

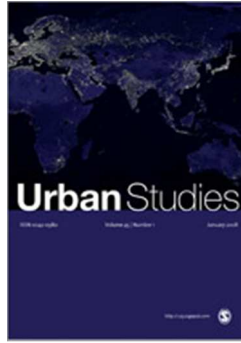
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**Residential Choices of Foreign Highly Skilled Workers in the Netherlands and the Role of Neighbourhood and Urban Regional Characteristics**

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## Residential Choices of Foreign Highly Skilled Workers in the Netherlands and the Role of Neighbourhood and Urban Regional Characteristics

**Abstract:** In the international competition for talent, local and national policy makers are keen to better understand the location choices of highly skilled workers to design more effective policies geared at the group's attraction and retention. In this study, we explain whether and to what extent the local living environment, in particular characteristics at the neighbourhood and urban regional level, affect the residential choices of foreign highly skilled workers. We make use of register data from Statistics Netherlands on the residential locations of all of these migrants who entered the Netherlands between 2000 and 2009. We combine this dataset with data on relevant characteristics at the neighbourhood level as well as with relevant amenities and labour market characteristics at the regional level. We estimate a negative binomial regression model to test which characteristics of neighbourhoods and urban regions are associated with high inflows of foreign highly skilled workers at the neighbourhood level. We find that, besides labour market characteristics, the characteristics of the local environment do matter for location choices of foreign highly skilled workers in the Netherlands. This group tends to settle in higher income, inner city neighbourhoods that offer a high degree of urban vibe. Furthermore, residential choices differ between single and multi-person households and change with duration of stay in the country.

**Keywords:** Neighbourhood, Housing, residential choice, urban amenities

### 1. Introduction

Across the globe urban economies are becoming ever more dependent on knowledge-based activities such as services, including finance and trade, communication, education, and information technology. For cities to gain a competitive edge in these industries and to achieve global status the attraction of foreign highly skilled talent is often seen as a vital element, with global champions as Paris, London and Los Angeles having established themselves as 'urban knowledge capitals' according to Sassen (2012; Richardson, 2016). Many cities are striving to become urban knowledge capitals (though of a lower league), where different professionals from all parts of the world meet, and there is a growing interest among urban policymakers and academics to better understand the drivers and processes that explain why foreign highly skilled workers migrate to specific urban regions and urban neighbourhoods and not to others.

This paper contributes to the literature on the global competition for foreign talent, in particular the competition between urban regions, by extending our knowledge on whether and to what extent characteristics at the neighbourhood and urban regional level affect the residential neighbourhood choices of foreign highly skilled workers. First large-scale empirical evidence derived from the Dutch Social Statistical Database (SSD) on all highly skilled workers who entered the Netherlands in the period 2000-2009 documents their initial regional and intra-municipal residential location choices to test the relevance of these local characteristics and answer the central research question: To what extent do characteristics of the neighbourhood and urban region affect initial and subsequent residential neighbourhood choices of foreign highly skilled workers in the Netherlands?

This paper contributes to closing two gaps in the present streams of literature on residential location choices of international highly skilled labour migrants and the literature on urban amenities and the creative class. Regarding the first, a wealth of literature addresses

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2  
3 the determinants of international labour migration in general (see e.g. Lowell, 2009, for an  
4 overview) and also, more recently, focusing on the specific group of highly skilled labour  
5 migrants (Mahroum, 2000; Boeri et al., 2012). However, by and large these studies explain  
6 country choices of these migrants, but little is known about the factors that explain location  
7 choices of these migrants *within* these countries (Frenkel et al., 2013). In particular, little  
8 empirical study of inter-city competition for foreign talent exists that documents the relevance  
9 of specific local factors, such as urban amenities, in attracting this group (Richardson, 2016);  
10 yet many cities invest in measures aimed at enhancing what Florida (2002) termed ‘place-  
11 specific attributes’, to lure the creative class, foreign and native alike.

12  
13 Second, the paper’s focus on the potential relevance of urban neighbourhood  
14 characteristics alongside city level characteristics is innovative for the literature on local  
15 amenities and the presence of the creative class. Following the seminal work of Florida  
16 (2002), much scholarly and policy attention is given to the local presence of the creative class  
17 as a potential engine of urban economic growth and recovery (Boualam, 2014). In this  
18 literature, the quality of soft location factors such as urban amenities (e.g. schools, theatres,  
19 restaurants, cafés) is emphasised as an important attraction factor for this group, but most  
20 studies treat the city as a single space, disregarding the fact that local manifestations of the  
21 creative class happen in specific areas of these cities that embody symbolically important loci  
22 for the local gentrifying community. These urban areas or neighbourhoods are characterized  
23 by the presence of cafés, restaurants, boutiques and art galleries, consumptionscapes that  
24 provide a locus for the articulation and display of an affluent gentrification-derived identity  
25 (Rofe, 2003). An important part of this identity also seems to be the notion of belonging to a  
26 global elite community, however, it remains unclear to what extent this actually requires the  
27 local presence of highly skilled foreign migrants, as literature falls short of making the  
28 distinction between native and foreign members of the creative class.

29  
30 This paper is structured in five sections. Following this introduction, section two contains the  
31 literature review. In section three we discuss the used microdata as well as the research  
32 design. Section four contains the findings of this study that include the descriptive statistics  
33 and results from the econometric analyses. Finally, section five provides the conclusions of  
34 this study.  
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## 38 **2. Neighbourhood Choices of Highly Skilled International Workers and the Role of** 39 **Urban and Neighbourhood Characteristics**

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42 Although many scholars around the world (e.g. Richardson, 2016) have underscored the vital  
43 importance of the attraction and retention of highly skilled foreign workers for the growth of  
44 regional clusters of knowledge-intensive industries, little empirical study on the inter-city  
45 competition for foreign talent is found. Existing large-scale studies on living location choices  
46 of highly skilled international labour migrants focus on country or region choices (eg. OECD,  
47 2010; Lowell, 2009), but there is a lack of studies at lower levels of spatial aggregation  
48 explaining in which urban neighbourhoods (the lion’s share of) these migrants settle and how  
49 these decisions are influenced by local characteristics of these neighbourhoods and the  
50 surrounding urban area. Given this literature gap, in section 2.1 the literature review builds on  
51 the large body of relevant scholarly work explaining residential location choices of  
52 households in general before discussing a growing stream of literature on specific features of  
53 residential preferences of highly skilled workers in section 2.2. However, contributions  
54 explicitly addressing preferences of highly skilled foreign workers remain scarce.  
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### 2.1 Residential Location Choices of Households and the Role of Urban and Neighbourhood Characteristics

Traditionally, the literature on residential location choices of households has focused on the economic and demographic determinants of this choice (e.g. Lawton et al., 2013). According to economic theory, people compare the costs and benefits of various residential locations and choose the location that maximizes their net benefits. Aspects that are considered in this regard are the availability of jobs, regional wage levels and the local presence of (dis-)amenities. The latter include natural attraction factors (e.g. climate and landscape), cultural attraction factors, as theatres, restaurants, cafés, festivals, children's attractions and recreational facilities and social attraction factors, as local safety, criminality levels, status or image, nuisance and pollution levels and the quality of schools (Henderson, 1982; Devogelaer, 2004; author name anonymized).

A number of specific factors related to the local environment have been shown to be important in determining household residential location choices. At the neighbourhood level, areas with better accessibility and proximity to jobs and to the city centre, where most urban amenities (e.g. shopping facilities, theatres, restaurants, cafés) are concentrated, are perceived as more attractive to live in. Apart from this, also the quality, housing tenure and housing stock composition in the neighbourhood matter for an area's residential attractiveness. Generally, areas with higher quality and more diverse housing tend to be more attractive (Devogelaer, 2004). Also, neighbourhoods with higher shares of owner occupants or higher average rents are viewed as more desirable (Quigley, 1985). Also the ethnic composition of the neighbourhood affects residential location choices. Immigrants are found to be more likely to settle in neighbourhoods with higher shares of co-ethnics (Zorlu & Mulder, 2008). Finally, the provision level of urban amenities determines residential attractiveness, whereby neighbourhoods with higher provision levels of amenities (e.g. restaurants and cafés) are more appealing, especially so for younger urbanites (Quigley, 1985; Nechyba and Strauss, 1998).

Many studies have looked into the determinants of residential preferences and choices at the urban regional level. Regions with more and higher quality amenities as restaurants, theatres, recreation facilities and events are seen as more attractive (e.g. Blomquist, et al., 1988). Also, Devogelaer (2004) finds that regions with universities or that are (state or provincial) capitals have a more favourable image and are better known, which makes people more likely to move there.

Prior research has shown that residential preferences and choices vary throughout the different life-cycle stages of households (e.g. Clark and Huang, 2003). A common finding (e.g. Devogelaer, 2004) is that singles at an early stage in adulthood prefer more compact and centrally located, commonly rental, housing, whereas larger households tend to prefer more spacious, owner occupied, housing – often linked to the desire to establish a family – housing that is not easily found in city centres at affordable prices. For families, as compared to single person households, the accessibility of high quality schools (Henderson, 1982), leisure and recreation spaces, neighbourhood safety and a socially homogeneous neighbourhood population are found to be more important (Hur and Morrow-Jones, 2008). Finally, for larger households with children, longer commuting distance to work tends to be less of an issue than for single person households (Kim et al., 2005).

High income households and higher educated households will be more successful on the housing market and therefore be more likely than other households to select into 'attractive' neighbourhoods. Accessibility, amenities, safety and other variables that determine neighbourhood attractiveness will thus have a stronger impact on neighbourhood selection of higher educated and high income households.

## 2.2 Specific Features of Residential Preferences of (International) Highly Skilled Workers

A recent stream of literature investigating local factors that influence residential preferences of highly skilled workers provides valuable insights for our analysis, although this literature generally lacks to distinguish between highly skilled workers of native and foreign origin. The findings from this literature suggest that the above stated economic and demographic factors are also highly relevant for residential preferences of the highly skilled (e.g. Sleutjes, 2013). Liu and Shen (2014) who study the interprovincial migration patterns of skilled migrants in China and Arntz (2010) in a study on interregional highly skilled migrants in Germany find that career opportunities are more important than amenities.

Besides work and career-related aspects, preferences are largely affected by the availability and accessibility of high-quality and affordable housing (Buch et al., 2013) and the quality of schools, cultural and recreational facilities in the neighbourhood and region (Florida, 2002; Yigitcanlar, 2010; Frenkel et al., 2013; Lawton et al., 2013; Buettner & Janeba, 2016). These studies find no uniform pattern of residential preferences among highly skilled workers including highly skilled international migrants (Bontje et al, 2009; Sleutjes, 2013), but heterogeneity in preferences, most likely explained by differences in household type, job type and length of the (intended) stay abroad. Bontje et al. (2009) point to the diversification of the group of highly skilled international migrants with a growing number of non-expats who stay for longer time or permanently in the country. According to the authors, in contrast to general expat preferences, the latter migrants are less oriented towards the higher segments of the housing market in central locations and more towards lower priced flats in suburban areas.

Research findings on residential preferences of the highly skilled will therefore vary with the personal characteristics of the group under study. A US-based study by Felsenstein (2002) and a study based on Amsterdam (Musterd et al., 2007) suggest that the highly skilled have a preference for suburban neighbourhoods where housing is more spacious. On the contrary, a second study from the Netherlands by Van Oort et al. (2003) finds a preference for areas in proximity to the city centre close to cultural amenities.

Rofe's (2003) study on the gentrifying neighbourhoods of Glebe and Inner New Castle, Australia, documents how global talent is attracted by seemingly sophisticated and global attributes of these locations that are characterized by an affluence of cafés, good restaurants, boutiques and art galleries. The author argues that premised upon notions of affluence and prestige, numerous gentrifiers pursue a local socio-spatial strategy of identity construction by which they aim to actively position themselves as an emergent global élite community.

Frenkel et al. (2013) investigate to what extent local amenities, accessibility, housing preferences and leisure-activity affect location choices of skilled workers at the intra-metropolitan level in the Tel-Aviv metropolitan region. The authors find that these workers seek affordable housing preferably in dense urban environments of large cities. Moreover, they have a preference to live in well-established knowledge communities that are located in close proximity to good schools and their work, and where cultural amenities and recreational facilities are abundant.

Lawton et al. (2013) study the residential preferences of the 'creative class' in Dublin and also include a subsample of migrants to find that classical factors such as the cost of housing, accessibility and travel time to work are most relevant as residential location determinants. Their outcomes also illustrate the relevance of the life-cycle stage for residential decision-making; specifically, the decision to have a family directly affects residential choice considerations. Younger workers tend to select city centre locations, whereas older workers prefer peripheral locations. The findings of Richardson (2014), who studies regional attraction and retention strategies for expats in the biotechnology sector of the Vancouver region, also

underscore the role of the spouse enabling longer term stay in the region, particularly in times of economic downturn.

Finally, Van Oort et al. (2003) study the residential preferences of employees in the ICT sector in the Netherlands. They find that these preferences are similar to those of the Dutch population in general. The authors distinguish between two groups of respondents with differing residential preferences: A group of young people that prefers a location in or near the city centre with all the urban amenities, and a group of older, more settled, people with a preference for greener, quieter, suburban areas or locations outside the cities. About two-thirds of all respondents, however, indicated that they would like to live within reach of a city centre to have urban amenities at hand. Almost all respondents find accessibility of their work important, however, this groups also shows an exceptionally high commuting tolerance as compared to native ICT professionals. Thus, characteristics of the home, the residential area and the availability of certain facilities is viewed as more important than living close to the workplace.

### 3. Research Design

Research on highly skilled international workers is troubled in two ways. On the conceptual side, there is no agreed definition across countries and among scholars of what exactly constitutes a highly skilled person. Common approaches to define this group of migrants are based either on the type of job carried out, the level of highest achieved education, or the earned income level (Charloff & Lemaître, 2009). On the practical side, there are problems associated with gathering and finding data on international migration of highly skilled workers, as often educational and job-classification data are not available.

This research makes use of the Dutch Social Statistical Database (SSD), which is unique micro data containing personal characteristics and residential address of all inhabitants of the Netherlands from 1999 onwards. With the SSD individuals can be followed over place and time, so initial and subsequent choices for a residential neighbourhood to live in of highly skilled international workers in the Netherlands can be studied.<sup>1</sup>

As in the SSD there is no information available on educational level and occupational status we define highly skilled workers based on age-specific income criteria that are derived from an in-depth analysis of the relationship between educational achievements, occupational status and income using a representative subsample of the Dutch population (Labour Force Survey).<sup>2</sup> See annex 1 (author name anonymized) for further details. Validity checks of the used definition carried out with the Labour Force Survey show that there is a large overlap in who is included in the definition of highly skilled whether defined based on occupational status, educational level or age-specific income criteria (author names anonymized). Therefore we expect to find similar location preferences for highly skilled workers if criteria based on educational level or occupational status would have been used. The included age differentiation is important in the identification of the highly skilled, as not even those employees with high educational achievements and high potential tend to start their career with high salaries. We apply this definition to the data on immigration from the SSD and define foreign highly skilled workers as all individuals who migrated to the Netherlands in that year and who meet these criteria in the respective year or the year after (author name anonymized).

In the period 2000 up to 2009<sup>3</sup>, 54,255 highly skilled workers migrated to the Netherlands, which is a relatively low number by international comparison, but the annual inflows are strongly increasing over the period (Docquier and Marfouk, 2005). The SSD contains information on their personal characteristics such as age, nationality, household type and

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3 residential address. We focus our analysis on urban regions in the Netherlands. There are 22  
4 urban regions in the Netherlands, which are central cities with surrounding suburban and rural  
5 municipalities that together function as one labour market and housing market area. We only  
6 focus on the urban regions and not on the areas in between urban regions to be able to use  
7 urban regional level data on labour market characteristics and amenities. 84 per cent of the  
8 foreign highly skilled workers choose a neighbourhood of first residence that is located in one  
9 of the 22 urban regions. 1,566 neighbourhoods<sup>4</sup> are located in these regions, however, not for  
10 all neighbourhoods data are available for all neighbourhood characteristics. In  
11 neighbourhoods with few dwellings or inhabitants data on average household income or land  
12 value are missing, therefore these neighbourhoods had to be excluded from the analyses.<sup>5</sup> For  
13 1,457 neighbourhoods data are available on all independent variables. These neighbourhoods  
14 are the first place of residence for 45,473 foreign highly skilled workers (64 people settle in  
15 neighbourhoods with missing data and are therefore excluded from the analyses). The models  
16 are thus estimated on 45,473 foreign highly skilled workers, of which 25,537 are singles and  
17 19,936 live in larger households.

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20 To establish which characteristics determine the location choice of these highly skilled  
21 workers we estimated negative binomial regression models (Cameron and Trivedi, 1998).<sup>6</sup>  
22 For every neighbourhood in the 22 urban regions we calculated the number of foreign highly  
23 skilled workers who selected that neighbourhood as their first residential address in the  
24 Netherlands. Multilevel negative binomial regression models explain the number of these  
25 individuals who selected a certain neighbourhood (count data) from characteristics of the  
26 neighbourhood and characteristics of the larger urban region. The models take into account  
27 the multilevel structure in the data by using clustered standard errors for urban regions. Three  
28 separate models are estimated to explain neighbourhood choice of: (1) all foreign highly  
29 skilled workers; (2) foreign highly skilled workers who live alone and (3) foreign highly  
30 skilled workers who live in larger households.

31  
32 To facilitate the interpretation of our regression findings we show the incidence rate ratios  
33 (IRR) in the findings section, these are the exponentiated regression coefficients. The IRR  
34 expresses the change in the dependent variable in terms of a percentage increase or decrease  
35 that corresponds with a unit increase in the independent variable. It is either above or below 1.  
36 For example, an IRR of 1.05 for the independent variable distance to school (measured in  
37 kilometres) would suggest that the number of foreign highly skilled workers in a  
38 neighbourhood increases by approximately 5 per cent with every additional kilometre distance  
39 to an international school. Conversely, an IRR value of 0.95 would imply a 5 per cent  
40 decrease of these migrants in the neighbourhood.

41  
42 We use independent variables on both neighbourhood and urban regional level to explain  
43 the number of foreign highly skilled workers in a neighbourhood. Independent variables such  
44 as the neighbourhood population, household and dwelling composition and accessibility and  
45 the number of points of sale, foreign companies or museums and cinemas in the urban region  
46 explain which neighbourhoods are attractive residential areas for this group of migrants.  
47 Descriptions of all variables are found in Table A1 in the appendix; Table 1 provides the  
48 variables' descriptive statistics.<sup>7</sup>

## 4. Results

### 4.1 Descriptive Statistics

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56 Between 2000 and 2009 54,255 foreign highly skilled workers arrived in the Netherlands.  
57 Migrants from Western countries account for three-quarters of this group, only a quarter has a  
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3 non-Western background. The annual inflow of these migrants fluctuates greatly over this  
4 period; notably, in years of economic growth more migrants arrive in the Netherlands.

5 Of these 54,255 highly skilled workers who came to the Netherlands over the period  
6 2000-2009, 30,270 migrants are singles (56 per cent) and 23,985 people live in larger  
7 households (44 per cent). 45,537 migrants, 84 per cent of all foreign highly skilled workers  
8 who came in this period, settled in the 22 urban regions. Most of these migrants settle in the  
9 urban region of Amsterdam, followed by The Hague and Rotterdam, which is not surprising  
10 as these are the largest and most international regions of the Netherlands accommodating a  
11 large number of international firms and organizations.

12 Considering the spread of these migrants across residential neighbourhood types in the 22  
13 urban regions (where 84 per cent of this population resides), we find a strong over-  
14 representation in city centres. In these areas, foreign highly skilled workers account for 2 per  
15 cent of the population. These are generally areas with high population density, where housing  
16 is most expensive, but which offer the highest provision level of urban amenities (e.g. cafés,  
17 restaurants, museums, theatres). A much smaller group of these migrants resides in urban  
18 areas outside the city centre and urban areas with generous provisions of green. In these areas  
19 these migrants account for about 0.4 per cent of the population. The more quiet residential  
20 settings of villages and country side living are not very popular among these migrants. Being  
21 little bound by financial constraints in most cases, foreign highly skilled workers are clearly  
22 urbanites, choosing residential locations in central locations with good accessibility and in  
23 proximity to jobs. This holds in particular for migrants in single person households, but it also  
24 holds for migrants living in larger households.  
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#### 29 *4.2 Explaining the Initial Neighbourhood Choice of Foreign Highly Skilled Workers*

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31 Above, we have discussed the distribution of foreign highly skilled workers across regions  
32 and residential settings. In the analyses to follow we explain the residential neighbourhood  
33 choice of these migrants from characteristics of the neighbourhood and the urban region. The  
34 findings from the negative binomial regression models are shown in Table 2 below.

35 Model 1 explains neighbourhood choice of all foreign highly skilled workers who arrived  
36 in urban regions in the Netherlands between 2000 and 2009. A number of observations can be  
37 made about the influence of neighbourhood variables on this outcome. The number of  
38 inhabitants in the neighbourhood is included as a control variable for population size  
39 differences. As expected, more migrants settle in more populated areas. The area's address  
40 density has no significant effect at the 5 per cent level. Although foreign workers mostly settle  
41 in dense urban areas, this effect is explained by other variables such as job access. In line with  
42 many earlier studies (e.g. Arntz, 2010; Lawton et al., 2013), we find that job access has a  
43 positive effect on neighbourhood selection of foreign highly skilled workers. The land value,  
44 tenure composition and the construction period of the dwellings in the neighbourhood have no  
45 significant effect on the inflow of these migrants at the 5 per cent level. Foreign highly skilled  
46 workers more often settle in neighbourhoods with lower shares of families with children and  
47 with higher household income levels. Accessibility by train or car seems not to matter for  
48 location choices of these migrants. Whereas the neighbourhoods' distance to a train station is  
49 insignificant at the 5 per cent level, their travel time to a highway access lane has a positive,  
50 but small effect, which indicates that foreign highly skilled workers select neighbourhoods  
51 further away from access lanes. Possibly this can be explained by their choice of inner-city  
52 locations instead of suburban new housing estates that are often closer to highway access  
53 lanes.  
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3 Also the age composition in the neighbourhood affects the settlement of these migrants;  
4 neighbourhoods with high shares of 25 to 45 year olds, or many inhabitants above age 65 are  
5 more popular than neighbourhoods with many children (under age 25) or many people aged  
6 45 to 65. The share of ethnic minorities in the neighbourhood has no significant effect on the  
7 settlement of these migrants at the 5 per cent level. The distance to an international school has  
8 a significant negative effect on settlement of these migrants; these migrants thus select  
9 neighbourhoods that are closer to international schools. A final neighbourhood aspect that is  
10 relevant for the presence of foreign highly skilled workers in urban neighbourhoods is the  
11 quantity of points of sale in the catering industry (e.g. restaurants, cafés, and takeaways) per  
12 1000 inhabitants. It has a positive effect on settlement for this group, which is in line with  
13 earlier research (Quigley, 1985; Rofe, 2003) that indicates a preference for lively  
14 neighbourhoods with many urban amenities.<sup>8</sup>

15  
16 On the level of the urban region, some indicators measuring the provision level of urban  
17 amenities are included; these are the number of museums, theatres and cinemas per 100,000  
18 inhabitants and the number of points of sale. These variables, however, have no significant  
19 effect on the settlement of foreign workers at the 5 per cent level. Urban regions with a  
20 university of technology and urban regions with a high share of foreign companies do attract  
21 many foreign highly skilled workers.  
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23  
24 <<Tables 1 and 2 about here>>  
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27 Model 2 explains neighbourhood choice of foreign highly skilled workers who are living  
28 alone at their first residential address (singles hereafter). A number of observations can be  
29 made about the influence of neighbourhood variables on this outcome. As in model 1 that  
30 includes all foreign highly skilled workers, also this subgroup tends to reside in more  
31 populated neighbourhoods, neighbourhoods with good access to jobs, higher household  
32 incomes, a higher supply of catering facilities and a large distance from highway access lanes.  
33 However, contrary to the findings in model 1, for the subgroup of singles the construction  
34 period of housing in the neighbourhood does matter. Singles tend to live in neighbourhoods  
35 with higher shares of housing constructed pre WWII and after 1990. Whereas the age  
36 structure of the population in the neighbourhood does not seem to affect the inflow of this  
37 group, the household composition does. Neighbourhoods with higher shares of couples and  
38 families accommodate fewer single foreign highly skilled workers. A final finding related to  
39 the neighbourhood characteristics is that, for the group of singles, the distance to an  
40 international school does not matter for their living choice, which seems logical.  
41

42  
43 On the urban regional level, the results for singles are similar to the results in model 1.  
44 Foreign companies and technical universities attract highly skilled workers, with the addition  
45 that also non-technical universities attract single foreign highly skilled workers.

46 Model 3 explains neighbourhood choices of foreign highly skilled workers who live in  
47 larger households. As in models 1 and 2, also these migrants in larger households select more  
48 populated neighbourhoods with lower shares of families, higher average income levels and a  
49 higher density of catering locations. As was found in the overall model, these migrants in  
50 larger households tend to reside in neighbourhoods with higher shares of residents in the age  
51 groups 25-45 and pensioners. Contrary to the findings of models 1 and 2, here the presence of  
52 ethnic minorities in the neighbourhood increases the presence of these migrants in larger  
53 households. Job access has no significant impact on the residential location choices of these  
54 migrants in larger households, while singles do select into locations with many jobs within  
55 commuting distance. Again, as in models 1 and 2, the distance to a train station does not  
56 matter, whereas the distance to the highway access lane is relevant. Also larger households  
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3 settle in neighbourhoods further away from highway access lanes. These migrants in larger  
4 households select into neighbourhoods close to an international school, while the distance to  
5 an international school has no significant effect on singles.

6 On the level of the urban region, only the presence of a university of technology has a  
7 significant positive effect on the neighbourhood choices of these migrants in larger  
8 households. The other characteristics of the urban regions, the proxies for the provision levels  
9 of urban amenities, the presence of a general university and the share of foreign companies  
10 are not significant at the 5 per cent level.  
11

### 12 4.3 Discussion of Findings 13

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15 A number of findings are particularly noteworthy and deserve further discussion. From the  
16 descriptive analysis it appears that most foreign highly skilled workers settle in the Randstad,  
17 the economic heartland of the Netherlands and in city centre neighbourhoods. The model  
18 shows, not surprisingly, that more of these migrants settle in regions with a university (of  
19 technology) and in regions with a high number of foreign companies, as these organisations  
20 employ a great part of this group. With regard to their inner-city location, we find more  
21 foreign highly skilled workers in neighbourhoods with higher incomes, especially in those  
22 with many catering facilities and many singles; that is, in the most lively inner city areas.  
23

24 Next to these overall findings, we see three notable differences in the residential choices  
25 between the groups of these migrants who live in single households and those who live in  
26 larger households. Singles tend to opt for neighbourhoods with a high share of housing from  
27 the pre-war and most recent construction periods and neighbourhoods where many other  
28 singles live, for migrants in larger households these aspects figure less prominently in their  
29 location choices. Larger households settle in neighbourhoods with a slightly more balanced  
30 mix of household types, high average income levels and with more ethnic minorities. Second,  
31 whereas singles opt for neighbourhoods close to jobs, migrants in larger households opt for  
32 neighbourhoods close to an international school. This likely suggests that compared to  
33 singles, larger households have different location preferences, with the school location of  
34 children taking priority over job accessibility. A third, somewhat puzzling finding, is that  
35 single migrants tend to settle more in regions with a general university, whereas migrants in  
36 larger households do not. This might simply be yet another indication that migrants in larger  
37 households tend to live further away from their jobs, e.g. to be closer to the partner's job or  
38 the international school; as many foreign highly skilled migrants work in university cities and  
39 migrants in larger households accept further commutes to work, this implies that fewer  
40 individuals in this group live in urban regions with universities. Another explanation might be  
41 that areas around technical universities provide more diverse employment opportunities for  
42 migrants than general universities. If an urban region can provide employment for both  
43 partners, it becomes more attractive for highly skilled workers in larger households. Technical  
44 universities tend to boast notable spin-off activities that create longer-term employment.  
45

46 A distinct feature of the residential preferences of foreign highly skilled workers as  
47 compared to those of the highly educated native population (see for the latter group e.g.  
48 Devogelaer, 2004), is that the former group tends to be more inclined to stay in highly  
49 urbanised neighbourhoods once they enter the family formation stage in their life-cycle,  
50 whereas native households tend to move to a larger extend to residential areas in the urban  
51 suburbs or in the periphery of cities. Plausible explanations why migrant households are more  
52 tied to central urban locations could be these areas' higher provisions of migrant-specific  
53 goods and services, their international atmosphere or the location-specific co-ethnic social  
54 networks there, attributes that this group values.  
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#### 4.4 Residential Dynamics and Neighbourhood Choice Five Years after Immigration

The residential choices of foreign highly skilled workers likely change as migrants stay longer in the country. Moreover, short-term stayers likely make other housing choices than longer-term stayers to start with, with the former in the case of expats often making use of employer-provided housing. To find out to what extent the above findings based on initial neighbourhood choices of migrants are relevant for their longer stay in the country, we study their residential dynamics and estimate the same regression models as above for the subgroup of migrants that still resides in the country five years after immigration.<sup>9</sup>

We find considerable residential dynamics for these highly skilled migrants: Of all highly skilled workers who entered the country between 2000 and 2009, 76 percent lived at the first address of registration at least half a year, 58 percent at least one year and 35 percent at least two years. After five years 93 percent did not live at the same address anymore, 58.5 per cent have left the country and 34.5 per cent have relocated within the country.

Given the large residential dynamics, it is striking that five years after immigration, with hardly any exceptions, the same local characteristics are relevant for migrants' neighbourhood choices as at the moment of first settlement. These exceptions do yield some additional insights that are worth discussing. Five years after immigration these highly skilled migrants live in neighbourhoods with high concentrations of ethnic minorities, while the share of ethnic minorities had no effect on initial location choice. This might be explained by a difference between short stay migrants who live in employer-provided housing, whereas migrants who stay longer in the Netherlands find a dwelling via their co-ethnic network, are attracted to ethnic specific facilities or prefer to live among other ethnic minorities (see also Zorlu and Mulder, 2008). Another difference between initial and later location choices is that the share of foreign firms in the urban region no longer affects migrant neighbourhood choices. It seems that the presence of foreign firms is particularly relevant as location factor for short-term stayers, a group including many expats who tend to live nearby their job in employer-provided accommodations. Also, longer term stayers likely work to a larger extent for Dutch employers and choose accommodations further away from their work.

## 5. Conclusion

In the international competition for foreign talent, little is known about which regions, municipalities and neighbourhoods attract foreign highly skilled workers and why. This case study from the Netherlands contributes to this debate by providing large-scale empirical evidence on the relevance of neighbourhood and urban regional characteristics for residential neighbourhood choices of foreign highly skilled workers. This paper is innovative as it is one of the first to focus on the importance of amenities at the neighbourhood level in the attraction of foreign talent. We find that highly skilled foreign workers select high income neighbourhoods with a large supply of catering facilities and a good accessibility of both jobs and international schools.

Secondly, we add to previous research by providing insights into the heterogeneity of settlement preferences of foreign highly skilled workers. In this study, a first step toward the systematic exploration of this heterogeneity was done, by contrasting local characteristics of residential location choices of single and larger households. Further research can contribute to our understanding of this heterogeneity, by looking at other distinguishing features, as the type of job or sector of work, a more fine-grained exploration of the life-course developments and countries of origin. Particularly interesting in this regard is our study's finding that in larger households location trade-offs seem to be made taking into account proximity to work

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3 as well as to (international) schools. However, whereas native households tend to move to a  
4 larger extent to suburban areas once they start living together or enter the family formation  
5 stage (Devogelaer, 2004), we find that among foreign highly skilled workers also larger  
6 households are more inclined to stay in highly urbanised neighbourhoods. This suggests that  
7 these migrant households have a stronger preference for central urban locations, possibly due  
8 to the greater availability of migrant-specific goods and services, the more international  
9 atmosphere or the location-specific co-ethnic networks there.

10  
11 Our definition of foreign highly skilled workers is based on age-specific income criteria,  
12 as income is a return to both skill level and labour market experience and because the micro  
13 data do not contain information on educational level or occupational status. Validity checks  
14 on a dataset that does include these variables (Dutch Labour Force Survey) show a high  
15 degree of overlap between the highly skilled based on educational level, occupational status  
16 and our age-specific income criteria, therefore we expect to find similar results if criteria  
17 based on education or occupation would have been used.

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19 This paper uses revealed preferences data, data on the actual location choices of foreign  
20 highly skilled workers. These highly skilled migrants have relatively high incomes and will  
21 therefore have a privileged position on the housing market which might enable them to settle  
22 in neighbourhoods of their preference. However, also for this group, not only preferences but  
23 also dwelling availability and local housing markets conditions determine where they will be  
24 able to find a dwelling.

25  
26 This paper provides novel policy-relevant insights on local attributes, including urban  
27 amenities, that seem to affect residential choices of foreign highly skilled workers and that  
28 therefore might be valuable for local and regional policy makers interested to attract this  
29 group. The findings of this study are based on the case of the Netherlands, a small country  
30 known for its internationally-oriented economy, but that except for Amsterdam perhaps lacks  
31 cities that compete among the global top of urban knowledge capitals (Sassen, 2012). We thus  
32 expect our findings to be particularly interesting for the many mid-sized cities aspiring to  
33 become globally connected by attracting foreign highly skilled workers.

34  
35 Firstly and most notable, foreign highly skilled workers have a strong tendency to live in  
36 centrally located urban neighbourhoods with high provision levels of urban amenities. Local  
37 policy makers may thus be able to woo this group of migrants by ensuring a sufficient supply  
38 of up-market housing in these areas while safeguarding or promoting the areas' urban vibe  
39 that results from an attractive mix of cafés, restaurants and other cultural amenities.

40  
41 Secondly, good news to mid-sized cities, as our study has shown that the provision of  
42 catering facilities and museums at the urban regional level does not have a positive effect on  
43 attracting these migrants, this implies that these cities do not need to compete with global  
44 champions in the provision of city-wide amenities. Instead the local provision of these  
45 amenities in the neighbourhoods where these migrants reside seems good enough for  
46 attracting this group.

47  
48 Thirdly, a considerable part of the foreign highly skilled workers brings their partner and  
49 children along. For this subgroup also high quality provisions of family-related facilities, most  
50 notably international schools, are relevant in attracting migrants and their families to live in  
51 particular urban areas.

52  
53 Finally and most importantly, this group of highly skilled migrants is becoming ever more  
54 diverse, including next to short-term stayers as expats and scientists, a growing number of  
55 longer term stayers, many with partners and children. Whereas short-term stayers tend to  
56 choose accommodation close to jobs and in central urban locations, for the latter group  
57 housing market preferences seem more varied. To be able to optimally cater to housing  
58 demands of a diversifying group of foreign highly skilled workers, local policy makers  
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interested to attract and retain this group are advised to gain a more thorough understanding of the varied natures of their residential preferences.

### Notes

1. For our analysis, we consider their first address upon settlement as is recorded in the municipal population register (GBA).
2. PBL Netherlands Environmental Assessment Agency and VU University created this definition of highly skilled workers. The following age-specific income criteria (gross annual salary at 2011 price level) were used: 37,841 euro (age 31 or younger), 45,240 euro (age 32-35), 49,100 euro (age 36-40), 53,490 euro (age 41-50) and 54,797 euro (age 51 and older).
3. Whether or not a person is a highly skilled worker was only known for the years 2000 up to 2010 on the basis of most recent data available in SSD and the Labour Force Survey. Because we also want to include individuals who become highly skilled workers one year after immigration we could only include migrants over the years 2000 to 2009. Please refer to annex 1 of (author name anonymized), for a detailed explanation.
4. Neighbourhoods are defined as four digit postal code areas.
5. This concerns 109 neighbourhoods, which all have less than 100 residences.
6. Our dependent variable, the number of foreign highly skilled workers settling in a neighbourhood is a positive integer variable. Therefore this variable is not normally distributed and therefore does not match the assumption of Ordinary Least Squares regression models. The negative binomial distribution and poisson distribution are discrete probability distributions; they only produce positive integers and are therefore more suitable for our model. The poisson distribution is a more restricted form of a negative binomial distribution and assumes that the mean and variance are equal. If this assumption holds alpha is zero, however, in our models alpha is significantly larger than zero indicating overdispersion of the variance. This indicates that the negative binomial model is a better fit to the data than the poisson model.
7. Neighbourhood or regional characteristics measured after 1999 may be influenced by the inflow of foreign highly skilled workers in 2000. In this situation, it is not clear anymore if these highly skilled migrants have chosen to live in a neighbourhood because of these characteristics, or that these characteristics are the result of the inflow of these migrants. To prevent reversed causality (e.g. neighbourhood characteristics changing because of the settlement of foreign highly skilled workers) we try to measure all neighbourhood characteristics in 1999, thus before foreign workers settle in a neighbourhood. However, for a few variables there was no earlier data available, therefore we had to use more recent data.
8. This effect might also be partly explained by reversed causality. As our earliest available information on the number of catering facilities is from 2004, the number of catering facilities in a neighbourhood might be partly explained by the demand from recently settled foreign highly skilled workers.
9. These 12,020 migrants (4,580 singles and 7,440 in larger households) first registered in the Netherlands in the period 2000-2006 and were still residing in the 22 urban regions of the Netherlands five years later (out of 35,477 migrants who came 20,739 had left again and 2,718 resided outside of 22 urban regions). Please refer to (author name anonymized) for details on the subsample and table 5.9 (82) for the regression outcomes. An English language translation is available upon request to the author.

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## 26 Appendix

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30 <<Table A1 about here>>  
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Table 1: Descriptive statistics of dependent and independent variables

	N	Minimum	Maximum	Mean	Standard deviation
<b>Dependent variable</b>					
Foreign highly skilled workers (FHSW): all	1,457	0	1,444	31	113
FHSW: singles	1,457	0	835	18	66
FHSW: larger households	1,457	0	671	14	49
<b>Independent variables on the level of the neighbourhood</b>					
Population (x1000)	1,457	0.10	23.04	5.92	4.18
Job access (x100,000 jobs)	1,457	1.462	34.080	15.205	8.645
Land value (x10,000 euro)	1,457	.726	61.603	7.189	5.307
Social rent (%)	1,457	0	92	32	21
Private rent (%)	1,457	0	79	15	13
Construction pre 1944 (%)	1,457	0	100	26	21
Construction 1945-70 (%)	1,457	0	89	29	18
Construction 1971-90 (%)	1,457	0	96	32	21
Couples (%)	1,457	13	60	31	6
Families (%)	1,457	5	71	37	11
Household income (x1000 euro)	1,457	15.4	58.5	26.4	4.6
Distance to IC-station (km)	1,457	.387	27.658	6.724	4.725
Travel time to highway access lane (minutes)	1,457	1	25	5	3
Age 25 to 45 (%)	1,457	13	65	32	6
Age 45 to 65 (%)	1,457	8	44	25	5
Age 65 plus (%)	1,457	0	58	14	6
Ethnic minorities (%)	1,457	0	85	17	13
Population density (x1000 addresses)	1,457	.015	11.562	1.672	1.668
Distance to School (km)	1,457	.090	68.094	12.079	11.537
Catering (points of sale/1000 inhabitants)	1,457	0	66.7	1.75	4.02
<b>Independent variables on the level of the urban region</b>					
Museums (count/100,000 inhabitants)	22	4.5	15.0	8.9	2.5
University	22	0	1	.50	.51
Technical University	22	0	1	.14	.35
Share foreign firms (%)	22	1.0%	8.7%	3.1%	1.7%
Points of sale (points of sale x 1000)	22	2.302	21.119	5.887	4.933

Notes: Please refer to table A1 for variable descriptions and data sources.

Table 2: Neighbourhood choice of foreign highly skilled workers according to household type

	Model 1		Model 2		Model 3	
	IRR	P>z	IRR	P>z	IRR	P>z
Population	1.190	0.000	1.182	0.000	1.195	0.000
Job access	1.026	0.045	1.029	0.048	1.023	0.061
Land value	1.018	0.164	1.013	0.274	1.020	0.072
Social rent	1.005	0.418	1.005	0.441	1.002	0.739
Private rent	1.003	0.559	1.004	0.425	0.999	0.901
Construction pre 1944	0.998	0.727	0.994	0.318	1.004	0.405
Construction 1945-70	0.991	0.062	0.984	0.003	0.998	0.643
Construction 1971-90	0.993	0.064	0.989	0.011	0.998	0.628
Couples	0.969	0.062	0.960	0.043	0.974	0.113
Families	0.945	0.000	0.934	0.000	0.956	0.000
Household income	1.105	0.000	1.089	0.000	1.112	0.000
Distance to IC-station	0.992	0.704	0.992	0.703	0.992	0.670
Travel time to highway access lane	1.001	0.000	1.001	0.001	1.002	0.000
Age 25 to 45	1.044	0.007	1.033	0.089	1.055	0.000
Age 45 to 65	0.995	0.756	0.991	0.615	0.998	0.924
Age 65 plus	1.040	0.039	1.035	0.124	1.047	0.009
Ethnic minorities	1.011	0.093	1.007	0.241	1.016	0.012
Density	0.946	0.472	0.931	0.327	0.950	0.505
Distance to School	0.983	0.005	0.991	0.174	0.976	0.000
Catering	1.048	0.000	1.050	0.000	1.042	0.000
Museums	1.035	0.322	1.030	0.404	1.047	0.167
University	1.398	0.113	1.632	0.038	1.209	0.333
Technical University	1.904	0.007	1.808	0.011	1.931	0.007
Share foreign firms	1.124	0.017	1.147	0.011	1.088	0.057
Points of sale	0.976	0.327	0.974	0.366	0.983	0.451
Pseudo LL intercept only	-5,291.32		-4,378.57		-4,378.71	
Pseudo LL final model	-4,560.61		-3,715.16		-3,686.27	
Pseudo LL poisson model	-24,866.05		-15,279.03		-11,873.82	
Test statistic Alpha>0	40,611, df=1, p<0.001		23,128, df=1, p<0.001		16,375, df=1, p<0.001	
Alpha	1,49		1,66		1,30	
N	1,457		1,457		1,457	

Source: own calculations based on SSD data provided by Statistics Netherlands merged with data on neighbourhood and urban regional characteristics from various data sources.

Table A1: Variable descriptions and data sources

Variable	Description	Source
<b>Dependent variables</b>		
Foreign highly skilled workers (FHSW): all	Total number of foreign highly skilled workers who migrated to the Netherlands between 2000 and 2009	CBS
FHSW: singles	Number of single foreign highly skilled workers	CBS
FHSW: larger households	Number of foreign highly skilled workers living in households of two people or more	CBS
<b>Independent variables on the level of the neighbourhood</b>		
Population (x1000)	Population size, unit is 1000 people (1999)	CBS
Job access (x100,000)	Number of jobs within 45 minutes travel time by car, unit is 100,000 jobs (1999)	ABF
Land value (x10,000 Euros)	Average price of land of dwellings in residential neighbourhoods (transaction price is decomposed into land value based on location characteristics and price of physical characteristics of the property), in 10,000 Euros (1999)	CBS
Social rent	Share social rented dwellings (1999)	CBS
Private rent	Share private rented dwellings (1999)	CBS
Construction pre 1944	Share of dwellings built before 1945 (1999)	CBS
Construction 1945-70	Share of dwellings built 1945-1970 (1999)	CBS
Construction 1971-90	Share of dwellings built 1971-1990 (1999)	CBS
Couples	Share couples in total number of households (1999)	CBS
Families	Share families with children in total number of households (1999)	CBS
Household income(x1000Euros)	Average household income, in 1000 Euros (1999)	RIO
Distance to IC-station (km)	Distance to intercity station, in kilometres (2008)	PBL
Travel time to highway access lane (minutes)	Travel time by car to nearest highway access lane, in minutes (2006)	PBL
Age 25 to 45	Share of population aged 25-45 (1999)	CBS
Age 45 to 65	Share of population aged 45-65 (1999)	CBS
Age 65 plus	Share of population aged over 65 (1999)	CBS
Ethnic minorities	Share of ethnic minorities in population (1999)	CBS
Population density (x1000 addresses)	Average number of addresses within 1 km from every address, in 1000 addresses (1999)	CBS
Distance to School (km)	Distance to international school, in kilometres (1999)	PBL
Catering	Points of sale in catering industry per 1000 inhabitants (2004)	Locatus
<b>Independent variables on the level of the urban region</b>		
Museums, Cinemas, Theatres	Number of museums, cinemas and theatres per 100,000 inhabitants (2001)	EM-cultuur, NFC & TIN
University	Presence of research university [0;1]	
Technical University	Presence of university of technology [0;1]	
Share foreign firms	Share foreign companies in total number of companies (2010)	Amadeus
Points of sale	Number of points of sale, x 1000 (2004)	Locatus