the Netherlands in 2006 and 2009?"

This sub-question examines the association between the concentration of low-income people in a neighbourhood and the intention to move. To answer this research question, this study combines the theory of the association between the variables of interest with suitable quantitative data analysis. This study enriches household-level data from the Netherlands' Housing Survey (Ministry of Internal Affairs Netherlands, 2011) with neighbourhood-level data from the Dutch Central Bureau of Statistics (Central Bureau of Statistics, n.d.). This study executes a quantitative analysis using a multiple logistic regression model to estimate the association. Because the intention to move is either yes or no and therefore binary, a logistic regression model is a valid method to analyse this association. Additionally, a multiple logistic regression enables the analysis of the association whilst also controlling for other drivers influencing the moving intentions of households. However, a multiple logistic regression model does not account for the hierarchical structure between the household and the neighbourhood-level variables. To address this limitation, this research will perform a variance-covariance estimation (Duque-Calvache et al., 2018). Chapter 3 will further emphasise on the data and the model.

3. "What is the difference between the association of the concentration of low-income people in the neighbourhood and the intention to move between the highest-income households compared to the lowest-income households?"

The secondary aim of this research is to estimate if there is a difference in the moving intentions between the highest-income and lowest-income households regarding the concentration of low-income people in the neighbourhood. As noted in the academic relevance, it is of interest to differentiate between income groups, as the moving intentions of higher-income households may differ from those of lower-income households due to the composition of the neighbourhood (Clark & Coulter, 2015). However, according to other literature on moving intentions, income does not affect the intention to move, as households do not take into consideration their resources and constraints (De Groot et al., 2008; Woo & Morrow-Jones, 2011). This study will include an interaction term into the multiple logistic regression to analyse this difference (Jaccard, 2003). This interaction term will provide insight into the presence of a potentially significant difference in moving intentions between the highest-income households and the lowest-income households.

The structure of the following chapters is as follows. Chapter 2 describes the theoretical framework, including the hypotheses and conceptual model for the analyses. Chapter 3 gives insight into the data, variables and methods. Chapter 4 presents the results and chapter 5 discusses the findings. Lastly, chapter 6 provides the conclusion of this thesis.

2. Theoretical framework

2.1 Intention to move

A household goes through a considerable decision-making process before realising its moving intentions (De Jong, 1999). A household constantly evaluates its current life, housing and neighbourhood characteristics. It then compares this with a desired or required (upcoming) living situation and sees if the current situation is satisfying. If not, the household will experience residential stress (Lee et al., 1994). Consequently, the most apparent solution for a household that experiences residential stress is moving to a better dwelling or neighbourhood. The decision-making process before realising a move involves different steps. If the current dwelling or neighbourhood does not satisfy a household's (upcoming) needs, it indicates a wish to move. This is the first step in the residential mobility process (De Groot et al., 2008). A wish is generally only about desires and hopes without having a clear perspective or time frame for realisation. The second step for a household is indicating having moving intentions. This differs from a wish since households have a more precise idea of their desires, preferences, and needs and within which time frame they need to be realised. As a result, the household is more committed to realising a move to deal with its (upcoming) residential stress (De Groot et al., 2008). The third step is gathering information on potential alternative dwellings (Skifter Andersen, 2008). During this orientation phase, households strive to align their utility framework with the budget constraints (Lu, 1997). More specifically, the household considers its preferences with regard to the dwelling and neighbourhood in relation to its resources. If the household finds a suitable available dwelling within its budget, it will follow up its moving intentions with an actual move. The literature focuses mainly on these moving intentions (stated preferences) and actual moves (revealed preferences). Within this research, as mentioned in the introduction, the interest is primarily in moving intentions. When focusing on the intention to move, compared to actually moving, the analysis includes all respondents who did not realise their move (De Groot et al., 2008). As a result, this research can directly analyse the association between the factors of interest, which is not influenced by the resources and constraints of a household.

An intention to move, as previously mentioned, is a result of residential stress, which arises from (expected) changes in someone's life. These individual and household changes can form triggers by giving new demands regarding the housing or neighbourhood situation. If that is the case, then a discrepancy between the current and desired housing or neighbourhood situation is present. If this mismatch becomes too large, a resident's quality of life declines, and the desire to move increases. This mismatch, expressed in having moving intentions, arises due to various factors. Firstly, changes in someone's life-cycle stage and social aspiration influence the mismatch between the current dwelling or neighbourhood and the desired dwelling or neighbourhood (Mulder, 1993; Mulder & Hooimeijer, 1999). Partnership, marriage, children and ageing greatly influence a household's preferences regarding their current housing and neighbourhood situation. For instance, younger people are more likely to express moving intentions compared to older people. The union or break-up of a partnership or marriage leads

to at least one needing to move. Being single, compared to households with more than one person, often leads to fewer constraints regarding realising moving intentions. Having or expecting children might give new views on the current housing or neighbourhood situation by changing the need for better schools, a safer neighbourhood or more rooms. All these changes in the life-cycle stage trigger moving intentions because there is a need to adjust the current living situation to meet the changed demand (Clark et al., 2014). Secondly, moving intentions can also arise due to social aspirations, which are the ambitions and desires of a household (Mulder & Hooijmeir, 1999). A household often needs to move if there are job or education opportunities because the commuting distance will otherwise be too large (Van Wissen & Bonnerman, 1991). If the household does not move, it cannot accept the job or education opportunities and therefore cannot fulfil its aspiration. Owning a (bigger) house, living near family, or improving one's current living situation, among other things, are also forms of social aspiration. The difference between the life-cycle stage and social aspiration is that the latter has no (upcoming) need and no residential stress. As a result, theoretical models explaining moving intentions include individual and household characteristics.

Besides individual and household characteristics, characteristics of the dwelling also influence moving intentions. For instance, compared to single-family homes, residents of apartments, terraced, corner and semi-detached houses are more often dissatisfied with their dwelling, and therefore more likely to express moving intentions (Baillie, 1990). The amount of space per person living in the household also influences moving intentions (Clark & Ledwith, 2006). Not enough space per person in the household means the house is too crowded, leading to dissatisfaction with the current dwelling. This study measures roomstress as the number of rooms available per person living in the household. The more crowded a house becomes, the more likely it is that a household expresses moving intentions. As mentioned in the life-cycle stage, expecting a child or the union of a partnership can then be of significant influence. Tenure, differentiated between owner-occupiers and renters, also influences the intention to move (Lu, 1997). Households who rent are more mobile than owner-occupiers due to having more flexibility and less transaction costs related to moving. On top of this, selling and buying a house is often seen as more stressful due to various risks and work than the less complicated transition from one rental home to another. Renting households often desire to become homeowners for various reasons like building equity, tax benefits and stability (Mulder & Hooimeijer, 1999). Additionally, the decision to purchase a house typically implies that the household expects to stay there longer, influencing its future moving intentions (Feijten & Mulder, 2002). However, despite housing characteristics influencing moving intentions, the household must be able to realise its intentions.

The capacity and constraints of a household determine the possibility of realising these moving intentions to a better dwelling or neighbourhood (Clark & Onaka, 1985). When a household intends to move, has the capacity and is not constrained, they will realise the move (Gardner et al., 1985). In the literature, the socioeconomic status of the household indicates its capacity. The most important factors of socioeconomic status are education and income level. Firstly, the highest education level attained

influences the intention to move (Mulder & Hooimeijer, 1999). Higher educational levels result in higher incomes and more job opportunities, making the possibility of needing to move higher. Secondly, households with a higher overall income level have more dwellings available to them than those with a lower income. As a result, households with a higher income are better able to realise their moving intentions than households with a lower income. Also, these households are less constrained due to the housing market (Dane et al., 2014). If the housing market has a lot of available and affordable owner-occupied and rental properties, it is more likely that households will realise their moving intentions. However, researchers estimate that moving intentions are no different for households with a higher socioeconomic status than those with a lower socioeconomic status (Woo & Morrow-Jones, 2011; De Groot et al., 2008). According to Timmermans et al. (1994), the preferences of the household, such as the desire to live in a bigger dwelling, closer to amenities or in a safe neighbourhood, influence the intention to move. These preferences remain regardless of the household's socioeconomic status.

The role of the neighbourhood is often less influential compared to individual, household and housing characteristics in explaining the moving intentions of households (Galster, 1987). Nonetheless, households are expected to indicate moving intentions due to the desire to improve their neighbourhood quality and lower residential stress. Additionally, different researchers include neighbourhood characteristics and expected changes in the neighbourhood in their analysis (Harris, 1999; Clark & Ledwith, 2005; Skifter Andersen, 2008). These researchers indicate the significant importance of these neighbourhood characteristics on the household's moving intentions. For instance, the difference between rural and urban areas, measured as the degree of urbanisation, affects the intention to move (Helderman & Mulder, 2007). Urbanisation, which indicates the density of a neighbourhood, is a good indicator of noise pollution, air quality, (traffic) safety and the availability of green space. The appearance, or lack thereof, influences the satisfaction of the households. As a result, Helderman and Mulder (2007) indicate that a more urbanised neighbourhood results in a higher likelihood of expressing moving intentions. Due to lower turnover rates in lower urbanised neighbourhoods, fewer houses and, thereby, fewer opportunities are available to potential buyers or renters. However, housing is often more affordable in these neighbourhoods, making its effect on the intention to move not straightforward. The perceived neighbourhood quality is another neighbourhood characteristic influencing the intention to move (Duque-Calvache et al., 2018). Residents who perceive or expect their neighbourhood quality to decrease more often express moving intentions. The concentration of low-income residents in a neighbourhood, which is the topic of this thesis, also influences moving intentions, as will be discussed in the following part.

2.2 Low-income neighbourhoods and moving intentions

The literature underscores the impact of the concentration of low-income people in neighbourhoods on the moving intentions of other residents in other countries (Harris, 1999; Matyeka, 2015; Clark & Coulter, 2015). Research by Mateyka (2015) found that moving intentions are related to the

concentration of low-income people in the United States. After conducting a multiple logistic regression with individual, household and housing characteristics, the study finds a significant relationship between the neighbourhood's poverty rate and the intention to move. The poverty rate is the percentage of people in a neighbourhood who have lived below the poverty line for longer than a year. The researcher indicates that a rise in the neighbourhood's poverty rate increases the probability of having moving intentions. Another research by Clark & Coulter (2015) looked into changing neighbourhood characteristics and their effect on the moving intentions of households. They indicate that as the neighbourhood becomes more deprived, the probability of the resident expressing moving intentions increases. A deprived neighbourhood is, in their research, determined by, among other things, the percentage of people with a low income. Their results indicate a positive relationship between the percentage of lower-income residents and the likelihood of indicating moving intentions, especially for higher-income residents. They mention that people avoid these low-income neighbourhoods because they are more prone to having bad reputations and social problems. Harris (1999) indicates that residents from low-income neighbourhoods are more likely to express moving intentions than those from other neighbourhoods because ordinary people do not aspire to live in these neighbourhoods. These moving intentions reflect complications in a neighbourhood. His research indicates that these complications often result from the concentration of lower-income residents in the neighbourhood. As a result, this concentration is a good indicator for analysing moving intentions. (Perceived) dissatisfaction due to the concentration of low-income residents in the neighbourhood influences the satisfaction of other residents in the neighbourhood (Skifter Andersen, 2008; Permentier et al., 2009; Musterd et al., 2016). Harris (1999) groups these negative effects into physical and socioeconomic complications (Harris, 1999).

The first type of complications influencing the intention to move of households are physical complications like violence, crime, pollution, vandalism and nuisance (Rabe & Taylor, 2010; Leibbrand et al., 2021; Basolo & Strong, 2002; Andersen, 2008). A large share of low-income residents in a neighbourhood often results in higher rates of violence and crime, resulting in certain households, especially with children, having moving intentions (Rabe & Taylor, 2010; Leibbrand et al., 2021). This is because fear of crime and violence greatly influences the satisfaction with the neighbourhood. Additionally, high crime and violence rates also influence housing prices, prompting households to take measures to prevent the deprecation of their homes. They often intend to move in order to eventually secure their investment. Also, pollution, litter and vandalism are more prevalent in concentrated and segregated low-income neighbourhoods (Basolo & Strong, 2002). Pollution, litter and vandalism affect residents' satisfaction with their living environment, which is important since the neighbourhood largely determines someone's direct living space. Anti-social behaviour due to nuisances affects the resident's safe and secure feeling within the neighbourhood. Because of these physical complications, due to the concentration of low-income people in the neighbourhood, it is expected that they influence the moving intentions of households.

The second type of complications which affect moving intentions are socioeconomic complications. These complications, resulting from large concentrations of low-income people in the neighbourhood, are lower educational achievements, lower income development and lower rates of upward mobility (Wilson, 1987; Kleinhans et al., 2010; Sykes & Kuper, 2009; Das et al., 2010; Musterd et al., 2006). These complications influence the outcomes and prospects of residents within the neighbourhood. A study by Sykes and Kuyper (2009) looked into neighbourhood effects and their relationship with educational achievements in the Netherlands. Disadvantaged areas, where unemployment and the overall share of low-income people are high, are associated with lower educational achievements. Also, more segregation due to the concentration of low-income neighbourhoods leads to lower forms of income development for the group aged 25 to 49 in the Netherlands (Das et al., 2010). Additionally, the concentration of low-income residents and segregation from other higher-income people also influences the chances for upward mobility. Strong social ties with different people from a higher social status, especially for residents with a lower socioeconomic position, increase these residents' employment and social mobility (Musterd et al., 2006). Consequently, the possibility of leaving poorer neighbourhoods might improve the resident's socioeconomic outcomes. Because of these outcomes, residents are more likely to express an intention to move to improve their chances in life.

However, in the Netherlands, the impact of these neighbourhood effects might be mitigated due to social programs and government interventions, compared to the US (Friedrichs et al., 2003). The Dutch government focuses its policies on realising and maintaining good neighbourhoods with good schools, employment possibilities, safety and social networks. These factors enhance an individual's opportunity to move up the social ladder (Van Ham & Clark, 2009). Nevertheless, because large amounts of social housing are mainly concentrated in the outside neighbourhoods of Dutch cities, the neighbourhood effects due to the concentration and segregation of these poorer residents might still be present (Bolt et al., 2010).

2.3 Hypotheses

The relationship between the key factors, the concentration of low-income people in a neighbourhood and the intention to move, has not been researched in the case of the Netherlands. In order to answer the main research question, this research will answer the following hypotheses:

Hypothesis 1: *"The percentage of low-income people in a neighbourhood has a significant positive effect on the intention to move of households."*

This hypothesis suggests a significant positive relationship exists between the percentage of low-income people in a neighbourhood and the intention to move of households. The hypothesis is based on earlier literature by Harris (1999) and Mateyka (2015), who estimate that households living in neighbourhoods with larger concentrations (indicated as percentages) of low-income people are more likely to have

moving intentions. This is because these low-income neighbourhoods are more prone to have physical complications like nuisance, litter and vandalism, affecting the resident's satisfaction (Rabe & Taylor, 2010; Basolo & Strong, 2002; Andersen, 2008). On top of this, low-income neighbourhoods are known for affecting the socioeconomic outcomes of the residents like lower income development, less upward mobility, higher unemployment and less educational achievements (Sykes & Kuyper, 2009; Musterd et al., 2006; Das et al., 2010). Considering these reasons, a positive relationship between the factors of interest should exist. This implies that as the percentage of low-income people increases in the neighbourhood, the probability of having moving intentions also increases. Figure 1 provides insight into this relationship. Additionally, various control variables, which also influence moving intentions, are depicted. These variables are selected based on the literature and their presence in the datasets. For each variable, it is indicated if it is present at the household or neighbourhood level.
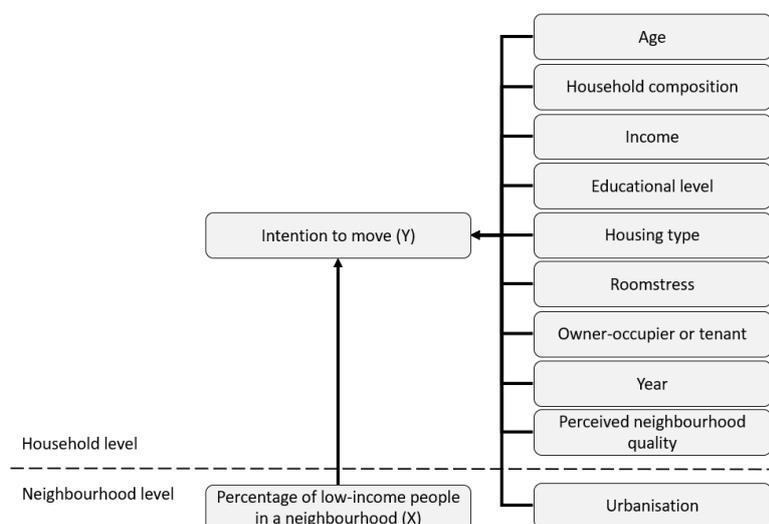
Figure 1. Conceptual model

Hypothesis 2: *"There is no significant difference in the relationship between the intention to move and the concentration of low-income people in the neighbourhood for households with the highest income compared to households with the lowest income."*

Hypothesis 2 aims to analyse whether there is a difference between the intention to move between the highest-income and the lowest-income households due to the concentration of low-income people in the neighbourhood. It thereby gives a further understanding of hypothesis 1. Timmermans et al. (1994) state that a household's preferences primarily drive an intention to move. Therefore, these preferences are expected not to be different based on personal attributes such as household income. Additionally, the hypothesis aligns with research from Woo & Morrow-Jones (2011) and De Groot et al. (2008), who indicate that income should not affect someone's intention to move.

3. Data, variables and methods

3.1 Data and variables

This study uses multiple datasets with variables on the household and neighbourhood level. The first datasets are the Netherlands' Housing Surveys from 2006 and 2009 (Ministry of Internal Affairs Netherlands, 2011). These datasets consist of an extensive questionnaire on housing quality and needs, which takes place every four years. The survey is person-based and gives insight into individual, household and housing characteristics. From the 2 surveys, 80,635 respondents could be gathered (N2006 = 39,234; N2009 = 41,401). This research will drop all respondents who are not the head of the family or their partner since their moving behaviour is shaped mainly by the head and their partner in the family. These are children, sons-/daughters-in-law and other family members. Also, this research will exclude students and new immigrants since their mobility behaviour is driven by school choices and social institutions (Bolt & Van Kempen, 2003). The analysis uses these datasets from 2006 and 2009 because of the presence of postal codes, which are key variables required to perform a merge with the other datasets. The postal codes approximately overlap with the size of the neighbourhoods in the case of the Netherlands (Van Ham & Clark, 2009). Due to these postal codes, the datasets are enriched with two datasets from the Dutch Central Bureau of Statistics (n.d.) containing neighbourhood-level data. To merge two datasets, it is important to align the observations correctly. The Netherlands' Housing Survey dataset contains the dependent variable: intention to move. The Dutch Central Bureau of Statistics dataset contains the independent variable: the concentration of low-income people in the neighbourhood. Due to the relationship of the key variables, the dataset of the independent variable should be closely before that of the dependent variable. This is because a household will or will not express moving intentions due to the concentration of low-income people in a neighbourhood. The survey moments of the data on the intention to move are primarily at the end of 2005 and in the first months of 2009. As a result, the neighbourhood-level datasets from 2004 and 2007 are taken and merged with the household-level dataset.

The main dependent and independent variables are the intention to move of a household and the concentration of low-income people in a neighbourhood, respectively. Firstly, the population of interest is the households and their moving intentions retrieved from the Netherlands' Housing Survey dataset. The moving intentions of these households result from the question: 'Do you want to move in the coming two years?' and are on the household level. This research will transform this variable into a dummy variable (yes/no) where the answers 'do not know' and 'recently found new housing' are dropped. 'Definitely yes' and 'I want to, but cannot find something' will be transformed to yes (1) and 'definitely not' to no (0). Of all the respondents who responded to the surveys, 10,8% expressed the intention to move within the coming two years. Secondly, the independent variable of interest within this research is the concentration of low-income people in a neighbourhood, obtained from the Dutch Central Bureau of Statistics (n.d.). The concentration of low-income people in a neighbourhood indicates the percentage of people in the neighbourhood whose income is lower than 40% of that year's overall Dutch income

distribution (Central Bureau of Statistics, n.d.). This Dutch income distribution was around 14 thousand euro in 2006 and 2009. This variable is on the neighbourhood level.

Multiple control variables are added based on the literature and their presence in the databases to better understand the relationship between the percentage of low-income people in a neighbourhood and the intention to move of households. Firstly, control variables regarding the life-cycle stage are age respondent, age respondent squared and household composition. The relationship between age and moving intentions is often non-linear and U-shaped (Bolt & Van Kempen, 2003). An extra variable, age squared, accounts for the non-linearity between age and the intention to move. Secondly, control variables regarding socioeconomic status are household income and educational level. Household income is the household's gross income, which will be transformed into its natural logarithm to deal with skewness and linearity. Thirdly, the current residence includes three control variables: housing type, roomstress and type of tenure. This study measures roomstress by dividing the number of rooms in a house by the number of people in a household. Fourthly, the variable survey year controls for the effects of the Global Financial Crisis of 2008 on the intention to move of households. Lastly, the analysis includes two neighbourhood characteristics: urbanisation and perceived neighbourhood decline. Table 1 provides the descriptive statistics regarding the intention to move, the percentage of low-income people in a neighbourhood and the control variables. Appendix A gives an overview and description of all variables used within this research.

Table 1. Descriptive statistics intention to move

	Observations	Mean	Standard Deviation	Min	Max
Intention to move (dependent variable)					
No	71,123	0.882	0.334	0	1
Yes	9,512	0.118	0.334	0	1
Percentage people with low-income neighbourhood (independent variable)	80,635	40.20	7.87	14	95
Age respondent	80,635	52.699	16.63	18	99
Age respondent squared	80,635	3053.771	1820.64	324	9,801
Household composition					
Single	25,351	0.314	0.471	0	1
Parents without children	26,978	0.335	0.467	0	1
Parents with children	23,437	0.291	0.451	0	1
One-parent household	4,869	0.604	0.248	0	1
Gross income household	80,635	47433.44	39978.29	0	199,945
Educational level					
Primary	8,246	0.102	0.295	0	1
Secondary	49,732	0.617	0.487	0	1
College and university	22,657	0.281	0.453	0	1
Housing type					
Detached house	9,347	0.116	0.309	0	1
Semi-detached house	8,727	0.108	0.304	0	1
Corner house	10,266	0.127	0.331	0	1
Terraced house	23,803	0.295	0.456	0	1
Apartment	28,492	0.353	0.482	0	1
Rooms per person	80,635	2.274	1.15	0.108	10
Tenure					
Owner-occupier	45,570	0.565	0.499	0	1
Renter	35,065	0.435	0.499	0	1
Survey year					
2005	25,984	0.322	0.467	0	1
2006	10,522	0.130	0.337	0	1
2008	13,101	0.162	0.369	0	1
2009	31,038	0.385	0.486	0	1
Perceived neighbourhood quality					
Neighbourhood improving	16,523	0.205	0.405	0	1
Neighbourhood declining	9,964	0.124	0.338	0	1
Neighbourhood stays the same	54,148	0.671	0.473	0	1
Urbanisation					
Very strongly urban	23,484	0.291	0.462	0	1
Strongly urban	22,112	0.274	0.446	0	1
Medium urban	12,062	0.150	0.352	0	1
Lightly urban	10,766	0.133	0.334	0	1
Not urban	12,211	0.151	0.351	0	1
Total amount of cases	**80,635**				

Table 2 shows a correlation matrix between the independent variable (the percentage of low-income people in a neighbourhood) and the dependent variable (the intention to move). The correlation between the percentage of low-income people in the neighbourhood and the intention to move is 0.0451, which indicates a positive relationship between the variables. More specifically, this indicates that an increase in the percentage of low-income people in the neighbourhood results in a higher possibility of having moving intentions.

Table 2. Correlation matrix

	Percentage low-income people neighbourhood	Intention to move
Percentage low-income people neighbourhood	1.000	
Intention to move	0.0451	1.000

In Table 3, the intention to move of different groups is visible. Firstly, the table showcases that younger people more often express moving intentions than older people. Meanwhile, those with a higher educational level do not necessarily express having more moving intentions. Those living in apartments or terraced houses and single or one-parent households' showcase having more moving intentions than other housing types and household compositions. Also, renters have more moving intentions than owner-occupiers. Respondents from 2008 and 2009 seem more likely to express moving intentions compared to 2005 and 2006. Residents who perceive their neighbourhood quality to decline express more often moving intentions than those who perceive their neighbourhood quality to improve or stay the same. Lastly, living in very highly urban and strongly urban neighbourhoods seems to indicate a higher probability of expressing moving intentions compared to lightly urban and not urban areas. A further analysis using multiple logistic regression modelling determines if these abovementioned comparisons are significantly different from each other. Of the respondents, almost 31% mention that their neighbourhood is at least one of the reasons why they indicate having moving intentions. Important to note is that not all respondents have answered this question (N=8662).

Table 3. Intention to move in different categories

Intention to move	No	Yes
Total	**71123**	**9522**
Age group		
10-19	63	35
20-29	4,482	2,160
30-39	11,039	2,580
40-49	14,499	1,713
50-59	14,213	1,269
60-69	12,662	933
70-79	9,297	635
80-89	4,522	191
90-99	346	6
Household composition		
Single	21,896	3,455
Parents without child	24,316	2,662
Parents with children	21,078	2,369
One-parent household	3,833	1,036
Educational level		
Primary	7,378	868
Secondary	44,216	5,526
College and university	19,529	3,128
Housing type		
Detached house	8,969	378
Semi-detached house	8,300	427
Corner house	9,459	817
Terraced house	21,573	2,230
Apartment	22,822	5,670
Tenure		
Owner-occupier	42,474	3,096
Renter	28,649	6,426
Year		
2005	23,086	2,890
2006	9,330	1,185
2008	11,540	1,558
2009	27,131	3,888
Perceived neighbourhood quality		
Neighbourhood improvement	14,449	2,084
Neighbourhood decline	7,354	2,610
Neighbourhood stays the same	49,320	4,828
Urban density		
Very highly urban	19,346	4,138
Strongly urban	19,362	2,750
Medium urban	10,967	1,105
Lightly urban	9,975	791
Not urban	11,473	738
Total	**80635**	

3.2 Method

To test the hypotheses, this research conducts a multiple logistic regression to find the relationship between the intention to move and the percentage of low-income people in a neighbourhood (Mateyka, 2015). A logistic regression is chosen because the intention to move is either 'yes' or 'no', thereby binary. A logistic regression model allows the prediction of the probability of the dependent variable. With this probability, the analysis can indicate if it is more likely that someone expresses the intention to move with an increase in the independent variable. Secondly, a multiple logistic regression allows the analysis of the relationship between two variables while controlling for extra variables, which also have explanatory power on the dependent variable. The multiple logistic regression model used to estimate the first hypothesis is:

$$ln\left(\frac{P(y=intention\ to\ move)}{P(y=no\ intention\ to\ move)}\right)_{ij} = \beta_0 + \beta_1 Low\text{-}IncomeNeighbourhood_j + \beta_2 Age_i + \beta_3 Age^2_i +$$

$$\beta_4 HouseholdComposition_i + \beta_5 lnIncome_i + \beta_6 Education_i + \beta_7 HousingType_i + \beta_8 Roomstress_i +$$

$$\beta_9 Tenure_i + \beta_{10} Year_i + \beta_{11} PerceivedNeighbourhood_i + \beta_{12} Urbanisation_j + \varepsilon_{ij} \qquad\qquad (1)$$

The explanation of the variables in model 1 is as follows: $\left(\frac{P(y=intention\ to\ move)}{P(y=no\ intention\ to\ move)}\right)_{ij}$ presents the odds of the intention to move to be 'yes'; P is the probability of the event occurring; This analysis uses the natural logarithm (*ln*) to transform these odds to a scale which is linear and, therefore applicable in a logistic regression; β_0 is the intercept term. β_n is the coefficient of every independent variable; $_i$ indicates if a variable is on the household level, and $_j$ denotes variables on the neighbourhood level; *Low-IncomeNeighbourhood$_j$* is the percentage of low-income people in a neighbourhood; *Age$_i$* is the age of the respondent and *Age2$_i$* is the age of the respondent squared; *HouseholdComposition$_i$* is the respondents household situation divided into four categories; *lnIncome$_i$* is the natural logarithm of the gross income of the household of the respondent; *Education$_i$* is the highest level of education achieved by the respondent; *HousingType$_i$* is the type of housing the respondent lives in and is categorical; *Roomstress$_i$* is the number of rooms divided by the number of people living in a household; *Tenure$_i$* is the tenure situation either being owner-occupier or renter; *Year$_i$* indicates the year the survey was taken; *PerceivedNeighbourhood$_i$* is the perceptions on the improvement of the neighbourhood over the past year; *Urbanisation$_j$* is a categorical variable about the level of urbanisation of the neighbourhood where the respondent resides; ε_{ij} is the error term. Variables within this model are present at the household and neighbourhood level, indicating a hierarchical structure where household-level observations are nested within the neighbourhoods (Clark & Coulter, 2015). A multiple logistic regression model does not consider this hierarchical structure of the dataset. As a result, it fails to account for the clustering of observations within a neighbourhood, resulting in biased standard errors. To address this issue, this research incorporates variance-covariance estimation (VCE) into the multiple logistic regression. This VCE adjusts the standard errors of the estimated coefficient to account for the clustering of observations within neighbourhoods (Duque-Calvache, 2018; Stata, n.d.). As a result, this leads to

more accurate estimates and robust interferences. The postal codes are chosen as the identifier for each cluster.

To answer hypothesis 2, this research will conduct a regression with an interaction term. This analysis aims to determine if the effect of the percentage of low-income people in a neighbourhood on the intention to move is the same for the households with the highest income compared to the households with the lowest income. The second hypothesis is as follows:

$$ln\left(\frac{P(y=intention\ to\ move)}{P(y=no\ intention\ to\ move)}\right)_{ij} = \beta_0 + \beta_1 Low\text{-}IncomeNeigbhourhood_i + \beta_2 UpperIncomeLevel_i + \beta_3(UpperIncomeLevel_i * Low\text{-}IncomeNeigbhourhood_j) + \beta_4 Age_i + \beta_5 Age^2_i + \beta_6 HouseholdComposition_i + \beta_7 Education_i + \beta_8 HousingType_i + \beta_9 Roomstress_i + \beta_{10} Tenure_i + \beta_{11} Year_i + \beta_{12} PerceivedNeighbourhood_j + \beta_{13} Urbanisation_j + \varepsilon_{ij}$$
(2)

Model 2 presents a comparable model to model 1 but includes an interaction term (Jaccard, 2003; Clark & Coulter, 2015). Firstly, to classify if a household's income is above the median, a dummy variable being, *UpperIncomeLevel_i,* is included. Consequently, *lnIncome_i* is no longer present in the model. Secondly, *UpperIncomeLevel_i * Low-IncomeNeigbhourhood_i* is the interaction term between the upper half of the median household income and the concentration of low-income people in a neighbourhood. When the coefficient β_3 is insignificant, it implies that the coefficient is no different from zero. Ultimately, this indicates that the effect of the concentration of low-income people in the neighbourhood on the intention to move is no different between the households with the highest income compared to the households with the lowest income. The interaction term in this model contains a variable on the household and neighbourhood level. As a result, the model only captures the effect of the percentage of low-income people in the neighbourhood on the intention to move of the highest-income households.

It is necessary to verify the assumptions regarding the multiple logistic regression models used. Firstly, the assumptions regarding the dependent variable in a logistic regression are: mutually exclusive alternatives, exhaustive choices and a finite number of alternatives. This research meets these criteria by transforming the dependent variable into a binary variable where the outcome is either 'yes' or 'no'. Secondly, this study examines the presence and influence of outliers from the continuous variables of income, age and roomstress. This study removes the outliers for income (above 200.000) and rooms per person (above 10). As a result, 356 observations are deleted. Thirdly, the linearity assumption is about linearity between the log odds of the dependent variable and the continuous independent variables. The continuous variable, log gross income household, should be checked for non-linearity. Appendix D shows that, after performing a Box-Tidwell test, this study meets the linearity assumption. The test indicates that a non-linear relationship is not present. Fourthly, this study checks the absence of correlation between the independent variables. Appendix E shows that no variable has a higher VIF

value than five except for the age and age-squared variables, which correlate with each other. This indicates no multicollinearity problems between the other variables of interest within the models. Lastly, the observations must be independent of each other. This study violates the independence of observations due to the merging of household-level data with neighbourhood-level data (Sommet & Morselli, 2017). This violation arises because households are nested within the neighbourhood, meaning the same factors affect multiple households in the same neighbourhood. These shared factors lead to correlation among observations within the neighbourhood, violating the independence of the observations. Consequently, this research uses a variance-covariance estimation to acknowledge and accommodate this violation of independence between observations within the same neighbourhood (Duque-Calvache, 2018; Stata, n.d.). As a result, the variance-covariance estimation adjust the standard errors of the coefficients to account for the correlation within neighbourhoods. However, variance-covariance estimation cannot account for the between-cluster variation and, therefore, cannot indicate the differences between neighbourhoods.

4. Results

In this chapter, this research offers the results from both hypotheses, as mentioned in chapter three[2]. Before revealing the results from the relationship between the concentration of low-income people in a neighbourhood on the intention to move of households, this study describes the multiple logistic regression models. Appendix B presents four multiple logistic regression models to indicate the improved log-likelihood, improved pseudo-R2 and the interaction between the different control variables. Firstly, the Pseudo R2 provides the proportion of the variability explained by the model. It showcases that the Pseudo R2 increases with every model. Model 4 indicates a Pseudo R2 of 0.1691, indicating that the independent variables explain almost 17% of the variance of the dependent variable (Hemmert et al., 2018). Secondly, the log-likelihood indicates the model's goodness of fit and provides insight into how well the models describe the data. The results indicate that the overall goodness of fit of model 4 is better compared to that of models 1, 2 and 3. This suggests that including the explanatory variables based on the literature has a meaningful effect on the outcome variable.

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[2]This study also examines the relationship between the concentration of low-income people in the neighbourhoods and the realised moves of households. This is done to research if there is a difference between moving intentions and realised moves. This study is visible in Appendix C. As mentioned in the theory, moving intentions are, compared to realised moves, not constrained due to a variety of factors like income. This analysis aims to see if there is a difference between moving intentions and realised moves based on these constraints. Unfortunately, due to an insufficient correlation between the concentration of low-income people in a neighbourhood and the odds that a household realises a move, the results showcased no significant results. A possible explanation could be that higher-income households are not constrained in realising their moves compared to lower-income households, possibly mixing up the relationship. When the regression is performed on only the highest-income group and the lowest-income group separately, no significant relationship between the variables of interest is present, despite what the literature suggests. Therefore, no insight could be given on the difference between the intention to move and realised moves.

Table 4 shows models 1 and 4 of Appendix B and their exponentiated coefficients, standard error and significance of the relationship between the concentration of low-income people in the neighbourhood on intention to move of households. The coefficients are transformed into exponentiated coefficients to make them better interpretable. As a result, the coefficient indicates the factor by which the odds of expressing moving intentions change for a one-unit increase for that particular independent variable. Model 1 regresses only the variables of interest, which are the concentration of low-income people in a neighbourhood and the intention to move of households. This result showcases the presence of a significant relationship between both variables. Model 4 includes variables about the life-cycle stage, socioeconomic status, housing situation, survey year and neighbourhood characteristics. The results indicate that the "concentration of the percentage of low-income people in a neighbourhood" stays significant even when controlling for certain key characteristics. These outcomes from model 4 showcase a significant odds ratio of 1.008, indicating a significant positive relationship between the percentage of low-income people in a neighbourhood and the odds of intending to move. More specifically, this exponentiated coefficient is interpreted as follows: a 1-unit increase in the percentage of people with a low income in a neighbourhood results in the odds of intending to move being 1.008 times higher, holding all other variables constant. Besides the percentage of people with a low income in a neighbourhood, other variables also significantly affect the intention to move. The results from the control variables showcase a significant positive relationship for one-parent households with children (compared to singles), college and university graduates (compared to primary graduates), living in corner/terraced houses and apartments (compared to detached housing), renters (compared to owner-occupiers), perceived neighbourhood decline/stays the same (compared to perceived neighbourhood improvement) and during the years of the global crisis (2008 and 2009 compared to 2005). On the other hand, significant negative relationships are age, 2006 (compared to 2005) and lower forms of urbanisation (compared to strong urban areas) on the intention to move. Age squared is barely more than 1, meaning almost no age effect is visible. Other categorical variables are non-significant, meaning that they are not significantly different from the reference category when explaining the outcome of the intention to move. Also, the natural log of the household's gross income and roomstress are not significant. However, these variables are included because of their importance based on the literature.

Model 5 includes an interaction term to analyse whether there is a significant difference in moving intentions between the households with the highest income and those with the lowest income due to the concentration of low-income people in the neighbourhood. This interaction term examines the relationship between the upper half of the median gross income of households and the concentration of low-income people in a neighbourhood. The results from model 5 show an insignificant interaction term, indicating that the coefficient is no different than zero (Jaccard, 2003). This insignificance indicates that there is no significant difference between the households with the highest incomes compared to those with the lowest incomes concerning the percentage of low-income people in a neighbourhood on the intention to move.

Table 4. Multiple logistic regression on intention to move

Intention to move	Model 1[3]		Model 4[3]		Model 5	
	Exp(β)[1]	S.E.	Exp(β)[1]	S.E.	Exp(β)[1]	S.E.
Percentage people with low-income neighbourhood	1.017***	(0.005)	1.008**	(0.002)	1.009***	(0.003)
Household composition (ref.= single)						
Couple/partners without children			1.047	(0.047)	1.075*	(0.045)
Couple/partners with children			0.896	(0.054)	0.926	(0.053)
One-parent household with children			1.264***	(0.067)	1.269***	(0.067)
Age respondent			0.931***	(0.004)	0.932***	(0.004)
Age respondent squared			1.000***	(4.4e-05)	1.000***	(4.53e-05)
Log gross income household			1.005	(0.028)		
Educational level (ref. = primary)						
Secondary			0.948	(0.042)	0.955	(0.042)
College and university			1.427***	(0.068)	1.455***	(0.069)
Housing type (ref. = detached house)						
Semi-detached house			0.984	(0.077)	0.984	(0.077)
Corner house			1.153*	(0.081)	1.150**	(0.081)
Terraced house			1.256***	(0.081)	1.252***	(0.081)
Apartment			2.216***	(0.156)	2.207***	(0.155)
Roomstress[2]			0.963	(0.019)	0.965**	(0.019)
Tenure (ref. = owner-occupier)						
Renter			2.541***	(0.083)	2.501***	(0.080)
Survey year (ref. = 2005)						
2006			0.916*	(0.035)	0.918**	(0.035)
2008			1.102*	(0.045)	1.107***	(0.045)
2009			1.073*	(0.034)	1.077**	(0.034)
Perceived neighbourhood (ref. = improving)						
Neighbourhood declining			3.089***	(0.113)	3.087***	(0.113)
Neighbourhood stays the same			1.050	(0.032)	1.051	(0.032)
Urban density (ref. = very strongly urban)						
Strongly urban			0.992	(0.038)	0.990	(0.038)
Medium urban			0.896*	(0.045)	0.895***	(0.045)
Lightly urban			0.852**	(0.049)	0.853***	(0.049)
Not urban			0.825***	(0.046)	0.825***	(0.046)
Upper half median gross income					1.042	(0.136)
Upper median income * percentage of low-income people neigbhourhood[4]					0.997	(0.003)
Constant	-2.695***	(0.055)	-.695***	(0.309)	0.495***	(0.086)
N	80635		80635		80635	
Pseudo R[2]	0.0027		0.1687		0.1688	
Log-likelihood	-29200		-24335		-24336	

Notes: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; [1]Exponentiated coefficients; [2]Roomstress = amount of rooms / amount of people in household; [3]Other models present in appendix B; [4]Interaction term = upper half median gross income * percentage of low-income people in neighbourhood

5. Discussion

This chapter discusses the results of the analysis. It compares it with literature on the relationship between the concentration of low-income people in a neighbourhood and the intention to move. This study presents evidence for a positive relationship between the percentage of low-income people in a neighbourhood and the intention to move in the case of the Netherlands. The concentration of low-income people in the neighbourhood is operationalised as the percentage of low-income people in the neighbourhood.

Hypothesis 1: *"The percentage of low-income people in a neighbourhood has a significant positive effect on the intention to move"* is supported by the results. More specifically, the exponentiated coefficient indicates that a 1-unit increase in the percentage of people with a low income in a neighbourhood increases the odds of having the intention to move times 1.008, holding all other variables constant. The relatively low effect of this relationship compared to other variables is expected because neighbourhood characteristics are often less influential than individual, household and housing characteristics on the intention to move (Galster, 1987). The positive relationship between the variables of interest aligns with research from Harris (1999). This research indicates that residents from low-income neighbourhoods have a higher probability of expressing moving intentions than other residents because of underlying complications due to larger concentrations of low-income residents. Mateyka (2015) researched which factors drive the intention to move of households. This analysis performed a similar logistic regression on multiple individual, household, housing and neighbourhood characteristics and their influence on the intention to move. The analysis defines the poverty rate as the percentage of people within a neighbourhood living in poverty for over a year. It indicates that a 1-unit increase in the poverty rate within a neighbourhood increases the odds of having the intention to move times 1.30. This differs with the odds ratio of 1.008, as determined in this research. A possible but unstudied explanation could be that the case of the Netherlands is different compared to the United States. As mentioned earlier in this research, social programs and government interventions are present in the case of the Netherlands, possibly mitigating the relationship between these variables. Additionally, it is not feasible to compare two countries one-on-one based on different databases and defined variables. However, it gives insight into similar trends regarding the same topic of interest. It is important to recognize that this relationship stems from variables being present at the household and neighbourhood level. Due to the use of multiple logistic regression modelling with a variance-covariance estimation, the model accounts for the clustering within neighbourhoods (Duque-Calvache, 2017). However, no clustering between neighbourhoods could be accounted for.

Hypothesis 2: *"There is no significant difference in the relationship between the intention to move and the concentration of low-income people in the neighbourhood for households with the highest income compared to households with the lowest income"* can be supported based on the results. The interaction term, which is not significant, indicates that the effect of the interaction term is no different from zero. This indicates that the effect of the concentration of low-income people in the neighbourhood

on the intention to move is no different between the households with the highest income and those with the lowest income. These results align with expectations based on the results from Woo & Morrow-Jones (2011) and De Groot et al. (2008). They mention that income does not significantly affect the intention to move. The findings and the literature support the idea that the preferences of households drive the intention to move (Timmermans et al., 1994). These preferences are, therefore, not different when a household has a higher income. As stressed before, the interaction term in this model interacts a variable on the household level and the neighbourhood level. As a result, the model only captures the effect of the percentage of low-income people in the neighbourhood on the intention to move of the highest-income households.

6. Conclusion

This research analyses the relationship between the percentage of low-income people in a neighbourhood and the intention to move in the case of the Netherlands. Individual, household and housing characteristics often mediate the role of the neighbourhood on the intention to move (Mulder, 1993; Clark & Ledwith, 2006; Lu, 1997). However, neighbourhood factors also influence people's intention to move (Helderman & Mulder, 2007; Duque-Calvache et al., 2018). The main research is: *"To what extent does the concentration of low-income people in a neighbourhood associate with the intention to move of households in the case of the Netherlands for the years 2006 and 2009?"* This study uses two large datasets with individual, household, housing and neighbourhood characteristics from the whole of the Netherlands. The percentage of low-income people in a neighbourhood is the percentage of income recipients whose income is lower than 40% of that year's overall Dutch income distribution. The intention to move is those households who indicate they want to move in the two years after the survey moment.

In this research, a multiple logistic regression analyses the relationship between the percentage of low-income people in a neighbourhood and the intention to move. Other individual, household, housing and neighbourhood factors influencing the intention to move are accounted for. Accounting for these variables allows for a better understanding of the variables of interest. The results indicate a significant positive relationship between the percentage of low-income people in a neighbourhood on the intention to move in the case of the Netherlands. More specifically, a 1-unit increase in the percentage of people with a low income in a neighbourhood increases the odds of having the intention to move times 1.008. This study also examines the difference between the intention to move of the highest-income households to that of the lowest-income households as a result of the concentration of low-income people in a neighbourhood. The analysis shows no significant difference between the highest-income and lowest-income households on the intention to move concerning the percentage of low-income people in a neighbourhood.

For future research, a variety of recommendations are given. Firstly, as earlier research pointed out, determining someone's moving intentions solely on one simple yes/no question might underestimate

what is really happening and how respondents experience a certain factor (Lu, 1999). Respondents, for instance, might say they have no intention to move due to their situation and do not acknowledge this because it gives them a feeling of failure. Also, when options are limited, respondents might indicate that they are satisfied with having at least a home which somewhat satisfies their needs (Speare, 1974). Also, people get accustomed to their situation as time passes, influencing their satisfaction. Future research and data collection efforts could address these limitations by gathering more in-depth data that extends beyond a simple yes/no question. The second recommendation concerns the concentration of low-income people in a neighbourhood being a good indicator of underlying physical and socioeconomic complications. However, it therefore also fails to grasp these real underlying complications and their effect on residents' intention to move. Future research could break down the concentration of low-income people in a neighbourhood into different underlying factors to see which are most relevant in influencing a household's intention to move. The third recommendation is that the multiple logistic regression model used to analyse the relationship between the variables of interest is not the most suitable method for the dataset. This is because the dataset includes variables at both the household and neighbourhood level (Sommet & Morselli, 2017). The regression method used cannot account for the correlation between neighbourhoods. Future research should perform a multilevel logistic regression to account for this limitation, providing a more accurate insight into the relationship between the variables of interest. (Clark & Coulter, 2015). The fourth recommendation is about focussing only on higher- and lower-income households. However, other demographic groups might have different moving intentions. Future research could emphasise this by looking at differences between races, ages or educational levels, among other things. Thereby, researchers can gather a more complete understanding of the variables of interest and possibly prevent influences due to the mixing of different groups. On top of this, the interaction term used in this research only looked into the difference in moving intentions between the highest- and lowest-income households. Dividing income into more than two groups could reveal differences, potentially providing insights not captured by comparing only the highest and lowest-income households.

The findings from this research have some important recommendations for policymakers. As the results showcased, the probability of expressing moving intentions becomes higher for all households if the percentage of low-income people in a neighbourhood increases. This is because neighbourhoods with a large share of low-income households often have more physical and socioeconomic complications, affecting everyone residing there. Consequently, this results in a selective residential mobility of households, making the neighbourhood more concentrated and segregated. The government's role is to act on this trend by preventing the complete sorting into only low- and high-income neighbourhoods. To effectively address this issue, policies should first focus on supporting low-income households in these vulnerable low-income neighbourhoods by improving their socioeconomic position (PBL, 2016). Examples of such policies are focusing on better education for less educated people, increasing minimum wages and employment mediation for the unemployed. As a result, these

people-based policies allow these households to escape these low-income neighbourhoods. Secondly, policies like safer neighbourhoods, good infrastructure, community engagement and affordable housing in more affluent neighbourhoods should be applied. These place-driven policies, although less impactful than person-based initiatives, should especially focus on improving the quality of life in low-income neighbourhoods to make these neighbourhoods more attractive to various households (Permentier, 2013). These people and place-based policies have proven to be the most effective way of dealing with the trend of concentration and segregation in neighbourhoods (PBL, 2016). This, in turn, leads to fewer moves due to this concentration, resulting in households residing longer in the neighbourhood, enhancing the likelihood that they create social ties and form communities. As a result, this increases the inclusivism and integration within a neighbourhood, resulting in more liveability (Van Ham & Clark, 2009).

Acknowledgements

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Appendix A Description of variables used in model

Variable	Meaning
Household-level variables:	
Intention to move	Intention to move as expressed during moment of survey (Q = do you want to move within two years?): - 0 = no intention to move - 1 = intention to move within 2 years
Household composition	Composition of the household at moment of survey: - 1 = single parent - 2 = Parents without children - 3 = Parents with children - 4 = One-parent household
Age respondent	Age of respondent at moment of survey
Age respondent squared^2	Age of respondent at moment of survey squared
Log gross income household	Household's gross income at moment of survey (transformed to its natural logarithm to deal with skewness and linearity)
Educational level	Highest educational level achievement by respondent at moment of survey: - 1 = Primary education - 2 = secondary education - 3 = college and university education
Housing type	Typo of house occupying by respondent at moment of survey: - 1 = Detached house - 2 = Semi-detached house - 3 = Corner house - 4 = Terraced house - 5 = Apartment
Roomstress^2	Amount of rooms divided by the amount of people in household at the moment of survey
Tenure	Tenure status at moment of survey: - 1 = Owner-occupier - 2 = Renter
Year	The year the survey was taken: - 1 = 2005 - 2 = 2006 - 3 = 2008 - 4 = 2009

Perceived neighbourhood	Respondents' expectation about neighbourhood improvement over the coming years at moment of survey:

- 1 = Perceived neighbourhood improvement
- 2 = Perceived neighbourhood declining
- 3 = Neighbourhood stays the same

Neighbourhood-level variables:

Percentage people with low-income neighbourhood	The percentage of low-income people within a certain postal code whose income is lower than 40% of that year's overall Dutch income distribution (Central Bureau of Statistics, n.d.)
Urban density	Amount of addresses in every neighbourhood at moment of data collection:

- 1 = Very strongly urban (>=2500 addresses per km^2)
- 2 = Strongly urban (1500-2500 addresses per km^2)
- 3 = Medium urban (1000-1500 addresses per km^2)
- 4 = Lightly urban (500-1000 addresses per km^2)
- 5 = Not urban (<500 addresses per km^2)

Appendix B Multiple logistic Regression Intention to Move

Table B1. Multiple logistic regression Intention to Move

Intention to move	Model 1		Model 2		Model 3		Model 4	
	Exp(β)[1]	S.E.	Exp(β)[1]	S.E.	Exp(β)[1]	S.E.	Exp(β)[1]	S.E.
Percentage of people with low-income neighbourhood	1.017***	(0.0048)	1.011**	(0.00337)	1.010***	(0.00270)	1.008**	(0.00242)
Household composition (ref.= single)							(	
Couple/partners without children			0.861***	(0.0287)	1.108*	(0.0494)	1.047	(0.0466)
Couple/partners children			0.619***	(0.0239)	0.987	(0.0597)	0.896	(0.0537)
One-parent household with children			1.320***	(0.0541)	1.378***	(0.0720)	1.264***	(0.0665)
Age respondent			0.923***	(0.00391)	0.944***	(0.00417)	0.931***	(0.00415)
Age respondent squared[2]			1.000***	(0.000041)	1.000**	(0.000043)	1.000***	(0.0000440)
Log gross income household			0.681***	(0.0172)	1.002	(0.0276)	1.005	(0.0281)
Educational level (ref. = primary)								
Secondary			0.780***	(0.0342)	0.948	(0.0410)	0.948	(0.0420)
College and university			1.047	(0.0497)	1.382***	(0.0658)	1.427***	(0.0677)
Housing type (ref. = detached house)								
Semi-detached house					1.024	(0.0787)	0.984	(0.0768)
Corner house					1.327***	(0.0910)	1.153*	(0.0808)
Terraced house					1.479***	(0.0917)	1.256***	(0.0810)
Apartment					2.865***	(0.195)	2.216***	(0.156)
Roomstress[2]					0.984	(0.0199)	0.963	(0.0193)
Tenure (ref. = owner-occupier)								
Renter					2.757***	(0.0900)	2.541***	(0.0834)
Perceived neighbourhood (ref. = improving)								
Neighbourhood declining							3.089***	(0.113)
Neighbourhood stays same							1.050	(0.0317)
Urban density (ref. = very strongly urban)								
Strongly urban							0.992	(0.0384)

Medium urban							0.896*	(0.0452)
Lightly urban							0.852**	(0.0489)
Not urban							0.825***	(0.0463)
Survey year (ref. = 2005)								
2006							0.916*	(0.0354)
2008							1.102*	(0.0446)
2009							1.073*	(0.0340)
Constant	-2.695***	(0.055)	5.259***	(0.256)	-1.214***	(0.300)	-0.695***	(0.309)
N	80635		80635		80635		80635	
Pseudo R^2	0.0029		0.0923		0.1448		0.1683	
Log-likelihood	- 29195		-26571		-25035		-24346	

Notes: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; [1]Exponentiated coefficients; [2]Roomstress = amount of rooms / amount of people in household;

Appendix C Realised moves

As mentioned in the theoretical framework, moving intentions are, compared to realised moves, not constrained due to various factors like income. In this appendix, this research will perform an analysis to compare moving intentions and realised moves with regard to the percentage of low-income people in a neighbourhood for different income groups. The following hypothesis will be answered:

"The percentage of low-income people in a neighbourhood has a significant positive relationship on realised mobility."

This hypothesis suggests that there is a significant positive relationship between the percentage of low-income people in a neighbourhood and the mobility of the residents. Researchers estimate this relationship to be present (Fjellborg, 2021; Bolt & Van Kempen, 2003). They indicate that higher poverty rates and a large share of low-income people in a neighbourhood often lead to higher mobility rates. This analysis uses data from the Netherlands Housing survey enriched with data from the Central Bureau of Statistics. The previous postal code is known from the respondents who moved.

The dependent variable of interest is those who moved two years prior to the survey moment. In this analysis, this research transforms this variable into a binary variable, classifying a respondent who has moved in the two years before the survey moment as a mover. Even though data is available for the four years before the interview, only the two years before the survey moment are considered valid. This is because no data is available on certain key independent variables at the time of a potential move. In order to use the current values of these variables, two years is the maximum period based on earlier research from Helderman and Mulder (2007). Because of this, moves in 2006 and 2007 (from survey year 2009) dropped. Unfortunately, the Netherlands Housing Survey of 2006 does not have the necessary variables to determine if a move happened in the two years before the survey was taken and could thereby not be included in the analysis. This means that only 47,355 cases will be used to analyse mobility.

If a respondent realised a move, the independent and control variables will be changed to the situation before moving. These control variables are the same as those of the intention to move. This will be done for the following variables: percentage of households with a low income in a neighbourhood, household composition, tenure, housing type, and urban density. Unfortunately, the situation before moving is not present in the dataset for certain variables, and thereby, only some of the control variables can be included. As previously indicated, the household's gross income and educational level before moving are also not present in the dataset. However, the two years before the move is realised are estimated to be too short to change this variable significantly, as is emphasised by Helderman and Mulder (2007). The descriptive statistics of the variables is presented in table C1.

Table C1. Descriptive statistics realized mobility

Moved yes/no (dependent variable)	Observations	Mean	Min	Max
No	44,701	0.945	0	1
Yes	2,654	0.554	0	1
Percentage people with low-income neighbourhood (%, independent variable)	47355	3.6717	2.639	4.553877
Age respondent	47355	52.85367	18	99
Age respondent squared	47355	3048.088	324	9801
Educational level:				
Primary	3,597	8.04%	0	1
Secondary	29,267	61.73%	0	1
College and university	14,491	30.23%	0	1
Household composition:				
Single	15,642	32.60%	0	1
Parents without children	15,156	32.19%	0	1
Parents with children	13,502	28.83%	0	1
One-parent household	3,055	6.38%	0	1
Gross income household	47355	50810.19	0	1281115
Tenure:				
Owner-occupier	27,045	57.15%	0	1
Renter	20,310	42.85%	0	1
Housing type:				
Detached house	4,934	10.49%	0	1
Semi-detached house	4,950	10.52%	0	1
Corner house	6,210	12.77%	0	1
Terraced house	14,148	30.28%	0	1
Apartment	16,907	35.93%	0	1
Year				
2008	14,272	29.82%	0	1
2009	33,594	70.18%	0	1
Urban Density:				
Very strongly urban	16,020	33.47%	0	1
Strongly urban	12,556	26.46%	0	1
Medium urban	6,441	13.88%	0	1
Lightly urban	6,026	12.80%	0	1
Not urban	6,312	13.40%	0	1
Total amount of cases	**47355**			

The model to answer the hypothesis is presented below. The model is that of a multiple logistic regression which is the right method due to the dependent variable being binary. It shows similarity with the intention to move model as was discussed in chapter 3.

$$ln\left(\frac{P(y=realised\ move)}{P(y=no\ realised\ move)}\right)_{ij} = \beta_0 + \beta_1 Low\text{-}IncomeNeighbourhood_j + \beta_2 Age_i + \beta_3 Age^2_i + \beta_4 HouseholdComposition_i + \beta_5 lnIncome_i + \beta_6 Education_i + \beta_7 HousingType_i + \beta_8 Tenure_i + \beta_9 Year_i + \beta_{10} Urbanisation_j + \varepsilon_{ij}$$

$\left(\frac{P(y=realised\ move)}{P(y=no\ realised\ move)}\right)$ presents the odds of the realised move being yes; P is the probability of the event occurring; The natural logarithm (ln) will be used to transform the odds to a scale which is linear and therefore applicable in a logistic regression; β_0 is the intercept term. β_n is the coefficient of every independent variable; $Low\text{-}IncomeNeighbourhood_i$ is the percentage of low-income people in a neighbourhood; Age_i is the age of the respondent, and Age^2_i is the age of the respondent squared; $HouseholdComposition_i$ is the respondents household situation divided into four categories; $lnIncome_i$ is the natural logarithm of the gross income of the household of the respondent; $Education_i$ is the highest level of education achieved by the respondent; $HousingType_i$ is the type of housing the respondent lives in and is categorical; $Tenure_i$ is the tenure situation either being owner-occupier or renter; $Year_i$ is the survey moment; $Urbanisation_i$ is a categorical variable about the level of urbanisation of the neighbourhood where the respondent resides; ε_{ij} is the error term.

Table C2 shows the multiple logistic regression between realised moves and the percentage of low-income people in a neighbourhood. As is observable in model 1, no significant relationship is observable between the percentage of low-income people in a neighbourhood and the odds of realising a move. The complete multiple logistic regression with all control variables is visible in model 2 and model 3. It can be seen that other control variables do have a significant effect on realised moves.

Table C2. Multiple logistic regression mobility

Moved yes/no	Model 1 Exp(β)[1]	S.E.	Model 2 Exp(β)[1]	S.E.	Model 3 Exp(β)[1]	S.E.
Percentage people with low income neighbourhood[2]	0.997	(-0.99)	0.994	(-1.37)	0.990*	(-2.26)
Household composition (ref.= single) [2]						
Couple/partners without children[2]			0.813*	(-2.27)	0.853	(-1.73)
Couple/partners children[2]			0.511***	(-7.20)	0.553***	(-6.24)
One-parent household with children[2]			0.935	(-0.54)	0.891	(-0.91)
Age respondent			0.825***	(-14.07)	0.824***	(-14.11)
Age respondent squared			1.001***	(8.73)	1.001***	(8.68)
Log gross income household			0.641***	(-8.12)	0.676***	(-6.91)
Educational level (ref. = primary)						
Secondary			0.923	(-0.50)	1.016	(0.10)
College and university			1.394*	(1.98)	1.507*	(2.41)
Housing type (ref. = detached house)[2]						
Semi-detached house[2]			0.725*	(-2.55)	0.693**	(-2.87)
Corner house[2]			0.772*	(-2.21)	0.625***	(-3.79)
Terraced house[2]			0.870	(-1.39)	0.681***	(-3.50)
Apartment[2]			0.048***	(-19.14)	0.029***	(-20.37)
Tenure (ref. = owner-occupier) [2]						
Renter[2]					1.478***	(5.07)
Year (ref. = 2008)						
2009					0.708***	(-5.21)
Urban density (ref. = very strongly urban)[2]						
Strongly urban[2]					0.706***	(-4.03)
Medium urban[2]					0.566***	(-5.38)
Lightly urban[2]					0.631***	(-4.35)
Not urban[2]					0.560***	(-5.19)
N	47355		47355		47355	

Notes: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; [1]Exponentiated coefficients; [2]Transformed to indicate situation before a move for movers; [3] Omitted because of collinearity

No relationship between the percentage of low-income people in a neighbourhood and the realised moves is observable. This is not in line with literature findings from Bolt & Van Kempen (2003) and Fjellborg (2021), who indicated that a positive relationship between these variables is present. It should, however, be noted that different characteristics might be an explanation for this to occur. The literature points out that some respondents are more mobile since they have a higher income and are, therefore, less constrained in moving (Fjellborg, 2021). Two logistic regressions are performed on the lowest- and highest-income groups to analyse this potential explanation. These are visible in table C3 and C4, respectively. These results also showcase no significant relationship between the variables of interested. Because of this insignificant result no comparison could be made between the intention to move and realised moves with regards to low-income neighbourhoods.

Table C3. Logistic regression mobility lowest-income group

```
Logistic regression                              Number of obs = 23,669
                                                 LR chi2(1)    =   0.65
                                                 Prob > chi2   = 0.4195
Log likelihood = -4476.6024                      Pseudo R2     = 0.0001
```

Moved_yes_no	Coefficient	Std. err.	z	P>|z|	[95% conf. interval]	
m_pers~h	.1243346	.1541098	0.81	0.420	-.177715	.4263843
_cons	-3.466044	.5630714	-6.16	0.000	-4.569644	-2.362444

Table C4. Logistic regression mobility highest-income group

```
Logistic regression                              Number of obs = 23,686
                                                 LR chi2(1)    =   1.11
                                                 Prob > chi2   = 0.2910
Log likelihood = -4248.4561                      Pseudo R2     = 0.0001
```

Moved_yes_no	Coefficient	Std. err.	z	P>|z|	[95% conf. interval]	
m_pers~h	-.1799678	.1700676	-1.06	0.290	-.5132942	.1533586
_cons	-2.421527	.6290073	-3.85	0.000	-3.654358	-1.188695

Appendix D Box-Tidwell tests

Table D1. Box-Tidwell test

```
Logistic regression                          Number of obs =  84,396
                                             LR chi2(2)     = 1263.08
                                             Prob > chi2    =  0.0000
Log likelihood = -31665.779                  Pseudo R2      =  0.0196
```

Def_intention_to_move	Coefficient	Std. err.	z	P>|z|	[95% conf. interval]	
ILog___1	-5.405178	13.07743	-0.41	0.679	-31.03647	20.22612
ILog__p1	-.0355529	2.673421	-0.01	0.989	-5.275362	5.204256
_cons	-1.972651	.0115954	-170.12	0.000	-1.995377	-1.949924

Log_gross_~d	-.5323547	.0151042	-35.25 Nonlin. dev. 1.996	(P = 0.158)		
p1	.4032663	.4446214				

Appendix E Multicollinearity results

Table E1. Multicollinearity results

Variable	VIF	1/VIF
Log people with low-income neighbourhood	1.07	0.933537
Log gross income household	2.07	0.482491
Educational level (ref. = primary)		
Secondary	3.01	0.332255
College and university	3.42	0.291994
Age respondent	43.63	0.022921
Age respondent^2	44.88	0.022280
Household composition (ref.= single)		
Parents without children	3.06	0.327270
Parents with children	4.27	0.189687
One-parent household	1.59	0.629951
Tenure (ref. = owner-occupier)		
Renter	1.67	0.600107
Housing type (ref. = detached house)		
Semi-detached house	1.77	0.564633
Corner house	2.08	0.479855
Terraced house	3.13	0.319082
Apartment	4.72	0.212045
Roomstress	2.78	0.360285
Year (ref. 2005)		
2006	1.23	0.815906
2008	1.28	0.781033
2009	1.39	0.719340
Perceived neighbourhood (ref. = improving)		
Neighbourhood declining	1.44	0.692463
Neighbourhood stays the same	1.48	0.675951
Urban density (ref. = very strongly urban)		
Strongly urban	1.56	0.642643
Medium urban	1.48	0.677199
Lightly urban	1.53	0.652372
Not urban	1.83	0.547826
Mean VIF	4.58	