Job-Related Migration in the Netherlands. The role of Geographical Access to Employment in a Polynucleated Urban Region

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Summary. Over the last few decades, the Netherlands' economic urban landscape has developed into a polynucleated urban structure. The resulting spatial distribution of job opportunities influences geographical job access at the individual level. This paper addresses the question, to what extent does spatial variation in job access within the Netherlands polynucleated urban structure influence job-related migration? First, it is shown that there are large differences in job access in the Netherlands in both the total number of jobs and in job levels. Scores on job access are higher in strategic residential locations in between the major cities in the polynucleated urban region of the Randstad than in the major cities themselves. Second, using data from the Netherlands Housing Demand survey and logistic regression models, it is shown that the probability of job-related migration decreases as the number of jobs within reach of the residence increases. The analyses control for both individual and household characteristics. The results show that strategic residential locations in between the major cities are as favourable as the cities themselves in terms of avoiding high spatial mobility costs.

Key words: job-related migration; job access; polynucleated urban region; regression models; housing demand survey

1. Introduction

Poor geographical access to suitable local jobs negatively influences employment opportunities and labour market outcomes at the individual level (see Kain, 1968; Preston and McLafferty, 1999 on the spatial mismatch hypothesis). If insufficient suitable jobs are available within acceptable commuting time from the residence, migration can help overcome poor local job access. Migration allows individuals to take advantage of alternative job opportunities, thereby serving as a mechanism for upward social mobility (Lichter, 1983). Since Sjaastad's (1962) seminal article 'The costs and returns of human migration,' job-related migration has often been referred to as a sort of investment in human capital that is expected to pay for itself in the form of a better job (Sjaastad, 1962; Blau and Duncan, 1967; see also Smits, 1999).

In general, the migration tolerance—or willingness to migrate—of the workforce is decreasing because of the rising share of dual-income couples and homeowners (Jarvis, 1999;

Mulder, 1993; Mulder and Hooimeijer, 1999; Van Ham, 2002). Given the role of job-related migration in clearing the labour market at the macro level, a problem of immobility arises. At the level of the individual worker, immobility increases the probability of underemployment (underutilization of human capital, unemployment and overeducation, for example). While the importance of migration as an instrument for career advancement is decreasing, the importance of a residential location with good access to suitable job opportunities is increasing. Such locations offer maximum career opportunities without involving a job-related change of residence (Van Ham, 2002).

A review of the literature on the origins and destinations of job-related migration leads to the impression that cities are the place to be. According to the classical economic approach to job-related migration, people move away from places where low wages, high unemployment, and poor job access prevail to places offering high wages, low unemployment, and good job access (Böheim and Taylor, 2002). Most theoretical models date back to those of rural-urban migration developed by Todaro (1969) and Haris and Todaro (1970). These models cities, with their major concentrations of employment opportunities, were attractive places for migrants to go when looking for a (better) job. Several studies from the last few decades show that living in or moving to a city leads to occupational achievement and reduces the need of costly migration for future job mobility (see for example, Blau and Duncan, 1967 for the USA; Wagner, 1989 for Germany; Fielding, 1992 for England; Lelievre and Bonvalet, 1994 for France).

The idea that cities are the place to be for maximum career opportunities is based on (regional) urban systems with one large central city. However, over the past few decades, in some regions the deconcentration of employment and residents has led to the rise of the complex urban forms of the polycentric city and the polynucleated urban system. Examples are the Rhine-Ruhr metropolitan region in Germany, the Flemish Diamond in Belgium, and the Randstad in the Netherlands. In such polynucleated urban regions there is no central city. Instead, several large concentrations of employment opportunities are located in close proximity to each other and connected by intensive road and rail networks (Dieleman and Faludi, 1998a; 1998b). The resulting spatial distribution of job opportunities is likely to influence access to employment opportunities at the individual level. In terms of job access, the best residential locations are not necessarily to be found in the urban nuclei. People living in strategic residential locations in between the major concentrations of employment should be able to change jobs without having to change residences.

This paper addresses the question, to what extent does spatial variation in job access within the Netherlands' polynucleated urban structure influence job-related migration? It was hypothesized that people living in strategic residential locations within the polynucleated urban area, from where they can reach many jobs within an acceptable commuting time, have the lowest probability of migrating for a job. The hypothesis was tested using individual-level data from the 1998 Netherlands Housing Demand Survey (WoningBehoefte Onderzoek). This dataset includes detailed information on individual and household characteristics for almost 120,000 respondents. In the empirical models, the effect of job access and strategic residential locations on job-related migration was estimated using logistic regression. Job access is included in the empirical model directly by measuring the number of jobs by job level within 30 minutes' travel from the residence.

2. Job Access and Job-Related Migration: Theoretical Background and Hypotheses

Micro-economic theories of geographic mobility are based on the premise that job-related migration is the result of rational decision-making driven by a desire for social mobility

(Shihadeh, 1991). Sjaastad (1962) placed job-related migration in an investment context by introducing a theoretical structure that takes both the costs and the returns of migration into account. According to Sjaastad, job-related migration is the result of an individual cost-benefit calculation in which both monetary and non-monetary costs and benefits are weighed before a residential move is undertaken. People only move residence for a job when the net expected future returns of migration are thought to be positive.

Job-related migration can be seen as a specific result of a job search. That job search is one of the main factors underlying labour mobility was recognized at an early stage (Stigler, 1961, 1962). When job search is placed within a spatial context, it becomes clear that geographical job access has an influence on the outcome of the job search process and on the probability of changing residence for a job. When plenty of suitable jobs are to be found within a short distance, a job search on the local labour market will most probably be successful. When access to suitable local jobs is poor, the geographically immobile workers are likely to end up underemployed. Only the geographically mobile workers will be able to escape underemployment by searching a wider area and accepting jobs at a greater distance, resulting in job-related migration. It is assumed that all workers want to minimize search and spatial mobility costs while maximizing career advancement. It was therefore hypothesized that those workers living on locations with good geographical access to suitable employment opportunities have the lowest probability of changing residence for a job.

In the literature on the spatial mismatch hypothesis, an explicit link between job search and geographical job access is made (Preston and McLafferty, 1999). How to define job access can be derived from this literature. A central assumption in the spatial mismatch debate is that most people only search for jobs on the local labour market because of the costs associated with searching a wider area. The outer border of the local labour market is delineated by the maximum time a worker can spend on commuting in a day and the mode of transport used. Research on the spatial mismatch hypothesis has stimulated the development of techniques to measure geographical access to suitable employment at a detailed spatial level using GIS (Hanson *et al.*, 1997; Ong and Blumenberg, 1998; Van Ham *et al.*, 2001). These measures are based on the time-geographic framework proposed by Hägerstrand (1970), which provides some very useful concepts that facilitate the understanding of the mechanism by which geographic access to employment influences job-related migration. According to Hägerstrand, time is an important constraint on spatial behaviour and influences the spatial choice sets open to individuals in nearly every domain of their lives. The maximum time a worker has available for commuting in a day—commuting tolerance—determines a worker's potential daily activity space for employment. In principle, all jobs within this potential activity space are open to a worker.

Not all jobs within a worker's reach would be suitable, however. According to the human capital theory (Becker, 1962), workers invest in productivity-enhancing skills and strive to maximize lifetime income. Because people differ in the level and specialization of their human capital, and jobs also differ in level, not all jobs are valued equally, so that only a subset of all the jobs available would be suitable for an individual job searcher. So geographical access to jobs can be defined as the number of jobs at the appropriate job level a job searcher can reach from the residence within an acceptable commuting time.

2.1 Other determinants of job-related migration
Job-related migration is a specific form of job mobility involving accepting a job at a greater distance. The determinants of job-related migration are therefore a combination of the determinants of job mobility and migration. The most prominent and documented fact about job mobility is that, on average, workers change jobs less frequently with increasing age (Topel and Ward, 1992; Booth *et al.*, 1999). This finding can be explained by the fact that the gains of job

mobility are expected to be lower for older workers (see Becker, 1962 on the human capital theory). In addition, older people also accumulate more location-specific capital that inhibits spatial mobility (DaVanzo, 1981). Older workers tend to have greater direct costs, because of homeownership and family obligations, and higher psychological costs of leaving familiar surroundings (Polachek and Hovarth, 1977; Sjaastad, 1962). It is therefore expected that, as people get older, the probability of job-related migration decreases rapidly.

Börsch-Supan (1990) found skill to have a double-edged impact on job mobility. On the one hand, the probability of a job change decreases with increasing levels of human capital. On the other hand, however, Börsch-Supan found that geographic mobility increases with the level of human capital. More highly educated people change jobs over a large distance more often than less well-educated people do. Highly educated people have a larger job search area because of the lower spatial density of specialized jobs. The probability of job-related migration was expected to increase with increasing levels of human capital.

In many households the male partner is still the main income provider, so most job-related migration takes place for the sake of his career (Markham and Pleck, 1986; Bonney and Love, 1991). Women can be expected to migrate less often for their labour careers than men. Having a partner is also expected to influence job-related migration. Human capital theory (Mincer, 1978; Polachek and Hovarth, 1977) argues that married workers are less likely to move because of greater direct moving costs, the need to offset the psychological costs for both spouses, and the likelihood that a move may result in lost employment or income for the tied mover. Lower mobility among cohabiting and married people is indeed found (DaVanzo, 1981; Mincer, 1978; Ritchey, 1976). Cohabiting and married people were therefore expected to show less job-related migration than single people.

Having children also leads to higher direct and indirect moving costs. One of the main reasons is that parents are reluctant to make their children change schools (Mulder, 1993). Uprooting children from their school and friends is something that parents do not like to do. Research consistently shows that adults with children are substantially less mobile compared with the childless. When people with children move these are typically local moves, triggered by the need of a larger dwelling (Fisher and Malmberg, 2001). The presence of children was therefore expected to decrease the probability of job-related migration.

Homeowners are less likely to move and less likely to change jobs than tenants are (Speare *et al.*, 1975; Courgeau, 1985; Clark and Dieleman, 1996; Van Leuvensteijn and Koning, 2000; Dieleman, 2001). The main cause of the difference in residential mobility may be found in the fact that buying a home involves long-term financial (a mortgage) and non-financial commitments. Further, there are high transaction costs involved with moving into an (existing) owner-occupied home. For the Netherlands, these costs are about 10 % of the value of the home (including 6 % transfer tax). Moving between rental homes does not involve these costs, so there are fewer financial barriers to residential mobility for renters than for owners (Helderman *et al.*, 2004). Homeowners were therefore expected to have a lower probability of job-related migration than tenants.

Summarizing, seven hypotheses have been formulated with respect to job related migration (see Table 1). The main hypothesis is that having good access to suitable employment opportunities decreases the probability of job-related migration.

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3. Job Access in the Netherlands' Urban Landscape

At the micro level, job access is determined by the location of the residence in relation to the locations of employment opportunities and by individual commuting tolerance. With regard to the locations of job opportunities, the processes of deconcentration and specialization have caused the spatial distribution of employment opportunities in the Netherlands to change over the past few decades. In the resulting urban structure, the monocentric model of urbanization is no longer valid and has to be replaced by a polycentric model (Dieleman and Faludi, 1998b). Hall (1966) had already signalled this with respect to the Randstad (see Figure 1). In his book *The World Cities*, Hall described the Randstad as an example of a nascent polycentric urban agglomeration. In his eyes, good job access and therefore a maximum choice of job opportunities is an important quality of this kind of polynucleated urban agglomeration. The urban sprawl, which reached significant proportions in the 1960s (when Hall published his book), led employment opportunities to spread out over a large part of the Netherlands. Through the deconcentration of employment and population, the national urban system has become a complex fabric of multiple centres of employment and dispersed residential locations (Van der Laan *et al.*, 1998).

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The Randstad, however, still remains dominant within the national urban structure and contains the bulk of national employment; more than 50% of all jobs in the Netherlands are located on less than 20% of the national territory. The major centres of employment are still within the Randstad—the cities of Amsterdam, Rotterdam, The Hague and Utrecht. The de-concentration of employment in the Netherlands has led to a selective dispersal of economic activities. Manufacturing industries and goods-handling activities have undergone a spatial shift towards regions outside the Randstad. At the same time, in the major cities in the Randstad, a trend of specialization towards professional, high-level jobs can be seen. This specialization implies that jobs are not evenly spread over the country in terms of professional level. It is therefore to be expected that, on a national scale, the employment structure of jobs within reach will differ strongly. Not all the jobs within a person's reach will be equally suitable; a person's educational background will also determine job access. Whether some locations are found to be more favourable than others will depend on an individual's level of education.

Within the Netherlands' urban economic landscape, the large cities are still the main concentrations of employment opportunities, so that one would expect job access to be highest in the city centres of Amsterdam, Rotterdam, The Hague and Utrecht. However, because of the polynucleated pattern of urbanization in the Netherlands, various 'labour islands' are located close to one another and a different pattern might show up. Given an acceptable commuting time, the residential areas in between the major cities in the Randstad will give access to more than one concentration of employment opportunities (see the strategic residential locations in Figure 1). The question is, to what extent do these strategic residential locations score higher on job access than the cities themselves, and to what extent does spatial variation in job access influence job-related migration?

4. Data and Methods

To test the main hypothesis of the study reported here, individual-level data and data on job access from residential locations was needed. The individual-level data used were taken from the Netherlands Housing Demand Survey (WBO) conducted in 1998 by Statistics Netherlands among

a sample of some 120,000 individuals (CBS, 1999). The research population is representative of the Netherlands' population aged 18 and over and not living in an institution. The dataset includes detailed information on individual and household characteristics. Furthermore, the dataset includes information on residential moves in the four years preceding the interview, including the main motive for the move and present and former residential location by four-digit postcodes.

For the analysis, respondents aged between 18 and 55 years old were selected, excluding the disabled and children living with their parents. The research population consisted of all respondents who had not moved in the four years before the interview and all respondents who had moved for reasons of work in this four-year period. Respondents who had moved for reasons other than work were not included in the analysis. The result was a total of 36,835 respondents, 1,937 of whom had moved for reasons of work in the four years preceding the interview.

Geographical job access from residential locations was measured using data on job opportunities from the National Information System of Employment (LISA) for 1997. This is a registry of nearly all jobs, by location, including government and other non-commercial organizations. Additional data on job levels was taken from the Dutch Labour Force Survey (EBB 1994, 1995 and 1996), held every year by Statistics Netherlands. The measure of job access was calculated with the GIS extension Flowmap (De Jong and Floor, 1993). As a proxy for residential locations, very small administrative regions were used: the almost 4000 four-digit postal code areas in the Netherlands. The size of the potential labour market that can be reached from these postal code areas is determined by commuting tolerance. For the purpose of this study, a general commuting tolerance of 30 minutes was used. In the Netherlands, 80% of the working population commutes less than 30 minutes one way (Van Ham, 2002). Job access was measured for five levels of education (see Van Ham *et al.*, 2001 for a detailed description of the method used). A measure of job access was allotted to all respondents on the basis of their (former) residential location and their level of formal education.

Table 2 presents the summary statistics and definitions of the variables used in this study. The dependent variable is dichotomous and indicates whether or not respondents moved residence for reasons of work in the four years preceding the interview. Several independent variables are included in the analysis: a continuous variable of job access, two dummies for residential location, three age dummies, four dummies for education, a dummy indicating whether the respondent is female, a dummy indicating the presence of a partner, a dummy indicating the presence of children, and a dummy indicating whether the respondent is a homeowner. Wherever possible, the variables were measured before the move for movers and at the moment of the interview for non-movers (see Table 2). Although the dataset used is representative for the Netherlands' population, the means in Table 2 can deviate from what one would expect. This is caused by the fact that for the analyses only respondents aged between 18 and 55 years old were selected and all respondents who had moved for reasons other than work were not included in the analysis.

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Since the dependent variable is dichotomous, logistic regression models were used. Two models were estimated: first, a model with job access as the main independent variable; second, a model with two dummies for residential location. Because the model with job access includes both individual-level and postcode-level information (job access), and there is more than one respondent per postcode in the sample, the respondents in the model need to be clustered by postcode of residence. Ignoring the nested nature of the data would violate the standard assumption of the independence of observations that underlies traditional regression models. Such an omission might lead to biased estimates of the standard errors of the coefficients, because the

random disturbances in the regression would be correlated (see, for example, Moulton 1990). Clustering the data by postcode in the applied model solves this problem (StataCorp, 2001).

5. Results

In Figure 2, geographical job access within 30 minutes of residential locations has been mapped. There are large differences in job access in the Netherlands, despite the deconcentrated pattern of employment. From locations in the Randstad, more than a million jobs can be reached within 30 minutes. In contrast, the northern and south-western parts of the Netherlands have job access below 200,000 jobs. The map clearly shows the influence of the polynucleated metropolitan structure of the Randstad on job access. Scores on job access are very high not only in the four major urban concentrations of employment opportunities —the cities of Amsterdam, The Hague, Rotterdam and Utrecht—but also in the residential locations in between these cities. These locations in between the four major cities in the Randstad actually score higher on job access than the cities themselves. Not only can people living at these strategic residential locations in between the major cities reach their present job; they also have access to many future job opportunities. These strategic residential locations are particularly important for dual-earner households who have to combine two job locations with one residential location.

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Large differences in access to jobs for specific job levels were expected, because the employment structure of the major cities in the Randstad specializes in terms of professional, high-level jobs. In Figure 3, a location coefficient is mapped for access to jobs that require a higher educational level. The location coefficient shows whether jobs at this level are over- or underrepresented in the total amount of jobs within reach from each postal code area with respect to the national share of these jobs. The map shows that jobs requiring a higher educational level are clearly overrepresented in the total amount of jobs within reach from locations in the Randstad as a whole and especially from locations in the northern wing of the Randstad, the city regions of Amsterdam and Utrecht. The northern wing of the Randstad appears to be a favourable residential location for highly educated workers.

The maps in Figures 2 and 3 both show very large differences in job access within the Netherlands. In general, scores on job access from residential locations in the Randstad are very high. The locations in between the four large cities in the Randstad show the highest job access. People living in these 'high-job-access' residential locations can be expected to show the least job-related migration.

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Table 3 presents the results of the logistic regression model of the probability of job-related migration. This, as expected, decreases with increasing access to job opportunities. This finding indicates that people living at 'high-job-access' residential locations can avoid spatial mobility costs when changing jobs. The finding does not provide sufficient evidence that strategic residential locations in between the major cities are as favourable as residential locations in the major cities themselves. The maps in Figures 2 and 3 show that the major cities in the Randstad also score high on job access. Therefore, in Table 4, a logistic regression model of job-related migration is shown which includes two dummies for residential location (see Map 1 for locations). These results show that people living outside the Randstad, where job access is lowest,

show the highest probability of job-related migration. The results also show that people living in the larger cities in the Randstad and those living in between the larger cities do not differ in terms of job-related migration. This finding is important, because it shows that, through the polynucleated urban structure of the Randstad, strategic residential locations in between the cities are at least as favourable with regard to job access as residential locations in the cities. People living at locations with poor access to employment opportunities have to invest more in spatial mobility to get a better job than people living at locations with good job access. The importance is hereby stressed of the strategic residential locations from which people can reach not only their present jobs but also many potential future jobs.

Most of the effects of the other variables in the models in Table 3 and 4 were found to be as expected. The results show that the probability of job-related migration decreases sharply with age and increases with level of education. As expected, the estimates show that females move less often than males for reasons of work. Surprisingly, according to the models, couples move more often than singles for job-related reasons; we expected the probability of job-related migration of singles to be higher. However, when the age variable is deleted from the model (not shown), the estimates show that singles do indeed move more often for work-related reasons than couples or couples with children. This result can be explained by the fact that, on average, singles are younger than couples. According to the estimates, the presence of children in a household has a negative effect on job-related migration. And the models show that homeowners move less often than tenants for reasons of work.

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6. Conclusions

This study addressed the question, to what extent does spatial variation in job access within the Netherlands' polynucleated urban landscape influence job-related migration? In classical, monocentric urban regions, residential locations with good access to employment can be found in the central cities. The results reported in this paper show that, in the polynucleated urban landscape in the Netherlands, it is not the cities but the suburban residential locations in between the cities in the Randstad that show the highest level of job access. It was hypothesized that people living in strategic residential locations within the polynucleated urban area, from where they can reach many jobs within commuting tolerance, have the lowest probability of migrating for a job.

The results show that the probability of job-related migration decreases with increasing job access. They show further that, compared with people living outside the Randstad, people living in the major cities in the Randstad and in between these major cities have the lowest probability of changing residence for a job. The effect of job access was found to be significant after controlling for individual and household characteristics.

Research on the spatial mismatch hypothesis has shown great advancement in understanding differences by gender and ethnic status in the effect of poor job access on occupational achievement (Preston and McLafferty, 1999). Given the outcomes of these studies it is very likely that gender and ethnic status also play a role in understanding the link between job access and job-related migration. Ethnicity can be expected to play especially an important role for women. A lack of language skills (and thus information) and discrimination by employers can cause (women from) ethnic minority groups to be less mobile on the labour market (Gilbert, 1998). Further exploring these differences would require much more detailed measures of job

access, since we know that the labour market is spatially segmented and that men and women and different ethnic groups operate on different (spatial) labour markets (Van Ham, 2002). With the data used in this study it would be possible to measure job access by industry, but linking these more detailed measures to individual respondents would be difficult. With the individual-level data used in this study it would not be possible to know the industry in which respondents searched for jobs. Using different individual-level data and a more detailed measure of access to suitable employment opportunities would enable researchers to study differences in spatial labour-market adjustment between categories of people in more detail.

The results of this study are an important indication that job access as a geographical context variable plays an important part in explaining (spatial) labour-market behaviour. The results suggest that living in strategic residential locations reduces the necessity of having to migrate for a better job. This is particularly important for dual-earner households and homeowners who have fewer opportunities to change residence for the sake of a better job. The results show that, besides residential locations in the major cities in the Randstad, the residential locations in between these major cities also offer good access to employment. The locations in between the cities are favourable, because they offer access to more than one concentration of employment. Pressure on the housing market at these locations can be expected to be high, because they are likely to attract new migrants while at the same time people already living there have no need to change residence for a job.
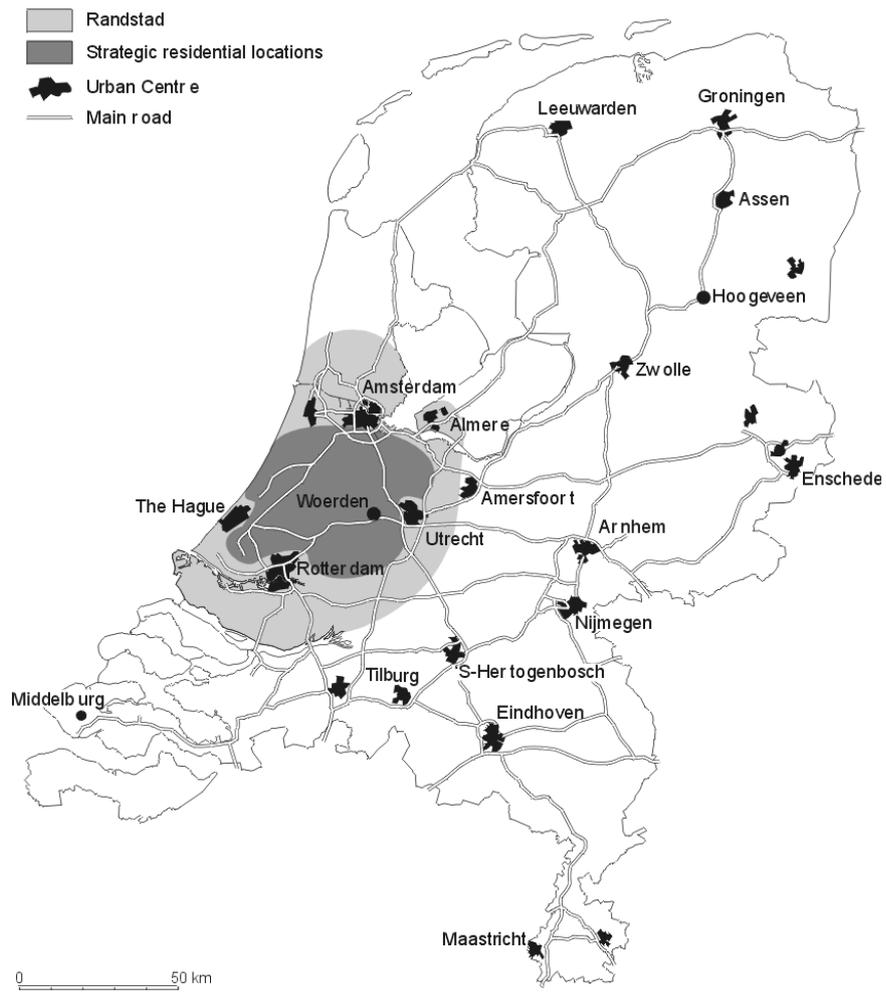
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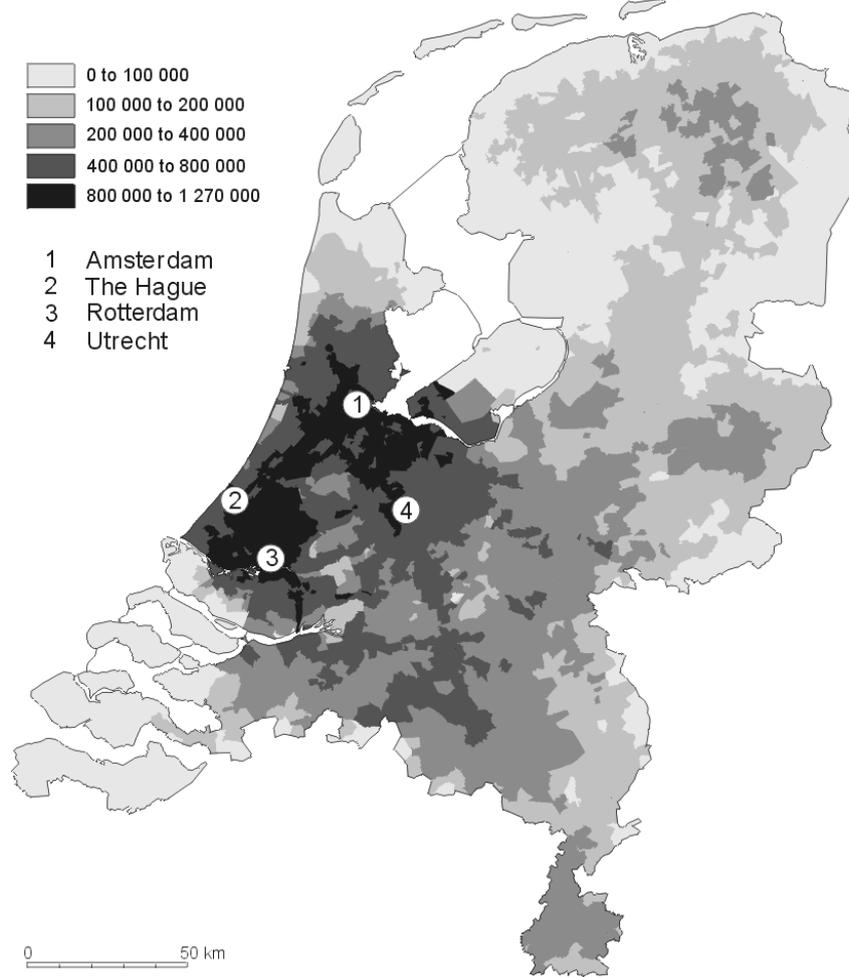
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Figure 1. Map of the Netherlands

Legend:
- Randstad
- Strategic residential locations
- Urban Centre
- Main road

Leeuwarden
Groningen
Assen
Hoogeveen
Zwolle
Amsterdam
Almere
Enschede
The Hague
Woerden
Amersfoort
Utrecht
Arnhem
Rotterdam
Nijmegen
Middelburg
Tilburg
S-Hertogenbosch
Eindhoven
Maastricht

0   50 km

Figure 2. Job access within 30 minutes (number of jobs)

0 to 100 000
100 000 to 200 000
200 000 to 400 000
400 000 to 800 000
800 000 to 1 270 000

1   Amsterdam
2   The Hague
3   Rotterdam
4   Utrecht

0   50 km

Source: National Information System of Employment (LISA) 1997, based on own calculations.

Figure 3. Access to high-level jobs (location coefficients)

Legend:
- 0 to 0.9 (1442)
- 0.9 to 1.1 (1461)
- 1.1 to 1.2 (681)
- 1.2 to 1.3 (352)

1 Amsterdam
2 The Hague
3 Rotterdam
4 Utrecht

0 _____ 50 km
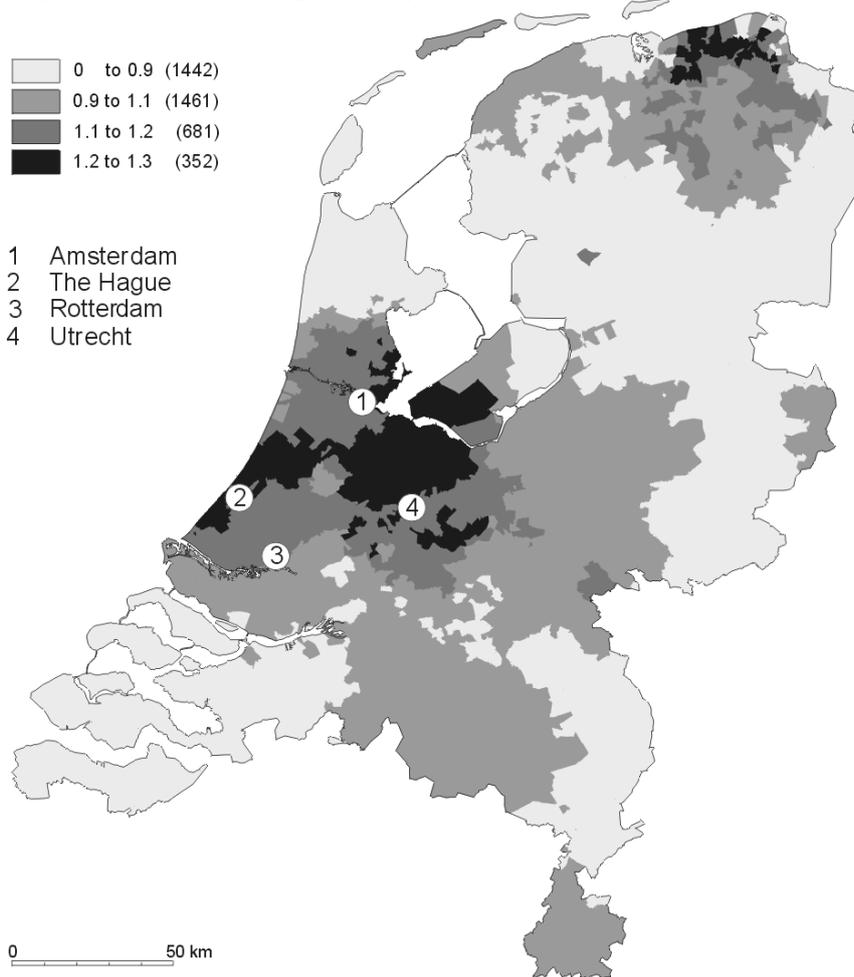
Source: National Information System of Employment (LISA) 1997 and Enquête BeroepsBevolking (EBB) 1994-1996, based on own calculations.

Table 1. List of hypotheses

	Job-related migration[a]
Good access to employment opportunities	-
Increasing age	-
Having a high level of education	+
Being female	-
Having a partner	-
Presence of children in the household	-
Being a homeowner	-

[a]+ positive effect expected; - negative effect expected

Table 2. Variable summary statistics and definitions

	Mean	Std.Dev.	Range
Dependent (moved for job)	0.053		0 or 1
Job access (in 100,000 jobs)[1]	1.066	1.020	0-4.94
Major cities in Randstad[1]	0.153		0 or 1
Between cities in Randstad[1]	0.110		0 or 1
Age 25-34[1]	0.204		0 or 1
Age 35-44[1]	0.407		0 or 1
Age 45-54[1]	0.381		0 or 1
Lower secondary educ.	0.232		0 or 1
Upper secondary educ.	0.389		0 or 1
Higher vocational educ.	0.182		0 or 1
University education	0.071		0 or 1
Female	0.437		0 or 1
Couple[1]	0.897		0 or 1
Children in household[1]	0.672		0 or 1
Homeowner[1]	0.730		0 or 1

Number of respondents = 36,835

[1]Measured before the move for movers and at the moment of the interview for non-movers

Source: Netherlands Housing Demand Survey (WBO) conducted in 1998 by Statistics Netherlands

Table 3. Logistic regression model of job-related migration with job access (with clustering)
_____

	Coeff.	Robust[1] Std. Err.	Odds Ratio
Job access	-0.100***	0.035	0.905
Age 18-24	0		
Age 25-34	-0.905***	0.148	0.404
Age 35-44	-1.763***	0.150	0.172
Age 45-54	-2.705***	0.159	0.067
Primary education	0		
Lower secondary educ.	0.299**	0.124	1.349
Upper secondary educ.	0.841***	0.122	2.318
Higher vocational educ.	1.383***	0.119	3.987
University education	1.970***	0.122	7.168
Male	0		
Female	-0.121**	0.049	0.886
Single	0		
Couple	0.531***	0.072	1.605
No children in househ.	0		
Children in household	-0.575***	0.057	0.562
Tenant	0		
Homeowner	-1.087***	0.058	0.337
Constant	-1.401***	0.181	

Number of respondents = 36,835
Initial -2 log likelihood = -7616 (improvement = 1200)
Wald chi2 = 1602, df = 12, p = 0.00
_____

**=p<0.05; ***=p<0.01
[1]Standard errors adjusted for clustering on four-digit postcodes

Table 4. Logistic regression model of job-related migration with residential location

	Coeff.	Robust Std. Err.	Odds Ratio
Not in Randstad	0		
Major cities Randstad	-0.313***	0.088	0.731
Between cities Randstad	-0.280***	0.104	0.756
Age 18-24	0		
Age 25-34	-0.919***	0.147	0.399
Age 35-44	-1.772***	0.150	0.170
Age 45-54	-2.719***	0.160	0.066
Primary education	0		
Lower secondary educ.	0.296**	0.120	1.344
Upper secondary educ.	0.776***	0.110	2.172
Higher vocational educ.	1.400***	0.114	4.055
University education	2.070***	0.121	7.923
Male	0		
Female	-0.120**	0.049	0.886
Single	0		
Couple	0.520***	0.072	1.682
No children in househ.	0		
Children in household	-0.576***	0.056	0.562
Renter	0		
Homeowner	-1.101***	0.059	0.332
Constant	-1.397***	0.182	
Number of respondents = 36,835			
Initial -2 log likelihood = -7616 (improvement = 1198)			
Wald chi2 = 1624, df = 13, p = 0.00			

**=p<0.05; ***=p<0.01