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ABSTRACT

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The selective inflow and outflow of residents by ethnicity is the main mechanism behind ethnic residential segregation. Many studies have found that ethnic minorities are more likely than others to move to ethnic minority concentration neighbourhoods. An important question which remains largely unanswered is to what extent this can be explained by own group preferences, or by other neighbourhood or housing market factors. By using longitudinal register data from the Netherlands, this study contributes to the literature on neighbourhood selection by ethnic minorities in two ways. First, it distinguishes between different ethnic minority groups where most studies look at the group as a whole. Second, it takes into account multiple dimensions of neighbourhoods where most other studies look at neighbourhoods one-dimensionally, which allows us to test the own group preferences hypothesis. Using a conditional logit model we find that housing market constraints can partly explain the selection of ethnic minorities into minority concentration neighbourhoods. Also own-group preferences are found to be important in explaining neighbourhood selection. There are, however, differences between ethnic minority groups. Own-group preferences and housing market constraints together explain why Surinamese and Antilleans select into minority concentration neighbourhoods. When these factors are taken into account, Turks and Moroccans are still found to select into concentration neighbourhoods of ethnic minorities other than their own ethnic group.

JEL Classification: J15, R23

Keywords: segregation, neighbourhood selection, ethnicity, own-group preference, conditional logit, the Netherlands

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Introduction

Ethnic residential segregation is caused by the selective mobility of members of ethnic groups into and out of specific neighbourhoods and in-situ demographic processes regarding fertility and mortality. Selective mobility is the most important factor explaining segregation (Bolt et al, 2002). There is a large body of research on selective outflow from neighbourhoods and especially 'white flight'. People are found to more often (want to) leave their neighbourhood when the share of ethnic minorities is high or increasing and this is especially the case for members of the white ethnic majority group (Feijten and Van Ham, 2009; Pais et al, 2009; Van Ham and Clark, 2009). Most of these studies also control for a range of other socio-economic neighbourhood characteristics (Crowder, 2000; Feijten and Van Ham, 2009; Van Ham and Clark, 2009). An important question remains whether individuals leave their neighbourhood *because* of the ethnic composition, or because of other correlated neighbourhood characteristics. Some studies find evidence for the *racial proxy hypothesis* (Ellen, 2000; Harris, 1999); they find no influence of the ethnic or racial composition of neighbourhoods on outflow once other neighbourhood characteristics, such as socio-economic status and tenure composition, are taken into account (Lee et al, 1994; South and Crowder, 1997).

In this study we focus on selective inflow; which households select into which neighbourhoods. Most studies test how a range of individual or household characteristics affect the probability to move to a certain type of neighbourhood. These existing studies have an important limitation; they generally characterise neighbourhoods based on a limited number of characteristics (Hedman et al, 2011). Studies typically model whether households move into a poverty neighbourhood or not (Bolt and Van Kempen, 2003; Clark et al, 2006; Logan and Alba, 1993), or into an ethnic concentration neighbourhood or not (Brama, 2006; Clark and Ledwith, 2007; Doff, 2010; South and Crowder, 1998). However, in reality the selection of a neighbourhood will depend on multiple neighbourhood characteristics that are assessed simultaneously and in combination (Hedman et al, 2011).

Ethnic minority households are found to be more likely than others to move to ethnic minority concentration neighbourhoods (Clark and Ledwith, 2007; Doff, 2010; South and Crowder, 1998). Also here it is important to test the racial proxy hypothesis: do ethnic minorities select into ethnic concentration neighbourhoods because they prefer to live among ethnic minorities, or because of other correlated neighbourhood characteristics. Ethnic minority households differ from the native majority population in their housing market opportunities and constraints and therefore different neighbourhoods are available and attractive to them (Manley and van Ham, 2011). Also own-group preferences might explain why ethnic minorities select into ethnic concentration neighbourhoods. Living close to family, or to others with the same cultural background can have advantages. Most studies, however, look at ethnic minorities as one homogeneous group while in reality the group of ethnic minorities in most countries is very heterogeneous. While ethnic minorities might have a preference to live among their own ethnic group, it is less likely that they prefer to live among other non-western minorities.

This study will focus on the neighbourhood selection of households of various ethnic minority groups and will contribute to the existing literature in two ways. First, it

investigates neighbourhood selection separately for different ethnic minority groups. Second, this study takes into account multiple dimensions of neighbourhoods where most other studies look at neighbourhoods one-dimensionally. We will investigate to what extent a move to an ethnic minority concentration neighbourhood can be explained by the share of the own ethnic group in the neighbourhood, or whether minorities also move to neighbourhoods with high shares of ethnic minorities other than their own ethnic group. This way we can get more insight in whether ethnic minority households choose minority concentration neighbourhoods, or whether their selection into these neighbourhoods is explained by a lack of choice due to housing market constraints. Our approach allows us to investigate to what extent the causes of residential ethnic segregation differ between groups (see also Bolt and Van Kempen, 2003). We use data from the longitudinal register based Netherlands Social Statistics Database (SSD), which contains the whole Netherlands population. We are one of the first to use a conditional logit model to investigate segregation. This model allows us to investigate the choice of a specific neighbourhood (not a neighbourhood type), while taking multiple neighbourhood characteristics into account.

Literature review

Minority ethnic groups are found to be more likely than others to move to ethnic minority concentration neighbourhoods (Brama, 2006; Clark and Ledwith, 2007; Doff, 2010; South and Crowder, 1998) and less likely to leave these neighbourhoods (Bolt and Van Kempen, 2010; Feijten and Van Ham, 2009; Pais et al, 2009; Van Ham and Clark, 2009). These patterns of selective mobility lead to segregation. The literature offers several possible perspectives on the causes of ethnic residential segregation, which we will discuss in some detail below.

According to the *preferences perspective*, ethnic residential segregation is caused by ethnic differences in preferences regarding who to share a neighbourhood with. It is argued that ethnic minority groups have preferences to live close to their own ethnic group and therefore select minority concentration neighbourhoods (Bolt et al, 2008). Much research has been done on the advantages of living in an *ethnic enclave*; a neighbourhood with a concentration of the own ethnic group. Especially for new immigrants living in an ethnic enclave can have positive effects (Beckers, 2011; Musterd et al, 2008; Philips, 2007). It can provide opportunities for housing, employment (Logan et al, 2002; Zorlu and Mulder, 2008) or care (Van Gent and Musterd, 2012). In ethnic enclaves, immigrants can find familiar culture (Logan et al, 2002), social support and a sense of security or belonging (Philips, 2007). Also family ties (Zorlu, 2009; Hedman, 2013) and ethnic facilities and shops (Logan et al, 2002) can be a reason for ethnic minorities to select into concentration neighbourhoods of the own ethnic group.

According to the *human capital perspective*, ethnic residential segregation can be explained by ethnic differences in socio-economic status and other personal characteristics (Logan and Alba, 1993; Crowder, 2001). Ethnic minority households have, on average, lower incomes than natives and therefore fewer opportunities on the housing market (Bolt, 2001). Households who are dependent on the social housing sector can only select into neighbourhoods where social rented dwellings are available.

Neighbourhoods with high shares of social rented dwellings will therefore often also be ethnic minority concentration neighbourhoods and ethnic minorities will more often move into these neighbourhoods. However, they select into these neighbourhood not because of the ethnic composition, but because of housing market constraints.

According to the *stratification perspective*, discrimination on the housing market limits the options for ethnic minorities to move into more desirable neighbourhoods, especially for groups who are stigmatized (Alba and Logan, 1992). Therefore the most desirable neighbourhoods will be native majority concentration neighbourhoods and ethnic minorities will be less likely to move into such neighbourhoods (Philips, 2007). Housing market institutions can have discriminatory effects, and reduce the opportunities of ethnic minorities (Alba and Logan, 1991; South and Crowder, 1998). For example, lending institutions might have less trust in those belonging to ethnic minority groups, who as a result might have problems getting a mortgage (Aalbers, 2006) or private landlords might prefer households from the majority ethnic group (Philips, 2007).

A final explanation why ethnic minority households might select into minority concentration neighbourhoods is because they fear discrimination in majority concentration neighbourhoods. Various researchers show that fear for discrimination or harassment prevented ethnic or racial minorities from moving to better (and 'whiter') neighbourhoods (Bowes et al, 1997; Hanhörster, 2013; Philips et al, 2007). Also research in the Netherlands shows that minorities do not want to live in neighbourhoods with only native Dutch inhabitants, because they are afraid they won't be accepted there or will not be able to get in touch with their neighbours (Kullberg et al, 2009). Also experiences of others with discrimination or avoidance in majority concentration neighbourhoods can prevent minorities from moving into such neighbourhoods (Hanhörster, 2013; Kullberg et al, 2009).

Stratification or fear of discrimination can especially affect neighbourhood choices of higher income minorities. While this group can afford to move to better (and 'whiter') neighbourhoods they will more often select into minority concentration neighbourhoods than could be expected based on their human capital (Logan and Alba, 1993). The preferences perspective expects minorities to want to live close to their own group, higher income households will be more successful on the housing market and therefore, if the preferences perspective applies, most often end up in neighbourhoods with own group concentrations. According to the human capital theory, minorities select into minority concentration neighbourhoods because of their on average lower income. This theory thus expects especially low income minorities to select into minority concentration neighbourhoods.

Ethnic minority groups in the Netherlands

The theories discussed above offer competing explanations for selective mobility and ethnic residential segregation. Which theory is the best explanation for neighbourhood selection will differ between ethnic groups (Bolt and Van Kempen, 2003; Logan and Alba, 1993). Research in the United States shows that the stratification perspective applies for the most stigmatised group of Blacks, while for less discriminated groups such as Asians and Hispanics the human capital perspective offers a better explanation for selective mobility (Alba and Nee, 1997; Logan and Alba, 1993; South et al, 2005).

Also in the Netherlands differences between ethnic minority groups can be expected to lead to different outcomes with regard to neighbourhood selection. The four largest ethnic minority groups in the Netherlands are Turks (2.4%), Moroccans (2.2%), Surinamese (2.1%) and Antilleans (0.9%). Turkish and Moroccan immigrants originally arrived in the Netherlands as guest-workers, recruited by the government in the 1960s to solve shortages on the labour market. At the time it was thought that these guest workers would return to their home countries, however, many of the guest-workers stayed, and in the 1970s and 1980s the immigrant population increased further because of immigration related to family reunification and family formation. Surinamese and Antilleans in the Netherlands are immigrants from (former) Dutch colonies. After de declaration of independence of Surinam in 1975, large scale immigration of Surinamese to the Netherlands started. Up to 1990, Antilleans came mainly to the Netherlands to follow higher education, however, in more recent years also more underprivileged Antilleans came to the Netherlands to find a job.

Turks and Moroccans have a lower socio-economic position than Surinamese and Antilleans, they are lower educated and more often unemployed (Dagevos, 2007). Also the socio-cultural distance to the native Dutch population is larger for Turks and Moroccans than for Surinamese and Antilleans. Surinamese and Antilleans more often have contact with native Dutch and adhere to more similar cultural values compared to Turks and Moroccans (Dagevos et al, 2007). Research on perceived ethnic hierarchies, or preferences, in the Netherlands shows that all ethnic groups are most positive about their own ethnic group, followed by native Dutch. For native Dutch and Antilleans, Surinamese are the highest valued minority outgroup, while Turks and Moroccans prefer each other over Surinamese and Antilleans (Hagendoorn, 1995; Gijsberts and Vervoort, 2007).

These differences between minority groups can lead to differences in sorting behaviour into neighbourhoods. Turks and Moroccans are found to select into neighbourhoods with the highest shares of ethnic minorities. As far as this is due to their low socio-economic position, this can most likely be explained by housing market constraints. Another explanation could be that, because of their large cultural distance from the native majority and their low position in the ethnic hierarchy, Turks and Moroccans are more likely to experience discrimination and therefore select into minority concentration neighbourhoods. Also the large cultural distance of Turks and Moroccans to the native population makes it more likely that these groups prefer to live among their own ethnic group and select into minority concentration neighbourhoods for that reason.

Modelling neighbourhood selection

Most research modelling neighbourhood selection takes into account only one aspect of the neighbourhood, for example, whether households move into a poverty neighbourhood or not, or into an ethnic concentration neighbourhood or not, and estimates the effect of individual and household characteristics on neighbourhood selection (Hedman et al, 2011). Manley and Van Ham (2011) combine two neighbourhood dimensions, poverty and ethnic concentration, and thus create four different neighbourhood types. They find ethnic minorities to be more likely to move to minority concentration neighbourhoods, to deprived neighbourhoods and especially to neighbourhoods which are both deprived and have a large concentration of ethnic minorities. Using traditional binary or multinomial

logit models it is not feasible to allow for much more than four outcome categories (neighbourhood types). Following Hedman and colleagues (2011), we argued in the introduction that it is important to model the combined effect of multiple neighbourhood characteristics on neighbourhood selection. In this particular study we are interested in the effect of the share of the own ethnic group and other ethnic minority groups when also controlling for other neighbourhood characteristics. The literature offers two alternative modelling strategies.

The first is to use aggregated models in which the number of households from a certain population group moving into a neighbourhood is estimated (Beckers and Boschman, 2013; Zorlu and Mulder, 2008). Zorlu and Mulder (2008) found that recent immigrants select into neighbourhoods with high shares of ethnic minorities, and especially high shares of their own ethnic group, also when other neighbourhood characteristics such as the housing market composition are taken into account. The disadvantage of such models is that they do not model neighbourhood selection on the individual level.

A second modelling strategy is to use discrete choice models in which a (moving) household selects one neighbourhood from a choice set of a limited number of alternatives. Discrete choice models have been used to estimate location choices, but mostly on a higher level. Various authors estimated the selection of immigrants into municipalities (Aslund, 2005), metropolitan areas (Liaw and Ishikawa, 2008), provinces (Xu and Liaw, 2006) or states (Bartel, 1989; Liaw and Frey, 2007). We know of only two studies which used this strategy to model neighbourhood selection. Ioannides and Zabel (2007) and Hedman and colleagues (2011) estimate neighbourhood selection and include interactions between neighbourhood characteristics and households characteristics. Thereby they estimate which households are more likely to move to which neighbourhoods. They both find that ethnic minorities are more likely than others to move to neighbourhoods with higher shares of ethnic minorities, higher income households are more likely to move to high income neighbourhoods and higher educated household heads are more likely to move to neighbourhoods with more higher educated residents. That is; they find evidence for neighbourhood reproduction through selective mobility.

These existing studies do not investigate whether ethnic minorities more often than others select into neighbourhoods with many low income or low educated inhabitants, nor whether they move to neighbourhoods with high shares of minorities, or only those with high shares of their own ethnic group. The current study aims to fill this gap by using a discrete choice model to investigate in detail the neighbourhood selection of non-western ethnic minorities. The main question to be answered is to what extent a move to an ethnic minority concentration neighbourhood can be explained by the share of the own ethnic group in the neighbourhood, or whether minorities also move to neighbourhoods with high shares of ethnic minorities other than their own ethnic group, and if so, whether this can be explained from housing market constraints.

Data and methods

We used unique longitudinal register data from the Social Statistical Database (SSD) from Statistics Netherlands. The SSD data covers the entire population of the

Netherlands, from 1999 – 2010, and consist of a number of linked registers including demographic, socio-cultural, and socio-economic characteristics of the population. The whole residential histories of the SSD population are geo-coded and this allows researchers to enrich the data with neighbourhood characteristics and to reconstruct neighbourhood histories of individuals.

For this study we selected ethnic minority households who moved within the Utrecht urban region. Utrecht is the fourth largest city in the Netherlands (322 thousand inhabitants). The urban region consists of the city of Utrecht and the surrounding suburban municipalities (with a total of 647 thousand inhabitants). Most residential mobility occurs within the urban region. The Utrecht urban region is an area of high housing demand. As a result, dwelling prices, especially in the city of Utrecht, are high and the waiting lists for social housing are very long. The social housing sector uses a choice based letting system which allows applicants to bid on dwellings all over the urban region. Within the Utrecht urban region, there is a great variety in neighbourhood types with regard to concentrations of various ethnic minority groups, dwelling prices and tenure composition. The share of ethnic minorities in Utrecht is somewhat lower than in the three larger cities in the Netherlands, but higher than in most other cities. Within the Utrecht urban region we identified 252 neighbourhoods (buurten in Dutch). We had to exclude 37 neighbourhoods because of missing data[1], which left us with information on 215 neighbourhoods which on average have 2,700 inhabitants.

We selected all household heads[2] who lived in the Utrecht urban region on the first of January 2010 and who had moved within the Utrecht urban region after the first of January 2006[3]. This resulted in the selection of 80,043 household heads, of which 13,137 (16%) were classified as non-western ethnic minorities. Because of missing data for 37 neighbourhoods we also had to exclude households who had moved to these neighbourhoods (345 of the 13,137 moving non-western minority households). Based on these selection our research population consisted of 12,792 non-western ethnic minority households (2,254 Turkish, 4,231 Moroccan, 1,867 Surinamese, 791 Antillean and 3,649 other non-western ethnic minority households)[4].

To model neighbourhood selection we used a conditional logit model (CLM)[5] (McFadden, 1974; see also Hoffman and Duncan, 1988). The CLM is closely related to the generalized multinomial model but where the multinomial model treats neighbourhood selection as a function of household characteristics, the CLM treats neighbourhood selection as a function of the characteristics of the alternatives (potential destinations). The comparison in a CLM is made *within* rather than *between* households, (as would be the case in a multinomial logit model), estimating the probability that household *i* will choose alternative *j* among a set of alternative neighbourhoods. Thus, let

[1] These neighbourhoods had to few dwellings (in 2006) to compute the average dwelling value.

[2] To determine the ethnicity of the household we used the ethnicity of the head of the household. We did not consider the ethnic background of the other household members nor whether and when they moved. In the remainder of the article we use the term households although we only looked at household heads.

[3] The most recent available data is from 2010. We focus on households who recently moved because they 'selected' a neighbourhood to live in. We use data of movers since 2006 to have a reasonably large number of moving households per ethnic group.

[4] For comparison reasons (in figure 1, 2 and 3) we also looked at the 57,353 native Dutch and 7,605 western minority households who moved within the Utrecht urban region between 2006 and 2010.

[5] The description of the Conditional Logit Model is adapted from Hedman et al., 2011.

P_{ij} denote the probability that household *i* will choose alternative *j*, based on the characteristics of the of the j^{th} alternative (N_j), and given the set of alternatives (the choice set, $C_{(i)}$) for the i^{th} household. The choice of the j^{th} alternative is related to the other alternatives in the choice set and their characteristics (N_k). Following Hoffman and Duncan (1988), the conditional logit model is written:

$$P_{ij}(N_j, C_{(i)}) = \exp(\beta N_j) / \sum_{k=1}^{K} \exp(\beta N_k) \quad (1)$$

The CLM estimates the probability that a household selects a particular neighbourhood (as represented by N_j) from a choice set of neighbourhoods (as represented by $C_{(i)}$), based on neighbourhood characteristics. Because the choice for a neighbourhood is modelled *within* a household, the household characteristics do not vary between options. Thus, in order to include household characteristics in the model, they must be interacted with neighbourhood characteristics, thereby it can be estimated whether certain neighbourhood characteristics are more important to certain households. We can include this in equation 1 by letting X_i denote the characteristics of the i^{th} household.

$$P_{ij}(N_j, X_i, C_{(i)}) = \exp(\beta N_j X_i) / \sum_{k=1}^{K} \exp(\beta N_k X_i) \quad (2)$$

We measured neighbourhood characteristics for 2006 (denoted by t-1 in equation 3), so before the actual move took place. This is important to avoid that the characteristics of the moving household influence the neighbourhood characteristics. Income was measured for 2010 because we used household incomes and the characteristics of the moving household were only known after the move (for example in the case of two singles moving to form a couple with two incomes, the joint income determines the choice of dwelling and neighbourhood). The probability that the i^{th} household will choose the j^{th} alternative, or in other words, will live in neighbourhood *j* at time *t*, is thus written:

$$P_{ijt}(N_{j_{(t-1)}}, X_{i_{(t)}}, C_{(i)}) = \exp(\beta N_{j_{(t-1)}} X_{i_{(t)}}) / \sum_{k=1}^{K} \exp(\beta N_{k_{(t-1)}} X_{i_{(t)}}) \quad (3)$$

Based on the above modelling strategy, for all 12,792 non-western ethnic minority households who moved within the Utrecht urban region between 2006 and 2010, we constructed choice sets consisting of 215 neighbourhoods. For all these households we know their destination neighbourhood (their neighbourhood on the first of January 2010), and we assumed that they choose their destination neighbourhood from a choice set of all neighbourhoods within the Utrecht urban region. Some households might have considered moving out of the urban region, but did not find a suitable dwelling there and therefore moved within the Utrecht urban region. Others might only have considered only a small part of the Utrecht urban area and have chosen a neighbourhood within that area. However, as most households have considered different neighbourhoods within the Utrecht urban region and selected their destination neighbourhood based on a comparison of these neighbourhoods, we can assume that all neighbourhoods within the urban region are part of the choice set from which moving households selected their destination neighbourhood[6].

[6] For households who moved from elsewhere to the Utrecht urban region, we cannot assume that they only considered all neighbourhoods within the Utrecht urban region, therefore we excluded these households from the analyses.

Table 1 provides the summary statistics of the neighbourhood characteristics in 2006. Besides neighbourhood characteristics, we also included a dummy variable for low household income in our models to estimate if there are differences in neighbourhood sorting between high and low income households[7].

Table 1: Descriptive statistics of neighbourhoods in 2006

	Mean	Std. deviation	Minimum	Maximum
Number of vacancies[8]	968.4	1022.9	7	4872
Percentage of social rented dwellings	28.9	24.3	0	100
Percentage of private rental dwellings	14.3	11.8	0	92
Percentage new dwellings (built after 2000)	13.8	25.3	0	100
Average dwelling value (x1000)	251.9	123.7	123	1032
Percentage couples	27.5	6.7	10	51
Percentage households with children	32.6	13.9	4	64
Percentage non-western minorities	11.7	12.1	0	79
Percentage Turks	1.8	3.1	0	21
Percentage Moroccans	4.2	6.8	0	47
Percentage Surinamese	2.1	1.6	0	10
Percentage Antilleans	0.7	0.5	0	2
Percentage other non-western	3.0	2.1	0	12
Percentage Moroccans + Turks	6.0	9.5	0	68
N	215			

Source: Own calculations based on SSD (made available by Statistics Netherlands) and Statistics Netherlands neighbourhood data

Results

Residential segregation and neighbourhood selection

The share of non-western ethnic minorities in the Utrecht urban region is 16%. Moroccans form the largest ethnic minority group, followed by Turks, Surinamese and Antilleans. These ethnic minorities live concentrated in certain neighbourhoods. We calculated the segregation index to measure how uneven ethnic minorities are spread over neighbourhoods within the Utrecht urban region. The segregation index can be interpreted as the share of members of a minority group that has to move to another neighbourhood in order to achieve an even distribution of that minority group over all neighbourhoods[9].

[7] Low income households are defined as the 30% lowest income households in 2010 based on the income distribution on national level.

[8] Vacancies are the number of dwellings that have become available in a neighbourhood. This is calculated as the total number of household heads who moved to a neighbourhood between 1-1-2006 and 1-1-2010.

[9] The segregation index varies between 0% if a minority group is evenly spread over all neighbourhoods in the urban region and 100% if all members of a minority groups live concentrated in neighbourhoods where no members of other groups live.

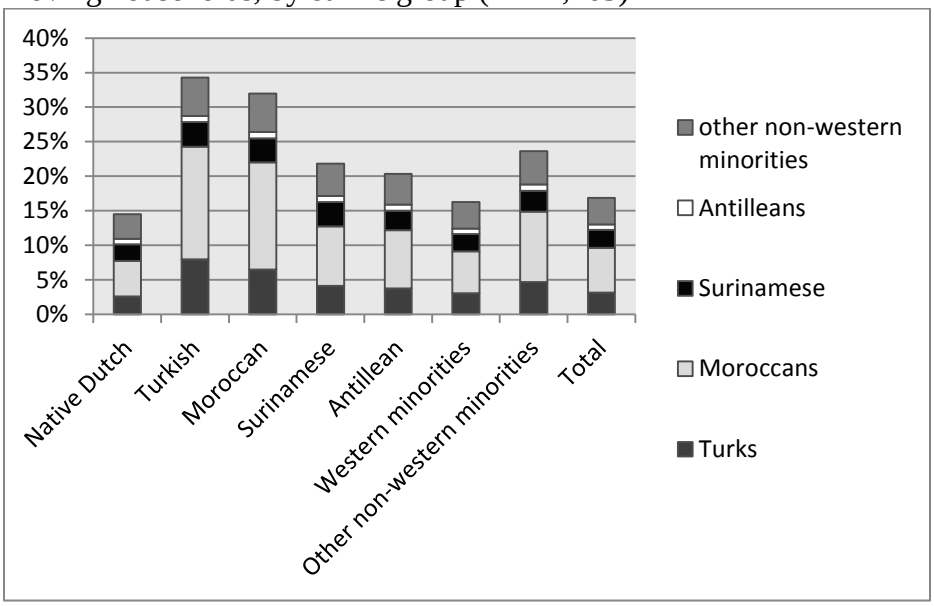
Table 3 The share of ethnic minorities and their segregation index in the Utrecht urban region (2010)

Ethnic group	Share	Segregation index
Total non-western minorities	16%	39%
Turkish	2.5%	54%
Moroccan	5.8%	51%
Surinamese	2.3%	29%
Native Dutch	75%	27%
Other non-western minorities	4.1%	22%
Antillean	0.8%	20%
Western minorities	9.5%	11%

Source: Own calculations based on SSD made available by Statistics Netherlands

Table 3 shows that in the Utrecht urban region there are large differences in the segregation index of ethnic groups. The segregation index of Turks is the highest (54%), followed by Moroccans (51%). The segregation index of Surinamese (29%) and especially Antilleans (20%) and the mixed group of other non-western minorities (22%) is much lower. Also the native Dutch population lives segregated in certain neighbourhoods (index of 27%). Western minorities have the lowest segregation index (11%), of all groups they are most evenly distributed over all neighbourhoods.

Figure 1 The share of non-western minorities in the destination neighbourhood of moving households, by ethnic group (N=77,763)



Source: Own calculations based on SSD made available by Statistics Netherlands

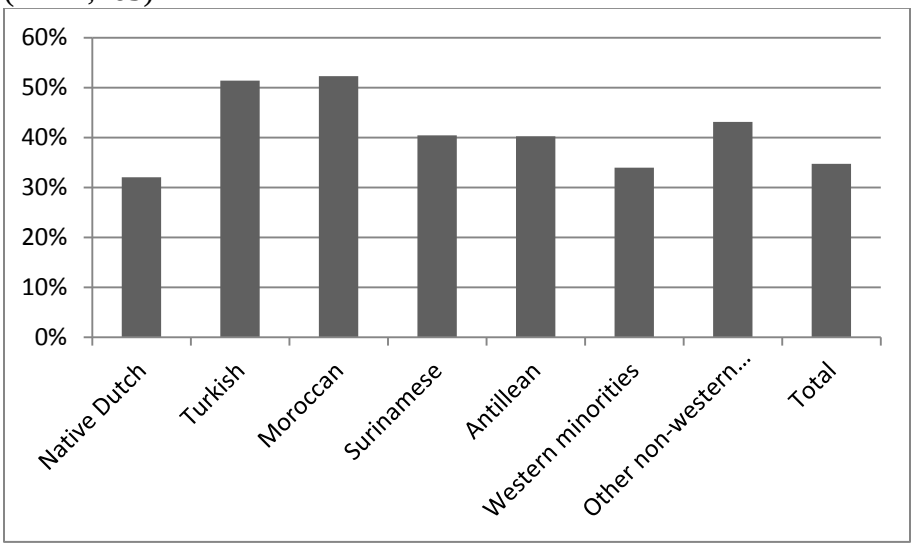
In this article we focus on households who moved within the Utrecht urban region between 2006 and 2010. Figure 1 shows for all moving households and by ethnic group, the share of non-western ethnic minorities in their destination neighbourhood. Native Dutch households who moved within the Utrecht urban region selected neighbourhoods with the lowest shares of non-western ethnic minorities (15%). Also western minority

households selected neighbourhoods with few non-western ethnic minorities (17%). Non-western ethnic minority households, and especially Turkish and Moroccan households, moved to neighbourhoods with higher shares of non-western minorities. Interestingly, Figure 1 shows that ethnic minority households do not necessarily select neighbourhoods with high shares of their own ethnic group. Turkish households moved to neighbourhoods with a relatively high share of Moroccans and Surinamese, even higher shares than in the destination neighbourhoods of Moroccan or Surinamese households themselves. Not only the share of the own ethnic group, but also the share of other non-western minorities is high in the destination neighbourhoods of non-western minorities. Therefore ethnic residential segregation is reproduced through residential mobility.

The effects of housing market characteristics

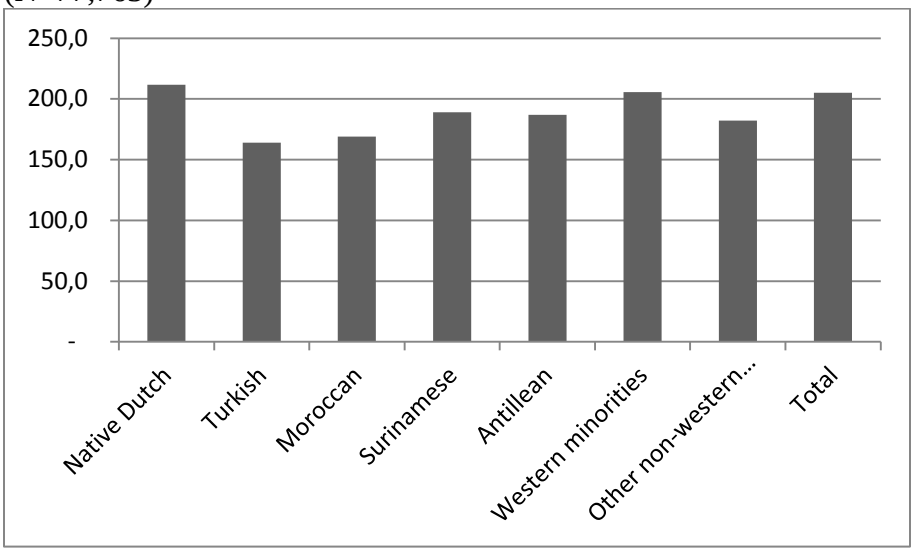
The fact that non-western minorities, and especially Turks and Moroccans, move to neighbourhoods with high shares of non-western minorities might be explained by other neighbourhood characteristics such as dwelling types or prices. If non-western minorities have different preferences and constraints on the housing market than other groups, they will also select into other types of neighbourhoods (and these neighbourhoods will therefore become minority concentration neighbourhoods). Figure 2 shows the share of social housing and Figure 3 the average dwelling value in the destination neighbourhoods of moving households, by ethnic group. Compared to native Dutch households, all non-western minority groups, and especially Turks and Moroccans, on average end up in neighbourhoods with higher shares of social housing (Figure 2) and lower dwelling values (Figure 3). Non-western minorities are more often dependant on social housing or inexpensive dwellings, and thereby limited in their neighbourhood choice. An important question is whether these housing market constraints can explain why non-western ethnic minority households select minority concentration neighbourhoods. We will investigate this further using conditional logit models.

Figure 2 Share of social housing in the destination neighbourhood, by ethnic group (N=77,763)



Source: Own calculations based on SSD made available by Statistics Netherlands and Statistics Netherlands neighbourhood data

Figure 3 Average dwelling value in the destination neighbourhood, by ethnic group (N=77,763)



Source: Own calculations based on SSD made available by Statistics Netherlands and Statistics Netherlands neighbourhood data

Explaining neighbourhood selection of non-western minorities

Table 4 shows the results of five conditional logit models which estimate which neighbourhood characteristics determine that a neighbourhood is selected out of a choice set of all neighbourhoods. We estimated models on data including 12,792 non-western minorities who moved within the Utrecht urban region between 2006 and 2010. Model 1 shows that non-western minorities move to neighbourhoods with high shares of non-western minorities[10]. In model 2 we distinguish between the share of the own ethnic minority group in the neighbourhood and the share of all other non-western minorities in the neighbourhood. Especially the share of the own group has a strong positive effect on neighbourhood selection, but also the share of non-western minorities other than the own group has a positive effect on neighbourhood choice. In model 3 we take into account several neighbourhood level housing market and household composition variables to determine whether housing market constraints explain neighbourhood selection. Non-western minorities select neighbourhoods with high shares of (social and private) rented dwellings, low dwelling values, high shares of new dwellings and many couples and families with children. Adding these variables to the model reduces the effect of non-western minorities other than the own ethnic group on neighbourhood selection from 2.430 to 0.405.

In model 4 we investigate how neighbourhood selection differs between high and low income households by including interaction effects between a dummy representing low household income and neighbourhood ethnic composition. The main effect of the own ethnic group remains the same compared to the previous model; minorities select into neighbourhoods with high shares of their own group. The interaction effect shows there are almost no differences in this effect between low and high income households.

[10] In all models we control for vacancies; the number of dwellings that have become available in a neighbourhood.

Table 4 Conditional logit model of neighbourhood selection of non-western minority households (N=12,792)

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**
Vacancies	0.001 **	0.001 **	0.001 **	0.001 **	0.001 **
% non-western minorities	3.563 **				
% own group		6.888 **	4.560 **	4.454 **	4.832 **
% other non-western min		2.430 **	0.405 **	0.002	0.345 **
% social rented dwellings			0.014 **	0.014 **	0.012 **
% private rental dwellings			0.009 **	0.009 **	0.010 **
% new housing development			0.003 **	0.003 **	0.003 **
average dwelling value			-0.005 **	-0.005 **	-0.004 **
% couples			0.018 **	0.019 **	0.018 **
% households with children			0.013 **	0.013 **	0.013 **
% own group*low inc hh				0.268	-0.716 **
% other non-western min*low inc hh				0.863 **	0.024
% social rented dwellings*low inc hh					0.003 **
average dwelling value*low inc hh					-0.003 **
Pseudo R-squared	0.1304	0.1310	0.1444	0.1447	0.1454

* p<0.05; ** p<0.01

Source: Own calculations based on SSD made available by Statistics Netherlands and Statistics Netherlands neighbourhood data

The main effect of non-western minorities other than the own ethnic group becomes very small (0,002), but the interaction effect with low household income is showing that only low income non-western minorities are more likely to select into neighbourhoods with higher shares of non-western minorities other than their own ethnic group. This could indicate that housing market constraints are behind the selection into neighbourhoods with other non-western ethnic minorities for low income households.

In model 5 we control for the fact that low income households will more often select into neighbourhoods with many social rented dwellings and lower dwelling values. The interaction effect found in model 4 disappears, which shows that housing market characteristics explain why low income households more often select into minority concentration neighbourhoods. Surprisingly, however, the main effect of the share of non-western minorities other than the own ethnic group increases again, so both high and low income ethnic minority households are more likely to select neighbourhoods with higher shares of non-western minorities other than their own ethnic group. Discrimination or fear of discrimination in majority concentration neighbourhoods might explain why ethnic minorities select into minority concentration neighbourhoods, also when these are dominated by other minority groups. On the other hand ethnic facilities or shops can make minority concentration neighbourhoods attractive for various minority ethnic groups. We find that low income households are less likely than high income households to select into neighbourhoods with high shares of their own ethnic group. As higher income households have more opportunities on the housing market and therefore more freedom in their neighbourhood choice, their stronger selection into neighbourhoods with

high shares of own group members is an indicator that own group preference is important in explaining neighbourhood selection.

Differences between ethnic groups

To get more insight in the differences between ethnic minority groups, we add interactions between household ethnicity and neighbourhood ethnic composition. Model 6 (Table 5) shows that there are differences between ethnic groups in the effect of the ethnic composition. Turks, Moroccans, Surinamese and Antilleans select into neighbourhoods with high shares of their own group. For other non-western minorities, the share of members of their own (very heterogeneous) group in the neighbourhood has a negative effect on their probability of selection into the neighbourhood.

Turks and Moroccans also select into neighbourhoods with high shares of non-western minorities other than their own ethnic group. While Surinamese and Antilleans select into neighbourhoods with low shares of non-western minorities other than their own ethnic group. In model 7 we also included neighbourhood housing market and household characteristics in the model, but the effects of the share of own and other groups stay qualitatively similar to what we found in model 6.

Table 5 Conditional logit model of neighbourhood selection of non-western minority households including interactions with household ethnicity (N=12,792)

	Model 6	**Model 7**
Vacancies	0.001 **	0.001 **
% own group*Moroccan hh	7.550 **	5.029 **
% own group* Turkish hh	14.773 **	11.434 **
% own group* Surinamese hh	33.708 **	26.356 **
% own group* Antillean hh	77.773 **	58.155 **
% own group * other non-western hh	-0.006 **	-0.003 **
% other non-western min* Moroccan hh	12.211 **	8.945 **
% other non-western min* Turkish hh	12.976 **	9.113 **
% other non-western min * Surinamese hh	-1.558 **	-1.879 **
% other non-western min* Antillean hh	-1.222 **	-1.677 **
% other non-western min* other non-western hh	0.005 **	0.003 **
% social rented dwellings		0.010 **
% private rental dwellings		0.005 **
% new housing development		0.001 *
average dwelling value		-0.004 **
% couples		0.022 **
% households with children		0.006 **
Pseudo R-squared	0.1455	0.1539

* $p<0.05$; ** $p<0.01$

Source: Own calculations based on SSD made available by Statistics Netherlands and Statistics Netherlands neighbourhood data

Separate models for four ethnic groups

To get a better understanding of which neighbourhood characteristics explain neighbourhood selection of the different ethnic groups, we estimate separate models for the four largest ethnic minority groups in the Netherlands (see Table 6). For each ethnic group we show two models, one without and one with interaction effects. We first discuss the models without interaction effects.

All ethnic groups select into neighbourhoods with high shares of their own ethnic group. Turks (model 8) and Moroccans[11] (model 10) also select into neighbourhoods with high shares of other non-western ethnic minorities, but this is not the case for Surinamese and Antilleans. In a model (not shown) with only the ethnic composition of the neighbourhood, Surinamese and Antilleans are found to select into neighbourhoods with high shares of their own group and high shares of non-western minorities other than their own group. When housing market characteristics are taken into account Surinamese and Antilleans are still found to move to neighbourhoods with high shares of their own group, but the effect of the share of other non-western minorities disappears.

Own group preferences and housing market constraints are thus important in explaining neighbourhood choice for all four groups. These two together explain why Surinamese and Antilleans select into minority concentration neighbourhoods. However, for Turks and Moroccans, a third perspective is needed to explain their neighbourhood selection. Also when own group preferences and housing market constraints are taken into account, they are still found to select into neighbourhoods with high shares of non-western minorities other than their own ethnic group. Discrimination on the housing market, or fear of discrimination in majority concentration neighbourhoods, might explain why Turks and Moroccan select into minority concentration neighbourhoods.

Models 9, 11, 13 and 15 test whether there are differences between high and low income ethnic minority households in neighbourhood selection by including interaction effects between neighbourhood characteristics and household income. The main effects of the neighbourhood characteristics do not change when these interactions are included. As could be expected we find that low income households more often select into neighbourhoods with low dwelling values. Among Surinamese, low income households more often select into neighbourhoods with higher shares of social rented dwellings. Taking this into account, we find differences between high and low income households in the effect of the ethnic composition of the neighbourhood on neighbourhood selection.

For Moroccans and Turks we find a negative interaction between low household income and the share of non-western minorities other than the own ethnic group. Taking into account all other housing market constraints and the fact that low income households more often move to neighbourhoods with low dwelling values, high income Moroccan and Turkish households are more likely to select into concentration neighbourhoods of

[11] For Turks and Moroccans the correlation between the share of their own group in the neighbourhood and the share of all other non-western minorities in the neighbourhood was very high (78%), mostly because the correlation between the share of Turks and the share of Moroccans is very high (81%). It was therefore not possible to include the share of the own ethnic group and the share of other non-western minorities in one model. Therefore we added the shares of Turks and Moroccans and the share of non-western minorities not being Turkish or Moroccan. Turks and Moroccans are culturally relatively close to each other, and therefore might prefer living not only close to their own ethnic group, but also close to members of the other ethnic group, or these two groups might select the same neighbourhoods because of ethnic facilities of use for both groups.

other ethnic minorities. This is in line with the strong version of the stratification theory (Logan and Alba, 1993). While for majority households a higher income gives access to better and thus 'whiter' neighbourhoods, this relationship is less strong for (stigmatised) minority groups. Low income households will select into minority concentration neighbourhoods because of housing market constraints; they cannot afford to live in majority concentration neighbourhoods. Although higher income households could afford to live in majority concentration neighbourhoods, they still do not select into these neighbourhoods because they might be or feel not welcome there.

For Surinamese and Antilleans we find interaction effects between the share of the own group in the neighbourhood and household income. The interaction effects show that low income Surinamese households (model 13) are less likely to select into neighbourhoods with a high share of other Surinamese than high income Surinamese households. Antilleans (model 15) with a low income are more likely to select into a neighbourhood with a high share of their own group compared to high income Antillean households. So although both Surinamese and Antilleans select into neighbourhoods with high shares of their own ethnic group, for Surinamese this effect is strongest for high income households, while for Antilleans this effect is strongest for low income households. For Surinamese this might be explained by strong preferences to live among the own ethnic group; higher income households have more opportunities on the housing market and will therefore be more successful in selecting into the neighbourhood of their preference. The stronger selection of low income Antilleans into own group concentration neighbourhoods can be explained by the ethnic enclave theory. According to the ethnic enclave theory, especially for new immigrants, or minorities who do not have a high socio-economic status (yet) it is profitable to live in own group concentration neighbourhoods. Especially among Antilleans, recent immigrants have the lowest incomes. Low income Antilleans will thus benefit most from living in ethnic enclaves and therefore more often select into these neighbourhoods.

Table 6 Conditional logit model of neighbourhood selection for the four largest ethnic minority groups in the Netherlands.

	Turks		**Moroccans**		**Surinamese**		**Antilleans**	
	Model 8	**Model 9**	**Model 10**	**Model 11**	**Model 12**	**Model 13**	**Model 14**	**Model 15**
Vacancies	0.001 **	0.001 **	0.001 **	0.001 **	0.001 **	0.001 **	0.001 **	0.001 **
% own group	3.163 **	3.120 **	2.359 **	2.453 **	25.404 **	29.588 **	51.149 **	31.771 **
% other non-western minorities	8.070 **	8.923 **	9.133 **	10.710 **	-0.083	-0.321	0.314	0.244
% social rented dwellings	0.002	0.004	0.017 **	0.015 **	0.007 **	0.004 *	0.006 *	0.006
% private rental dwellings	-0.014 **	-0.014 **	0.013 **	0.013 **	0.009 *	0.009 *	0.006	0.006
% new housing development	0.009 **	0.009 **	0.001	0.001	-0.003 **	-0.003 **	-0.002	-0.002
average dwelling value	-0.010 **	-0.008 **	-0.005 **	-0.004 **	-0.004 **	-0.003 **	-0.003 **	-0.003 **
% couples	0.037 **	0.036 **	0.056 **	0.056 **	0.025 **	0.025 **	0.000	0.000
% households with children	0.000	0.000	0.013 **	0.013 **	0.017 **	0.017 **	0.005	0.005
% own group * low income hh		0.031		-0.240		-11.599 **		43.633 **
% other non-western min * low inc hh		-2.294		-3.979 **		0.423		0.154
% social rented dwellings * low inc hh		-0.004		0.004		0.007 *		-0.001
average dwelling value * low inc hh		-0.006 **		-0.003 **		-0.003 **		-0.001
pseudo R-sqared	0.2239	0.2251	0.1883	0.1890	0.1204	0.1232	0.0915	0.0930
N	2254		4231		1867		791	

* p<0.05; ** p<0.01

Source: Own calculations based on SSD made available by Statistics Netherlands and Statistics Netherlands neighbourhood data

Conclusions and Discussion

This study aims to contribute to a better understanding of the mechanisms behind ethnic residential segregation. We are one of the first to take multiple neighbourhood characteristics into account when investigating neighbourhood selection, and to analyse differences between ethnic minority groups. This allows us to test the own group preferences hypothesis. The descriptive analyses show that ethnic minority households are more likely to select into minority concentration neighbourhoods than others. Using a conditional logit model we estimated to what extent this can be explained by housing market characteristics of those neighbourhoods or by a preference to live close to the own ethnic group. We find that housing market constraints play a role in neighbourhood selection for all ethnic minority groups. Ethnic minorities select into neighbourhoods with different housing market and household characteristics and this partly explains why they select into minority concentration neighbourhoods. Also own group preferences are found to be important for all four minority groups. Ethnic minorities select into neighbourhoods with high shares of their own ethnic group. For Surinamese and Antilleans, the selection into ethnic minority concentration neighbourhoods can be explained by a combination of housing market constraints and own group preferences. However, for Turks and Moroccans we find that they select into concentration neighbourhoods of ethnic minorities other than their own ethnic group, also after controlling for own group preferences and housing market constraints.

An additional explanation is thus necessary to understand neighbourhood selection of Turks and Moroccans. A first explanation is that Turks and Moroccans are discriminated by housing market institutions. Kullberg (2002) states that in the choice based letting system, there are no opportunities for discrimination. However, the system could still have discriminatory outcomes, if groups with lower language proficiency are less likely to end up in (attractive) majority concentration neighbourhoods. Discrimination on the mortgage market (Aalbers, 2007) or on the private rented market might also restrict ethnic minorities in their neighbourhood choice. Especially Turks and Moroccans, who have a low position in the ethnic hierarchy might experience such discrimination. A second possible explanation is that Turks and Moroccans *choose* not to move to majority concentration neighbourhoods because they fear discrimination or exclusion. Turks and Moroccans have a larger cultural distance from the Dutch society, therefore a fear of exclusion might prevent them from moving into majority concentration neighbourhoods. A third explanation might be that ethnic differences in personal characteristics affect neighbourhood selection. For example, our data did not contain information on education, but since we know that Turks and Moroccans have a lower educational level than the other two ethnic groups, and education affects neighbourhood selection, this might explain why especially Turks and Moroccans end up in concentration neighbourhoods of ethnic minorities other than their own group.

Our research has two limitations. First, because we use register data we do not have insight in the selection process or the locational preferences of households and cannot ask them *why* they selected their neighbourhood or which neighbourhood characteristics where important in their decision. Second, we did not take into account personal characteristics other than income. Characteristics such as educational level, language proficiency or residential satisfaction are likely to affect neighbourhood

selection but are not available in the register data we used. Also the nature of the modelling strategy we used complicates the inclusion of personal characteristics because they can only be included when interacted with a neighbourhood level characteristic.

The main finding of this study is that own group preferences are important in explaining the selection of ethnic minorities into minority concentration neighbourhoods. This could indicate that ethnic minority groups voluntarily segregate into ethnic enclaves, because living in enclaves could have certain advantages for them. Ethnic enclaves could induce minority emancipation and participation (Musterd et al, 2008), however, they might also hinder the integration of minority groups in society (Van der Laan Bouma-Doff, 2007). Our research also shows that own group preferences can only partly explain selection into concentration neighbourhoods; also housing market constraints and for some groups possibly discrimination constrain the neighbourhood choice of ethnic minorities and cause them to select into minority concentration neighbourhoods.

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