
Spatial flexibility in job mobility: macrolevel opportunities and microlevel restrictions

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Abstract. Disequilibria among regional labour markets persist through spatial inflexibility in job mobility resulting from restrictions in migration and long-distance commuting. This contribution analyses workplace mobility—the acceptance of a job at a great distance from the place of residence—using a direct measure which includes both migration and long commutes as means for covering this distance. Two sources of spatial inflexibility are identified. The first is a low overall chance of general job mobility; the second is a limited search area leading to low workplace mobility. In a two-step analysis we show that workers who find another job are a highly selective group. Within this group the variation in accepting a job at a great distance is wide, because of the individual restrictions that are often gendered. We also show that ample availability of job opportunities stimulates general job mobility and reduces workplace mobility, but only after controlling for individual restrictions. These findings are in line with the spatial mismatch hypothesis.

1 Introduction

Job mobility allows individuals to take advantage of alternative job opportunities, thus serving as a mechanism for upward social mobility (Lichter, 1983), or as a means of avoiding un(der)employment (Simpson, 1992). Faced with a lack of suitable job opportunities on the local labour market, a job searcher has three options (see also Simpson, 1992). The first is to stay put in the present job, or in the current state of unemployment. The second option is to accept a local job for which one is overqualified. The third option is to search a larger area and accept a job at a greater distance: workplace mobility. The first and second options lead to underemployment. The third option requires people to be more spatially flexible: they will have to migrate, or stretch their commuting tolerance—the maximum time they are willing to travel for a day at work. Assuming that everyone would prefer to maximise the return on human capital, the choice of option is a matter of restrictions rather than preference.

In this paper we define job mobility as accepting a job by the unemployed or by those already in employment. From a human capital point of view both the employed and the unemployed will accept a job to increase the return on their human capital. Spatial flexibility is the possibility of accepting a job at a greater distance. Workplace mobility is a special case of general job mobility: accepting a job at a greater distance.

Workplace mobility plays an important part in clearing the national labour market by reducing a coexisting surplus of demand and supply in regional markets. But at the individual level, workplace mobility also leads to higher mobility costs in the form of commuting or migration. Individual restrictions on meeting these costs might severely hamper the clearing of the labour market at the national level. This disequilibrium problem is well known in the migration literature. Ballard and Clark (1981), for instance, show that regions with a lack of suitable job opportunities sometimes have lower rather than higher out-migration rates. They resolved this paradox by taking the selectivity of migration into account. As the more mobile leave the area, the migration propensity decreases, because the less mobile remain behind. A lack of suitable job

opportunities at the place of residence is the trigger for the migration decision of those who have left.

The three options identified above show that the disequilibrium problem has been only partly defined in the migration literature. The start of the disequilibrium is geographical disparity in job access—the number of suitable local job opportunities—without which accepting a job at a greater distance could be avoided altogether. Migration is only one of the means of accepting a job at a greater distance; the other is stretching the commuting tolerance. Together, migration and commuting tolerance determine an individual's spatial flexibility. Measured in terms of distance, commuting tolerance has undoubtedly grown over the past few decades, through faster means of transport. In contrast, migration tolerance is affected negatively by the rising share of dual-earner households. Dual-earner households have a lower propensity to make a residential move than do couples or families with a single breadwinner (Jarvis, 1999; Mulder, 1993; Mulder and Hooimeijer, 1999), but may accept a longer commute.

Because migration and commuting are substitutes in spatial flexibility, analysing only one of them yields a partial understanding of workplace mobility. More importantly, the options show that there are two sources of selectivity in accepting a job at a larger distance. The first is an overall low chance of finding another job which makes people stay put in their jobs or in unemployment. The second is that people who are able to find another job, but are restricted in their search area, choose the second option rather than the third. The mechanisms affecting these choices are different. In general, a low level of job mobility leads to staying put. Spatial inflexibility leads to accepting a job closer to home. The determinants of these two types of inflexibility are not necessarily the same.

Although an extensive body of research has identified the main determinants of job mobility, little is known as yet about the determinants of workplace mobility. Moreover, the existing literature on job mobility pays little attention to job access. Only the monetary costs of commuting and migration are taken into consideration, not the availability of jobs. Relatively little labour economics research has been formulated in a truly spatial context (Crampton, 1997). Spatial labour-market behaviour is, however, determined by more than just the cost of covering distance. Job access also play a role (Fisher and Nijkamp, 1987; Hanson and Pratt, 1991).

A more comprehensive approach to the role of space in job mobility is needed: an approach in which general job mobility and workplace mobility can be separated, in which workplace mobility is measured directly and not via migration or commuting, and in which access to job opportunities enters the analyses after factors determining spatial flexibility at the individual level have been taken into account. The aim of this paper is to provide such an approach.

We present a two-step analysis. In the first step we analyse the odds that people find a(nother) job in a given time period: job mobility. In the second step we analyse the odds that people who accept a job do so outside a range of 45 km from their place of residence: workplace mobility. The 45 km range corresponds to an average commuting time of 30 minutes by car. The results from the first step are used to correct for the selectivity in general job mobility in the second step. In both the first and the second step, we include job access as an independent variable. The main hypothesis is that people living in a location with poor job access show lower odds of general mobility and higher odds of accepting a job over a long distance after controlling for the determinants of spatial inflexibility.

The data on individual characteristics and behaviour come from the Netherlands Labour Force Surveys (EBB) 1994–97. We have used retrospective information on job mobility in the year preceding the interviews, including the distance to the new job

from the original place of residence. The data on job opportunities were derived from the National Information System of Employment (LISA). Job access of residential locations is measured as the absolute number of jobs, by job level, which can be reached within 30 minutes by car from that location. Job access is estimated with the use of a network-oriented geographic information system extension (see van Ham et al, 2001). The variable is matched to the behavioural data by using the postcode of the residential locations as a key.

2 Job mobility, workplace mobility, and job access

Our theoretical framework elaborates the three options identified in the introduction: staying put; accepting a job nearby even if it is below one's education level; widening the search area. The starting point for our conceptualisation is that workplace mobility is a special case of job mobility in general; among those who accept a job, only a selective group of workers accept a job at a greater distance. The review of the literature begins with a discussion of the determinants of general job mobility. Next, we focus on the determinants of workplace mobility. We discuss spatial flexibility and restrictions; which individual characteristics determine individual opportunities for workplace mobility. After that, we place job and workplace mobility in a spatial context by including job access in our theoretical framework. The theoretical basis of the framework is essentially economic, drawing on aspects of human capital and search theory.

2.1 Human capital and job mobility

The most prominent and widely documented fact about job mobility is that, on average, workers change job less frequently with increasing age and experience. Topel and Ward (1992) reported that young men made more than two thirds of their lifetime job changes during their first ten years of work experience (see also Booth et al, 1999). The age effect on job mobility can be explained by human capital theory (Becker, 1962). Over the years, workers invest in productivity-enhancing skills and strive to maximise the utility of this accumulated human capital. The stock of human capital people acquire during a lifetime has three main components. The first is general human capital, commonly acquired through the educational system, which enhances productivity equally in all sectors. The second is sector-specific human capital (Simpson, 1992). This human capital enhances productivity only in a specific sector of the economy. The third component is enterprise-specific human capital which is acquired with tenure (on-the-job training) and is not transferable across employers. The sector and firm capital can be lost when people accept another job. If older workers have longer tenures and therefore more specific human capital than younger workers, the wage gains of job-to-job mobility would thus be lower for older workers. In addition, older workers have fewer remaining years of work in which to recoup the costs of a job change (Mincer, 1962).

Viewpoints differ about the effect of education on job mobility. According to Bartel and Lichtenberg (1987), more highly educated workers tend to have faster moving careers and change jobs more often as an institutional requirement for climbing the career ladder. Bartel and Lichtenberg argue that there ought to be considerable job mobility among highly educated workers. However, Börsch-Supan (1990) found that people with a high level of education are less likely to change jobs. This finding is consistent with the theory of firm-specific capital. Workers seem to accumulate more skill and knowledge specific to a firm if they have a higher level of education. This firm-specific capital increases job duration and inhibits job mobility.

Unemployed people do not utilise their accumulated human capital and therefore face considerable loss of income. Further, unemployment, and especially long-term unemployment, leads to loss of skills. On the basis of human capital theory and after controlling for educational level, we would expect being unemployed to have a positive influence on the probability of accepting a job.

The labour-force participation of women is lower than that of men. Women, whether participating or not, are also less often engaged in job search than men (Keith and McWilliams, 1999; van Ham et al, forthcoming). According to the 'new home economics', this difference is a result of women's lower wage rates (Becker, 1975; 1991), generating a division of labour in which women undertake most of the household and childcare responsibilities. Apart from microeconomic factors, traditional attitudes with respect to women and child-raising also play a part (Hanson and Pratt, 1990; 1995; Pratt and Hanson, 1991). As a result, many women with spouses, particularly those with working spouses, place a low priority on pursuing a career (van Ommeren et al, 1999). We expected women, particularly those in two-earner households, to show less job mobility than men. We further expected that, for women, the presence of young children in the household would negatively influence job mobility.

According to Gilbert (1998) much research disregards the effect of gender on labour-market outcomes. She argues, however, that especially for women ethnicity and racism play an important role. A lack of language skills and discrimination by employers can cause ethnic minority groups to be less mobile. Further, as Gilbert argues, women from ethnic minorities in particular are more spatially constrained which may lead to reduced job mobility. Based on the above we expected the downward effect of being an immigrant on job mobility to be stronger for females than for males.

2.2 Determinants of workplace mobility

Many people are more or less fixed in space as a result of limited possibilities for long-distance commuting and job-related migration. Those who accept a job at a greater distance are a very selective group. We have denoted the possibility of accepting a job at a greater distance as 'spatial flexibility'. Large variations in spatial flexibility—and therefore the probability of accepting a job at a greater distance—were expected for various socioeconomic groups. To some extent the determinants of workplace mobility overlap those of general job mobility.

The role of age is based on a mechanism which resembles the effect of the accumulation of sector-specific or firm-specific human capital. Older people also accumulate more location-specific capital which inhibits spatial mobility (DaVanzo, 1981). Older workers tend to have greater direct costs, because of homeownership and family obligations, and higher psychic costs of leaving familiar surroundings (Polachek and Horvath, 1977; Sjaastad, 1962). We therefore expected that as people got older the probability of accepting a job at a greater distance would decrease rapidly.

According to Börsch-Supan (1990), when people with a high level of education accept a job, they more often do so at a greater distance. This effect of education is consistent with the theory of search and transaction costs. These costs decrease with level of education, because highly educated individuals are likely to accumulate more information and process information more efficiently. Education is said to be associated with greater knowledge of alternative opportunities (March and Simon, 1958). Furthermore, jobs requiring a high level of education are more spatially dispersed than jobs at a lower level. We therefore expected the highly educated to be more spatially mobile: they have to search larger areas to find a suitable job (Simpson, 1992). According to DaVanzo (1978), economic theory suggests that, other things being

equal, the unemployed are more spatially flexible, because they have lower opportunity costs of moving and less job-specific capital than the employed. They are expected to be more responsive to job opportunities elsewhere and therefore to accept jobs at a greater distance more often.

Findings from the literature on job-related migration and commuting led us to expect gender and household situation to be important determinants of workplace mobility. Women have been shown to have shorter commuting distances and times than men (Blumen, 1994; Gordon et al, 1989; McLafferty and Preston, 1997; Turner and Niemeier, 1997). According to Madden (1981), gender differences in household roles are important in influencing women to accept jobs closer to home [see also Johnston-Anumonwo (1992) on the household responsibility hypothesis]. Because women face more time–space constraints than men, we expected them to show less workplace mobility. We further expected that the presence of children in a household would cause women to reduce their workplace mobility more than men (see also Baccaïni, 1997; Rouwendal, 1999).

Having a partner would also be expected to influence workplace mobility. Human capital theory (Mincer, 1978; Polachek and Horvarth, 1977) argues that married workers are less likely to move, because of the greater direct moving costs, the need to offset the psychic costs for both spouses, and the likelihood that a move may result in lost employment or income for the tied mover. Lower mobility among married people is indeed found (DaVanzo, 1981; Mincer, 1978; Ritchey, 1976). Job-related long-distance migration has also been found to be lower among dual-earners than among one-earner couples (Wagner, 1989, for Germany; Mulder, 1993 for the Netherlands; Bartel, 1979, Lichter, 1982 for the USA). For a two-earner household, any change of geographic location is likely to be more expensive than for one-earner families (Shaklee, 1989). This lack of migration tolerance among couples might be compensated by a larger commuting tolerance among the male partners in particular. The presence of a partner to deal with domestic chores and childcare would increase the time budget of the other partner. We would therefore expect cohabiting and married women to be less spatially mobile than singles, whereas we would not expect such an effect for men.

The characteristics of the accepted job were also expected to influence the distance at which a job is accepted. Accepting a job at a greater distance requires high investments in the form of commuting or migration. Clearly, migration is only worthwhile when the returns are sufficiently high (Sjaastad, 1962). People would probably be less willing to accept a job located at some distance from their residence for a part-time position (compare Giuliano, 1998). The return on investment in workplace mobility is highest for high-level jobs. Several studies show a positive relationship between occupational level (or income) and actual geographical mobility (Duncan and Perrucci, 1976; Lichter, 1980; Polachek and Horvarth, 1977; Ritchey, 1976), or the willingness to move (Fernandez, 1981; Markham et al, 1983). Markham and Pleck (1986) expected a positive effect of occupational level on willingness to move, because of the wider geographical dispersion of labour pools for specialised jobs and the greater visibility to such employees of jobs in other locations.

The economic sector might also have an influence on workplace mobility, because of the uneven spatial distribution of jobs between sectors. It is easy, for example, to imagine that jobs in healthcare are more widely dispersed than jobs in the petrochemical industry, so workers in one sector might have to be more spatially mobile than those in another sector.

Undoubtedly, commuting distance to the previous job also plays a part. For those who already had a long commute, the new job might be closer rather than further away. Furthermore, some people have adjusted their lives to long commutes and are

used, for example, to combining their commuting trip with shopping, or taking their children to childcare facilities. We therefore expected that workers who already commuted over a long distance in their previous job are more spatially mobile when accepting a new job.

2.3 Job access of residential locations as a spatial context variable

People change job to make career advancement. Career advancement through job mobility is only possible if suitable employment is available and accessible. When access to suitable local job opportunities within reasonable commuting time is poor, workplace mobility is a means of escaping underemployment that results from the spatial mismatch between supply and demand (see also Simpson, 1992).

The ‘spatial mismatch hypothesis’ as formulated by Kain (1968) was “originally coined to describe a broad set of geographical barriers to employment for African-American inner city residents” (Preston and McLafferty, 1999, page 387), but has wider implications. Central in the spatial mismatch debate is that poor geographical access to jobs reduces employment opportunities and negatively influences labour-market outcomes. Kain already described the importance of transportation in shaping access to employment (Preston and McLafferty, 1999). The mechanisms that cause underemployment in the case of spatial mismatch are a combination of individual restrictions with a wider overall context of poor job access.

The availability of employment opportunities largely depends on the spatial configuration of suitable employment relative to the location where someone lives (see van Ham et al, 2001). Fielding (1992) has shown for the United Kingdom that at the national level migration towards the employment-rich southeast of England generates positive labour-market outcomes (see also Fielding and Halford, 1993). At the regional level it is important to differentiate between social groups. According to Hanson and Pratt in their book *Gender, Work, and Space* (1995, page 119) “for people looking for work close to home (most of whom are women), the residential location on this landscape, the location from which the job search begins, importantly defines access to different kinds of work.” In discussing job availability, the segmentation of the labour market should be taken into account. Workers differ in their level and degree of specialisation of human capital, and jobs differ by level. Only a subset of all the jobs within reach is suitable for an individual job searcher (Hanson and Pratt, 1995). Assuming that all job searchers want to maximise the returns on previous investments in human capital, they will search for jobs where these returns can be maximised (see also Becker, 1962).

Accessibility of jobs is determined by the spatial flexibility of individual workers. Phelps (1970) pictured the economy as a group of ‘local labour-market islands’ between which moves are costly. The cost of covering the distance between islands inhibits workers from accepting jobs located on other islands. Hägerstrand (1970) recognised that, besides monetary costs, time is also an important constraint on spatial flexibility. From a fixed residential location, the journey to and from work is only possible when this occurs within an individual’s daily activity space. According to this line of reasoning, a job is accessible as long as it can be reached on a daily basis within an acceptable commuting time. Most people’s commuting tolerance is limited: 45 minutes’ commuting is the maximum for most employees (van Ommeren, 1996; Wachs and Taylor, 1993). In practice, Wachs and Taylor (1993) find for the USA that almost two thirds of all employees spend less than 35 minutes commuting to work. In the Netherlands, 80% of all employees spend half an hour or less (van Ham et al, 2001). Given these empirical results it seems reasonable to assume that for the Netherlands job

access can be defined as the number of suitable jobs which can be reached from the residence within 30 minutes.

There are two conclusions on the effect of job access on (spatial) job mobility. First, access to suitable employment increases the probability that one can find a better job. We therefore hypothesise that living in a location with good access to suitable employment leads to more job mobility. Because women are less spatially flexible than are men, we further hypothesise that for women job access has a stronger effect on job mobility. Second, we deduce from the spatial mismatch hypothesis that workplace mobility is a means to overcome poor local job access. We therefore expected that people living in locations with poor job access and unable to reach a reasonable number of suitable jobs within a reasonable commuting time would have to be more spatially flexible and, as a consequence, be more likely to accept jobs at a greater distance.

Summarising, we have formulated a number of hypotheses both with respect to general job mobility and workplace mobility (see table 1). For both we expect that mobility will decrease with age and will be higher among the unemployed. With respect to education we have formulated competing hypotheses on the effect on job mobility and expect a positive effect on workplace mobility. We have also formulated contrasting hypotheses for men and women with respect to the role of the household situation. Having a partner will decrease the mobility among females. Having a child will reduce mobility among both sexes, but more particularly among the females. Ample job access will have a positive effect on general job mobility as it increases the opportunities for career advancement, but will have a negative effect on workplace mobility as it decreases the need to widen the search area.

Further factors leading to higher workplace mobility are: the number of hours worked, the level of the job, and a large commuting distance at the start of the observation period. We expect varying effects from the sector in the economy, depending on the geographical dispersal (negative) or concentration (positive) of the jobs.

Table 1. List of hypotheses.

	Job mobility ^a		Workplace mobility ^a	
	men	women	men	women
Age	–	–	–	–
Education	+ or –	+ or –	+	+
Being unemployed	+	+	+	+
Having a partner	0	–	0	–
Children in the household	–	--	–	--
Being an immigrant	–	--	nh	nh
Hours per week	nh	nh	+	+
Job level	nh	nh	+	+
Sector	nh	nh	Different effect per sector	
Previous commuting distance	nh	nh	+	+
Job access	+	++	–	–

^a + positive effect expected; – negative effect expected; 0 no effect expected; nh no hypothesis.

3 Data and methodology

The implications of these theoretical considerations for the empirical analyses are far reaching. The relationship between poor job access and workplace mobility is not straightforward. Whether people accept a job at a greater distance also depends on the chances of finding another job and on the size of the search area. To a

considerable extent, the determinants of the chances of finding another job and of spatial restrictions that limit the search area overlap. For instance, a higher level of education enhances the chances of finding a job, requires people to search a wider area, and increases the returns on the decision to accept a job at a greater distance. Analysing the role of spatial restrictions would therefore lead to biased results if the selectivity of the group finding a job at all were ignored. To analyse the relationship between job access and workplace mobility, one needs to correct for this selectivity and to control for spatial restrictions at the individual level. Many of the determinants are gendered and are therefore, expected to have different effects for men and women. Separate analyses are a pragmatic choice to avoid the inclusion of too many interaction effects in the empirical models.

The data used in this paper were derived from the Netherlands Labour Force Surveys (EBB) conducted in 1994, 1995, 1996, and 1997 by Statistics Netherlands. The dataset includes detailed information concerning individual and household characteristics, such as level of education, number of children, job characteristics, partner characteristics, and detailed information on the workplace and the residential location. Furthermore, the dataset includes information on where the respondent worked and lived one year before the interview.

The analyses were restricted to respondents aged between 15 and 54 years excluding students, the armed services, the self-employed, workers without a fixed working address, and the disabled. After this selection, the dataset amounted to 144 050 men and 156 295 women. In total, 15 171 men and 14 377 women accepted a job in the year before the interview. Men and women were analysed separately. First, we analysed labour-market flexibility in general: whether or not people accept a job. Second, for the selective group of workers who accepted a job, we analysed whether or not they accepted a job at a greater distance. In both analyses the dependent variable is dichotomous; we have therefore used logistic regression models.

In the second analysis we have included only those who accepted a job in the year before the interview. To correct for this selectivity, we used Heckman's (1979) two-step procedure, by including a correction factor, λ , in the analyses of job acceptance at a greater distance. In its transformed form λ represents the inverse of the predicted probabilities of accepting a job from the first model. The first and second analyses need to have different sets of independent variables so as to avoid multicollinearity between λ and the subset of independent variables in the second model. For this reason the variables 'immigrant or descendant' and 'year of interview' are included only in the first model.

3.1 Variables

The dependent variable in the analysis of job acceptance measures whether people accepted a job in the year before the interview. Eight independent variables have been included. Level of education is measured in five categories: primary education; lower level secondary education; upper level secondary education; higher vocational education; university. Age is measured in seven categories: younger than 25 years; 25–29 years; 30–34 years; 35–39 years; 40–44 years; 45–49 years; 50–54 years. The type of household is categorised as: single; couple with nonemployed partner; couple with employed partner; others (predominantly children living with their parents). Dummy variables indicate whether there was a child younger than 5 years old present in the household, and whether a respondent was of foreign origin (immigrants and their descendants being coded as one category in the data). The year of interview is indicated in four categories: 1994; 1995; 1996; 1997. Labour-force status a year before the

interview is measured as employed, or not employed. Job access is included as a continuous variable.

The dependent variable in the analysis of workplace mobility measures whether people accepted a job at a greater distance. We defined long distance as 45 km or more. We would have preferred to use a direct measure of travelling time, but unfortunately it was not possible to calculate an accurate estimate of the travelling time between the two locations. Instead, we decided on this 45 km threshold because this is the distance that, on average, can be covered in about 30 minutes of travel time. In the theoretical part of this paper (see section 2.3) we saw that this is a reasonable approximation of the maximum time people are willing to commute. For all respondents who accepted a job in the year before the interview we calculated the distance in kilometres between the place of residence one year before the interview and their present job: this is the distance at which they accepted a job.

In the analysis of workplace mobility, ten independent variables and the correction factor lambda have been included. Age, level of education, type of household, and job access are measured in the same way as in the first analysis. The presence of children is categorised in more detail as: no children; youngest child under 6 years old; youngest child between 6 and 12 years old; youngest child between 12 and 17 years old. Hours worked per week are in four categories: 13–20 hours; 21–35 hours; 36–40 hours; more than 40 hours a week.

The variable job level was developed by Statistics Netherlands. Job levels are assigned to jobs on the basis of the Standard Job Classification (SBC-1992, see CBS, 1993). Job levels are defined by the amount of theoretical or practical schooling needed to perform the task adequately and needed working experience (or training time). Five job levels are distinguished: elementary; low; middle; high; graduate. Job sector is categorised as: manufacturing and agriculture; construction; transport and communication; wholesale and retail trade; hotels and restaurants; financial and business services; public administration; education and health; community, social, and personal services. Together, job level and sector are the best proxies available of the occupational differentiation in skills from more ubiquitous towards highly specialised jobs and in geographical distribution from widely dispersed towards highly concentrated jobs. The data do not allow us to differentiate between jobs in the 'old' or the 'new' economy.

Labour-force status one year before the interview is defined as employed or not employed. A respondent's commute for the previous job at a greater distance is defined in an analogous manner to the dependent variable. A commuting trip of more than 45 km one year before the interview is considered a long distance. For respondents without a job one year before the interview the 'former commuting trip' variable is missing. In order to be able to include these respondents in the analyses we used the substitution of the means method. For the respondents without a job one year before the interview, the average of the respondents with a job has been substituted for this dummy. This substitution of the means leads to unbiased coefficients of the dummy for those with a job one year before the interview (compare Cohen and Cohen, 1975, chapter 7).

3.2 Measuring the job access of residential locations

The job access of a residential location is measured as the absolute number of jobs, by job level, which can be reached within 30 minutes by car from that location. Two important choices underlie the way we measured job access. The first is that we decided to use a 30-minute threshold instead of a smooth travelling-time trade-off. The reasoning behind this is that in the Netherlands nearly 90% of commuters use private modes of transport and 80% of the working population travels less than

30 minutes per single journey to work. Our threshold of 30 minutes travelling by car is therefore thought to be a reasonable measure of local labour-market access (van Ham et al, 2001). Second, we decided to use absolute measures of the number of jobs within reach instead of applying some correction for the competition for these jobs from other jobs searchers residing in the same area. We do so, because what we are interested in is a measure of the size of the total opportunity set, as this size determines the probability of a suitable job becoming available.

Job access of residential locations should be measured at a detailed geographical level to account for the spatial distribution of jobs in dispersed locations. The finest measurements of residential locations in our dataset are the almost 4000 four-digit postcode areas. The role of the transportation network in measuring job access is crucial, because the transportation infrastructure links residence to jobs. We therefore have to take into account the quality of the connection in terms of the average travelling speed on each road segment. To handle the geographical detail and the measurement of travelling times over the road network, the choice of a geographical information system has become popular in spatial mismatch research (Hanson et al, 1997; Ong and Blumenberg, 1998). We used Flowmap, a network-oriented GIS-extension developed at the Faculty of Geographical Sciences, Utrecht University (De Jong and Floor, 1993) to calculate the number of jobs within 30 minutes by car, using a fastest-path algorithm.

For data on the spatial distribution of jobs we used the 1991 and 1994 National Information System of Employment (LISA)⁽¹⁾ This is a registration of nearly all the establishments in the Netherlands, including government and other noncommercial organisations. An establishment is defined as an individual plant, store, or office; multiestablishment firms have separate listings for each establishment. The dataset includes information on total employment per establishment and the location of each job site by address. To estimate job access on the basis of the LISA dataset, all establishments were geocoded to a postal code area by using work-site addresses. Unfortunately, LISA does not contain information on job levels. By combining the LISA data and the data from the EBB we estimated the number of jobs by level (using the four SBC-1992 job levels) for each four-digit postcode area. Flowmap was used to generate proximity counts, the number of jobs per level that can be reached within 30 minutes by car, for each postcode [see van Ham et al (2001) for a more detailed description of the method used]. We allotted a measure of job access to all the respondents on the basis of their residential location and their educational level.

Figure 1 shows the enormous differentiation in the total number of jobs that can be reached within 30 minutes from residential locations. As can be expected, job access is high from locations in and around the four major concentrations of employment opportunities: the cities of Amsterdam, Rotterdam, The Hague, and Utrecht. In line with the original spatial mismatch hypothesis, the locations in between these cities, not the four largest cities themselves, show the highest job access. The four cities are located relatively close to each other, so people living in between them can reach more than one concentration of employment within 30 minutes (see also van Ham et al, 2001). The worst job access, however, is found in peripheral locations. This finding corresponds with the idea of the central urban area as an 'escalator region', offering ample opportunities for the upwardly mobile (Fielding, 1992).

⁽¹⁾ The LISA datasets were obtained from the National Institute of Public Health and the Environment (RIVM, Bilthoven, The Netherlands) for the Ruimtescanner project.

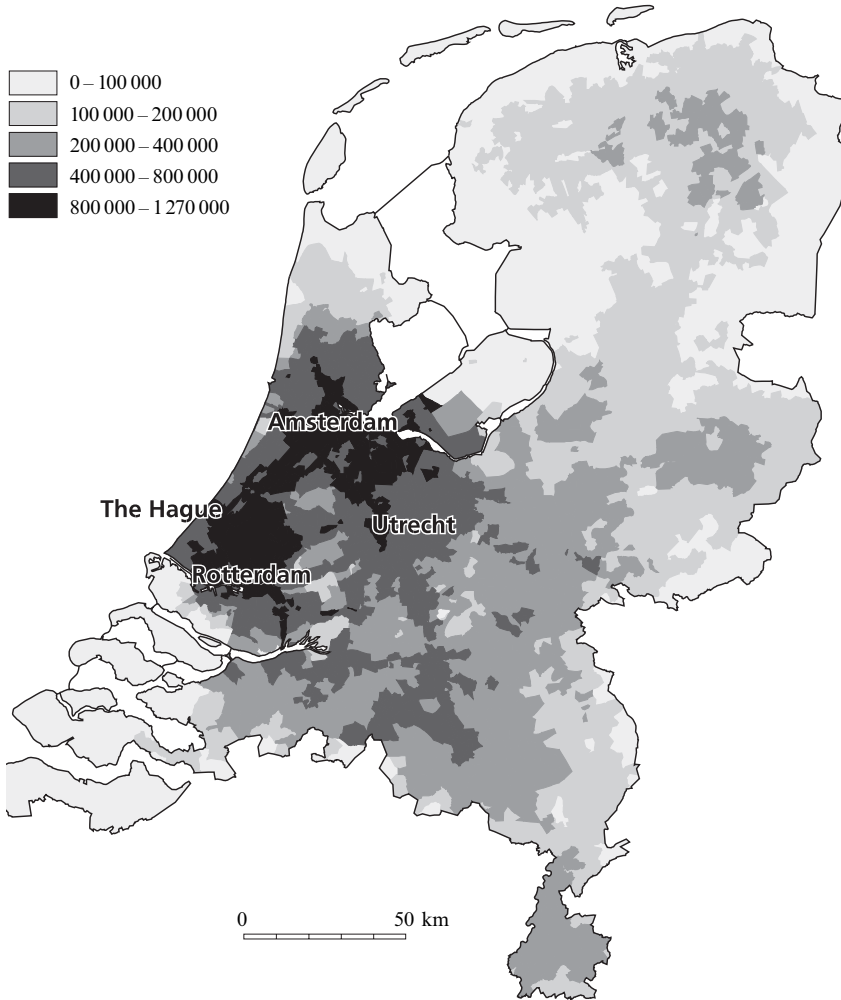


Figure 1. Job access within 30 minutes (number of jobs) (source: National Information System of Employment 1991 and 1994, based on own calculations).

4 Results

4.1 Job mobility

Just over 10% of the men and 9% of the women found another job in the year preceding the interview. Table 2 (see over) gives the results of the analysis of job mobility. The analyses were run separately for men and for women as we hypothesised marked differences between them.

As expected, the probability of finding a job decreases with age. The probability of job mobility increases with level of education. This finding is in contrast with that of Börsch-Supan (1990) in the USA and supports the hypothesis of Bartel and Lichtenberg (1987) that more highly educated workers changed jobs more often. As expected, employed people find another job less often than unemployed people. Previous work on job search behaviour (van Ham et al, forthcoming) shows that this higher level of mobility among the unemployed can be related to the search intensities. Most factors (such as age and education) that drive the search are identical for the employed and the unemployed, but the overall search intensity among the latter group is

Table 2. Logistic regression of job mobility by gender.

	Men			Women		
	<i>B</i>	standard error	exp(<i>B</i>)	<i>B</i>	standard error	exp(<i>B</i>)
Age (years)						
<25	0		1	0		1
25–29	–0.522***	0.031	0.594	–0.673***	0.031	0.510
30–34	–0.909***	0.036	0.403	–1.119***	0.034	0.327
35–39	–1.265***	0.039	0.282	–1.494***	0.035	0.225
40–44	–1.500***	0.041	0.223	–1.833***	0.037	0.160
45–49	–1.836***	0.045	0.160	–2.265***	0.042	0.104
50–54	–2.111***	0.053	0.121	–3.004***	0.059	0.050
Education						
primary	0		1	0		1
lower secondary	0.426***	0.037	1.531	0.512***	0.041	1.669
upper secondary	0.652***	0.036	1.919	0.912***	0.040	2.490
higher vocational	0.921***	0.040	2.511	1.415***	0.043	4.116
university	1.106***	0.045	3.021	1.839***	0.052	6.290
Previous labour-force status						
nonemployed	0		1	0		1
employed	–1.844***	0.021	0.158	–1.207***	0.021	0.299
Household situation						
single	0		1	0		1
couple, partner nonemployed	0.343***	0.035	1.409	–0.296***	0.042	0.744
couple, partner employed	0.488***	0.032	1.629	–0.100***	0.026	0.905
others	0.254***	0.036	1.290	0.204***	0.037	1.226
Child under 6 years						
no	0		1	0		1
yes	–0.125***	0.027	0.883	–0.990***	0.027	0.372
Immigrant or descendant						
no	0		1	0		1
yes	–0.521***	0.033	0.594	–0.329***	0.034	0.720
Year of interview						
1994	0		1	0		1
1995	0.117***	0.028	1.124	0.074***	0.029	1.077
1996	0.235***	0.028	1.264	0.212***	0.029	1.236
1997	0.620***	0.027	1.859	0.893***	0.027	2.443
Job access (×100 000)	0.017***	0.005	1.017	0.024***	0.004	1.024
Constant	–0.997***	0.050		–1.473***	0.051	
Initial-2 log likelihood	98 077			97 502		
Model-2 log likelihood	81 569			81 489		
Improvement	16 507,			16 012,		
	20 degrees of freedom,			20 degrees of freedom,		
	<i>p</i> = 0.0			<i>p</i> = 0.00		

Significance: * $p < 0.10$; ** $p < 0.05$, *** $p < 0.01$.

understandably higher. We therefore included only the main effect for employment status in this analysis and concentrate on gender differentials in the following.

Although the signs of the age and education parameters are identical for men and women, the magnitudes are clearly different. The constant is significantly more negative in the model for women, indicating overall lower job mobility. The age effect is more strongly negative for women than for men. The odds of a woman aged between 50 and 54 finding a job are 0.05 times the odds of a woman aged under 25 finding a job. The educational effect is strongly positive. The odds of a woman with a university

degree finding a job are six times higher than for women with only primary education; for men, these odds are only three times as high.

Among the more highly educated (with at least higher vocational training) the stronger educational effect for women compensates for the lower constant and the more marked age effect up to the age of 45. In other words, within the group of younger singles with a higher education, the odds of job mobility for men and women are roughly the same. Gender differences show up in particular among older people and people with less human capital.

Marked gender differences are brought about by the position in the household. Men with a partner are more mobile than single men, whereas women with a partner are less mobile than single women. Having a partner apparently allows men to be more active or successful in the labour market, whereas for women having a partner hampers their job mobility. The presence of a child under 6 years old in the household exacerbates this effect. Having young children has only a small negative effect on job mobility for men and a strong negative effect for women. For women with a child under 6 in the household, the odds of accepting a job are 0.37 times the odds for women without a child under 6.

As expected, immigrants and their descendants are less mobile than nonimmigrants. The lower chances in the labour market of migrants might be the result of lower skills (language) or of discrimination by employers. Opposite to what was expected, male immigrants are less mobile than female immigrants. Year of the interview has been included in the model to avoid multicollinearity and unstable parameter estimates when we include lambda in the model of workplace mobility to control for selection effects. The results show that the year of interview has a significant effect on job mobility. People interviewed in more recent years are more mobile. This effect probably results from the rapid growth in the demand for labour in the Netherlands at the end of the 1990s.

The effect of job access confirms the hypothesis we deduced from the spatial mismatch debate: living in a location with good access to suitable employment leads to more job mobility. As expected, for women the effect of job access on job mobility is stronger than for men. Because women are less spatially flexible, they are more dependent on local jobs.

4.2 Workplace mobility: accepting a job at a greater distance

Table 3 (see over) presents the results of the analysis of workplace mobility. Of those respondents who accepted a job, 14% of the men and 8% of the women accepted a job at a greater distance. The research population consists of respondents who found a job in the year before the interview. The dependent variable measures whether or not the respondent accepted a job over a greater distance. Only the models corrected for selection effects are presented.

As expected, as age rises people are less likely to accept a job at a greater distance. For men, the effect of age is not significant in a model without correction for selection effects (not shown). This result indicates that our population is selective by age. Because job mobility in general decreases with age, our population, which includes only people who accepted a job, consists of a selective group of older workers who are still active on the labour market. These workers are not a representative sample of the whole population of older workers and therefore our parameter estimates in the model without correction are biased. When we correct for the fact that the population is selective by age, the unbiased parameters show that, as expected, workplace mobility indeed decreases with age.

Table 3. Logistic regression of workplace mobility by gender.

	Men			Women		
	<i>B</i>	standard error	exp(<i>B</i>)	<i>B</i>	standard error	exp(<i>B</i>)
Age (years)						
<25	0		1	0		1
25–29	–0.064	0.103	0.938	–0.290**	0.113	0.749
30–34	–0.270***	0.135	0.763	–0.487***	0.155	0.614
35–39	–0.556***	0.165	0.574	–0.864***	0.198	0.421
40–44	–0.497***	0.187	0.608	–1.153***	0.238	0.316
45–49	–0.652***	0.218	0.521	–1.246***	0.279	0.288
50–54	–0.780***	0.253	0.458	–1.831***	0.406	0.160
Education						
primary	0		1	0		1
lower secondary	0.029	0.148	1.030	0.205	0.270	1.228
upper secondary	0.553***	0.155	1.739	0.694**	0.272	2.001
higher vocational	1.051***	0.178	2.859	1.360***	0.295	3.897
university	1.337***	0.198	3.808	1.858***	0.325	6.413
Household situation						
single	0		1	0		1
couple, partner nonemployed	0.165	0.103	1.180	–0.205	0.160	0.815
couple, partner employed	0.076	0.096	1.079	–0.243***	0.086	0.784
other	–0.282***	0.107	0.754	–0.659***	0.132	0.517
Children under 18 years						
no children	0		1	0		1
youngest under 6 years	0.083	0.084	1.084	–0.530***	0.153	0.589
youngest 6–12 years	0.007	0.104	1.007	–0.676***	0.172	0.509
youngest 13–17 years	0.011	0.111	1.010	–0.313**	0.167	0.731
Hours per week						
13–20	0		1	0		1
21–35	–0.077	0.172	0.926	0.298***	0.112	1.347
36–40	0.127	0.156	1.135	0.468***	0.116	1.596
>40	0.137	0.189	1.147	0.555**	0.215	1.742
Job level						
elementary	0		1	0		1
low	0.830***	0.158	2.294	0.479**	0.202	1.613
middle	1.110***	0.159	3.035	0.743***	0.206	2.102
high	1.610***	0.171	5.003	0.924***	0.226	2.519
graduate	1.733***	0.190	5.660	1.511***	0.250	4.532
Sector						
1		0		1	0	
manufacturing and agriculture						
construction	0.353***	0.109	1.423	0.100	0.330	1.105
transport and communication		0.038	0.124	1.038	0.551***	0.204
1.735						
wholesale and retail trade	0.045	0.092	1.046	0.116	0.157	1.123
hotels and restaurants	0.238	0.161	1.268	0.448***	0.220	1.565
financial and business services	0.265***	0.085	1.304	0.155	0.146	1.168
public administration	0.516***	0.097	1.676	0.045	0.176	1.046
education and health	–0.295***	0.109	0.745	0.150	0.143	1.162
community, social, and personal services	0.072	0.159	1.074	0.317	0.197	1.373
Previous labour-force status						
employed	0		1	0		1
nonemployed	0.392**	0.208	1.480	0.105	0.154	1.111
Previous commuting trip						

Table 3 (continued).

	Men			Women		
	<i>B</i>	standard error	exp(<i>B</i>)	<i>B</i>	standard error	exp(<i>B</i>)
Job access ($\times 100\,000$)	-0.161***	0.032	0.847	-0.153***	0.041	0.858
Lambda-1	0.676***	0.235	1.965	0.499**	0.221	1.649
Constant	-5.032***	0.550		-4.734***	0.542	
Initial-2 log likelihood	12 530			7 926		
Model-2 log likelihood	9 887			6 308		
Improvement	2 643			1 617		
	35 degrees of freedom, $p = 0.00$			35 degrees of freedom, $p = 0.00$		

Significance: * $p < 0.10$; ** $p < 0.05$, *** $p < 0.01$.

Also as expected, level of education has a positive effect on the probability of accepting a job over a greater distance, for both men and women. This confirms the findings of Börsch-Supan (1990) that when more highly educated people accept a job they tend to do so at a greater distance than the less well educated. The age effect is stronger for women than for men, although the difference is less marked than in the model of general job mobility. The odds of a woman aged between 50 and 54 accepting a job at a greater distance are 0.16 times the odds of a woman aged under 25 accepting a job at a greater distance (and not 0.05, as in general job mobility). The odds of a university graduate accepting a job at a greater distance are almost four and more than six times as high, for men and women respectively, as for a person with only primary education.

These results lead to the interesting observation that single women with higher education are more spatially mobile than comparable men. The constant shows that there is no overall lower workplace mobility for women. Gender differences arise in particular from the position in the household, as the parameters of these variables show. For men, having a partner has no effect on the probability of accepting a job at a greater distance. Women with a working partner are less spatially mobile than single women. The effect of having children on workplace mobility is also as expected; for men there is no effect, but for women there is a negative effect. Both findings confirm that women partners, particularly mothers, and not women in general, are more spatially constrained than men.

The findings for men are contrary to the results from the migration literature; married or cohabiting men and fathers are not less spatially flexible than single men and men without children. Clearly, the inclusion of both migrations and long commutes in our dependent variables accounts for this difference. The household situation ties men to their place of residence, but does not preclude long commutes as a means of spatial flexibility. Workers in the category 'other' are less spatially mobile than other workers. This can be explained by the fact that these workers are predominantly still living with their parents.

The effect of the number of hours worked per week points in the same direction. Working part-time does not decrease men's workplace mobility. For women we see a significant but small effect: the more hours they work, the higher the probability of their accepting a job at a greater distance. This finding indicates that women combining paid labour with domestic duties are more sensitive to distance than are men in

part-time jobs. As expected, the level of the job has a positive effect on workplace mobility.

Sector also has a significant effect on workplace mobility. Men working in the construction sector, financial and business services, and public administration are the most spatially mobile. Men working in education and healthcare are the least spatially mobile. These effects are thought to relate to differences in the spatial distribution of jobs in different sectors. People do not need to be spatially mobile to get a job in education or healthcare, because these jobs are more evenly distributed over the country than, for example, jobs in finance. Again, gender differences show up. The effects of job level and particularly of sector are less strong for men than for women. This finding would indicate that women can transfer their human capital more readily between firms and between sectors, probably because they are in less specialised jobs.

For men, being unemployed has a positive effect on workplace mobility. The effect of being unemployed was opposite in a model without correction for selection effects (not shown). This result indicates that our population, which includes only people who accepted a job, is selective. Respondents who were unemployed one year before the interview are not representative of the whole population of unemployed people. Only those who were successful in finding a job have been included and so without correction our parameter estimates in the model are biased. When we correct for the fact that the population is selective, the unbiased parameters show more workplace mobility for the unemployed. This finding confirms the hypothesis that the need to accept a job at a greater distance is higher for the unemployed than for those who already have a job. For women there is no effect from previous labour-force status. Respondents who already had a job and commuted over a greater distance were more likely to accept another job located at some distance from where they lived.

The effect of job access confirms our main hypothesis: after controlling for individual characteristics determining spatial flexibility, people living in locations with poor access to suitable employment opportunities more often accept a job at a greater distance. With every extra 100 000 suitable jobs within reach, the odds of accepting a job over a long distance are decreased by a factor of 0.85 for men and 0.86 for women. So, for example, for a woman with access to 100 000 jobs within 30 minutes, the odds of accepting a job at a greater distance are estimated to be 1.60 times higher than for a woman with access to 400 000 jobs within 30 minutes. This finding indicates that accepting a job at a greater distance is partly driven by a shortage of suitable local employment opportunities.

5 Discussion

At a national level, workplace mobility is the mechanism that clears the labour market. Yet the existing literature shows that disequilibria among regional labour markets persists owing to individual restrictions in accepting a job at a greater distance from the place of residence. To understand labour-market adjustment adequately as a macro-level phenomenon, microlevel behaviour should be included in the conceptualisation and in the empirical analysis.

In this contribution we have set out to extend the understanding of individual behavioural responses to a lack of suitable job opportunities on the local labour market. The starting point of the analyses is that workers facing such a lack have three options: staying put in their present job, or remaining unemployed; accepting a job within reasonable commuting distance from their residence, even if the job is beneath one's level of education; widening their search area and accepting a job at a greater distance, either by migrating or by accepting a long commute. Defining these behavioural outcomes as options is not to say that people can choose between them

freely. Because the first and second options are bound to lead to underemployment, the choice of these options is a matter of restrictions rather than preferences.

Our analyses contribute to the existing literature on workplace mobility in four ways. The first of these is the use of a direct measure of workplace mobility: the distance at which people accept a job. In this way, workplace mobility is conceptualised more clearly than when commuting or job-related migration are examined. The results show, for instance, that the conclusion from the migration literature, that married men and particularly fathers are less spatially mobile, is only partially true. Using the direct measure of workplace mobility it turns out that this group has higher general job mobility and are as likely as single men to accept a job at a greater distance. Obviously, for this group, stretching their commuting tolerance is the alternative to migrating when accepting a new job.

Our second contribution is the distinction drawn between general mobility and workplace mobility in analysing labour-market adjustment. The first result is that, in line both with the spatial mismatch hypothesis and with the escalator region concept, ample availability of job opportunities increases the level of general job mobility. Our results also show that ignoring the category that has not found a job would lead to biased results in the analysis of workplace mobility. We found, for instance, that the fact that unemployed people less often accept a job at a greater distance is caused by the fact that they often lack the qualifications to secure a job, irrespective of distance. After controlling for this selectivity it appears that people with low chances of finding another job in general and the unemployed in particular actually accept a job at a greater distance more often.

The third contribution is the elucidation of gender differentials in labour-market adjustment. It has repeatedly been claimed that women have fewer opportunities for career advancement owing to spatial restrictions that narrow the search area for another job. Our results show that women have an overall lower chance of finding another job. Being a spouse or a mother adds considerably to this effect. However, among the younger (under 45) and well-educated singles the chances for men and women are the same. After controlling for selectivity, we found that women do not have an overall lower chance of accepting a job at a greater distance and that highly educated women are *more* spatially mobile than men. Gender differentials do show up in the impact of the presence of a partner and children. For men, this presence does not limit their spatial inflexibility; for women, it does. The conclusion is therefore that spatial flexibility might contribute to the underemployment of women spouses and mothers, but not of women in general.

The fourth contribution is the incorporation of the job access of the residential location as a spatial context variable. With the use of Flowmap, a network-oriented GIS extension (see De Jong and Floor, 1993), we calculated the number of jobs, per job level, which could be reached from residential locations within 30 minutes. The results show that job access has a positive effect on general job mobility. The results also confirm our main hypothesis that people living in locations with poor access to suitable employment opportunities more often accept a job at a greater distance. Apparently, for many people, accepting a job at a greater distance is a precondition for taking a step up the career ladder. Our results show that the spatial context is important in explaining labour-market adjustment. This idea is strengthened by the fact that the sector of the job also has a significant effect on workplace mobility. Sectors differ in the spatial distribution of jobs. Therefore, workers with sector-specific human capital in a sector concentrated in only a few locations have to be more spatially flexible when accepting another job. The fact that the sector effect is less

pronounced for women might indicate that they occupy less specialised jobs and can transfer their human capital between sectors more easily.

The inclusion of these macrolevel variables may not, however, be optimal. Other variables, for example, the number of suitable vacancies that can be reached, might measure the local opportunity set of job opportunities in a better way. Data on vacancies might also offer better opportunities for operationalising suitability; in our data, the level of the jobs within reach is the only measure for suitability. More tailored measures of job-access modelling might strengthen the analyses of the role of access of job opportunities in labour-market adjustment. Unfortunately, data on vacancies are hard to obtain, seldom available, and of questionable reliability. Statistically, the standard errors of the job-access variable might be underestimated, because job access has been measured at the level of postcodes rather than the individual. However, because the magnitude of the parameter is four to five times the standard error in our analysis, we are confident that a multilevel analysis would also have generated a significant effect from job access.

We therefore conclude with confidence that our findings show the importance of the residential location in avoiding costly workplace mobility. Workplace mobility serves as a mechanism to overcome poor local access to suitable jobs. This statement implies that, for people who want to avoid mobility costs in terms of commuting and migration, those locations with the highest locational quality in terms of job access are the most favourable. These locations can be found at the edge of the larger cities, in between the major concentrations of employment. This is especially important for working women partners and mothers, because they are more spatially constrained than men and are therefore more dependent on local job opportunities. These locations will also be superior for the unemployed, some of which may remain outside employment because of their spatial inflexibility.

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