

Job access, workplace mobility,
and occupational achievement

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Job access, workplace mobility, and occupational achievement

Toegang tot banen, werkplaatsveranderingen
en de voortgang in de arbeidscarrière

(met een samenvatting in het Nederlands)

Proefschrift

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Maarten van Ham

geboren op 11 augustus 1972 te Utrecht

Promotoren: Prof. Dr. Pieter Hooimeijer, Universiteit Utrecht
Prof. Dr. Clara H. Mulder, Universiteit van Amsterdam

To my parents, Jan and Gemma

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Preface

At the beginning of 1998, Pieter Hooimeijer suggested that it was time to write a research proposal for a PhD project. In the one and a half years I had worked as Pieter's research assistant I had found doing research thoroughly enjoyable; nevertheless, the idea of working on one project for more than a year alarmed me. It was the enthusiasm of Pieter, Claartje Mulder and Oedzge Atzema which persuaded me to write a joint research proposal. The proposal forestalled my apprehension regarding a long-term research project by planning the research as a series of related papers to be published in journals over a period of less than the usual four years.

In October 1998 I embarked enthusiastically on the research under the supervision of Pieter and Claartje. One of my first tasks was to develop an instrument to measure job access. To do the calculations, I started to write a computer program myself, but, not being an expert in GIS I was delighted to discover that the software needed was already available, it had been developed in my own faculty. With the help of Tom de Jong and Jan Ritsema van Eck, I was able to use the GIS extension Flowmap for the calculations.

The research plan was an extension of my Master's degree project; I had reserved enormous help from Anton Oskamp and Jeroen Smits during the writing of my Master's degree dissertation, so I was well prepared. I benefited greatly from Jeroen's extensive literature overviews and learned a great deal from his perfectionism in data handling. Together with Jeroen, I travelled several times to the Statistics Netherlands (CBS) branch in Heerlen to work with the Labour Force Survey data. There he introduced me to Arie Elkind, Jos Kickken, and many others who provided great help with data and software problems.

For me, a great benefit of being a PhD student was the freedom I had in ordering my working time. This flexibility allowed me to continue commuting between Potsdam in Germany and Utrecht. Over the years I have spent many working days and thousands of kilometres in the train reading the literature and writing this book on my way to Simone's house — my second home. Being together with Simone, our friendship, and the regularity of the travelling sustained my discipline and energy. Simone, I am sure you will be the next to finish your thesis. I wish you all strength and energy — I know you can do it!

This book benefited greatly from the comments of all those who took part in the informal discussions at the *Leerzitting*. These not only yielded valuable com-

ments which helped me improve my work, but also helped me develop a critical approach to my own work and the work of others. Similarly, my sojourn as a research fellow at the Max Planck Institute for Human Development in Berlin and cooperation with Felix Büchel helped me develop this critical approach.

The Faculty of Geographical Sciences proved a most congenial and stimulating work environment, thanks to the many colleagues there. My preference for an office of my own is not to be construed as having no need for the company of others. On the contrary: having an office of my own gave me the opportunity to visit colleagues (and distract them from their own work) as frequently as possible. My favourite victims were Erik Stam, Gideon Bolt, Tim Schwanen, and Peteke Feijten. A working day without Erik the philosopher (who also makes great coffee) and Gideon the provocative debater would have been a bore. With them, I visited congresses, had long discussions, and unloaded my sorrows and complaints, to which they always listened patiently. Tim also helped me a great deal with his critical comments concerning theory and methodology. And then there is Peteke; I would like to say to her, *it's all about the facts*, although I am not so sure that my love for the facts really helped me complete this book. Peteke, I am very happy that our careers have crossed. Meeting you was a true life event, and I look forward to the long-term effects. There were also other friends who helped me keep a balance between the different dimensions in my life. I enjoyed the many hours of cycling, running, swimming, and all the enjoyable dinners and evenings spent with Marijn and Geertje, Joris and Yvette, Pepijn and Mariam, and other friends, too.

This book would not have come about without the support of Pieter Hooimeijer and Claartje Mulder. To have them both as *promotoren* was indeed a luxury. Never could the slightest fault have been found in the time and energy they invested in me. They provided a listening ear whenever it was needed, for both professional and private matters. Together they proved to be a strong team: Pieter as a fast thinker (sometimes far too fast for me) who always managed to structure my work when I had lost the overview. And when Pieter seemed over enthusiastic and ambitious, Claartje was there to safeguard the process and protect me from following too many side paths. Claartje maintained her critical approach throughout and helped me develop a scientific conscience. Her knowledge of data and methodology was of inestimable value. Although I am delighted for Claartje that she has been appointed as a Professor in the University of Amsterdam, her departure is a great loss for Geography in Utrecht. One of the things I appreciated most from both Pieter and Claartje was that not only were they critical when necessary, but also full of compliments and evident pride whenever I had solved some problem, or had a paper accepted for publication. Together, they have made the writing of this thesis a pleasure and have helped bring it to success. I learned a great deal from them both and I look forward to further fruitful cooperation in future research.

Maarten van Ham
Utrecht, January 2002

Chapter 1

Introduction

1.1 Background of the study

The level of unemployment is an important indicator of the functioning of the national labour market. A high level of unemployment is a matter of major concern for national governments because it incurs extra economic and social costs, such as social security expenditure. Less attention has been devoted to underemployment, a better reflection of the actual surplus of skills and qualifications than unemployment statistics. Underemployment encompasses a much wider definition of the under-utilization of the labour force and includes, for example, over-education the incidence of which for several European countries and the USA is estimated at between 10% and 42% of the employed population (Groot and Maassen van den Brink, 2000). Discouraged job seekers (non-participation) and involuntary part-time workers are also included in the underemployed (Simpson, 1992; Büchel, 2000). Even though western economies have been growing in recent years, the level of underemployment has proved unexpectedly resistant to reduction. Two major causes of this phenomenon can be identified. The first is that the skill structure of the labour force does not match the occupational structure of the labour demand: underemployment is a problem not only of a quantitative mismatch, but also of a qualitative mismatch. Occupational mismatch leads not only to the unemployment and over-education of workers, but also makes finding workers whose skills match available vacancies difficult for employers.

The second cause of underemployment is the spatial mismatch between where workers live and where jobs are located. Even in the case of a perfect balance between supply and demand at national level, underemployment will still

persist because of regional discrepancies in the match of supply and demand. Not only are jobs more concentrated in space than the workforce, but the spatial distribution of jobs also differs by industrial sector and occupational level. When the characteristics of the regional workforce do not match the requirements of the demand side, the under-utilization of labour may ensue. Regional differences in underemployment may be resolved by the spatial mobility of the labour force. At least in theory, spatial mobility plays an important part in clearing the national labour market by reducing the coexisting surplus of demand and supply in regional markets. However, the labour force is relatively immobile. At the individual level, the spatial flexibility of workers — both commuting tolerance (the maximum time workers are willing to spend on covering the distance between home and work) and migration tolerance (worker's willingness to migrate) — is limited (Hooimeijer, 1996). Being spatially flexible leads to higher mobility costs in the form of commuting or migration and individual restrictions on meeting these costs might severely hamper the clearing of the labour market at the national level. In terms of migration tolerance, the spatial flexibility of the workforce is decreasing, because of the rising share of dual income couples and home owners (Jarvis, 1999; Mulder, 1993; Mulder and Hooimeijer, 1999). Given the role of job related migration in clearing the labour market at the macrolevel, a problem of immobility arises. A decrease in the migration tolerance of workers might lead to immobility on the labour market, resulting in higher underemployment rates, but also to an increase in long-distance commuting, leading to pressure on the infrastructure, local housing markets and the environment.

The above suggests that, in order to understand the spatial disequilibrium at the macrolevel, it is important to know how geographical barriers influence individual (spatial) labour market behaviour. Over the years, labour economists have paid considerable attention to structural barriers on the labour market caused by dual and segmented labour markets, occupational segregation and discrimination. The main focus of the existing body of research is on job-worker matching: the match between the level of occupations and the skill level of workers. However, spatial barriers in this match have largely been neglected (Hanson and Pratt, 1991; Fisher and Nijkamp, 1987; Van der Laan, 1996). What is needed is a theoretical framework within which the effect of the opportunity structure on occupational achievement can be understood, including geographical barriers to employment and spatial mobility as an instrument to overcome these barriers.

1.2 Theory and problem definition

Sjaastad (1962) was one of the first to develop concepts to help explain the influence of migration as an equilibrating mechanism in the labour market. In his article 'The costs and returns of human migration' he proposed looking at migra-

tion as an investment increasing the productivity of human resources, an investment with costs which also renders returns. Since his seminal article, interregional migration is often referred to as a form of investment in human capital that is expected to pay off in the form of career advancement.

Where Sjaastad (1962) tried to express migration as an equilibrating mechanism on the national level, Blau and Duncan (1967) focused more explicitly on the significance of migration in the occupational achievement of workers. In their classic work 'The American Occupational Structure', Blau and Duncan devoted a chapter to the relationship between geographical and social mobility. They recognized the existence of regional differences in the opportunity structure and acknowledged their effects on workers' careers. More importantly, they recognized that "the occupational restrictions imposed by the community into which a man is born (...) are not (...) inescapable (...); he can migrate from his birthplace to another in which opportunities are better" (Blau and Duncan, 1967: 243). They further recognized that labour is not indefinitely mobile and spatial barriers are important: "men do not flow from places of poor to places of good opportunity with the ease of water" (Blau and Duncan, 1967: 243). Their analysis showed that in the USA migration is selective of workers with high potential and that those who do migrate tend to attain higher occupational levels and experience more upward mobility than non-migrants. Further, they showed that workers living in or moving to larger cities (which have a good opportunity structure) had the highest chances for upward social mobility.

The focus is on interregional migration in the work of both Sjaastad and Blau and Duncan. The emphasis is on residential relocations, necessitated by changes in work locations. In the literature on land use the focus is on commuting as a means of connecting the home and work locations of workers. The classic land-use model (Alonso, 1964) is based on the city as a daily urban system with an urban core of employment and a surrounding suburban residential area. A worker's choice of residential location is made on the basis of a trade-off between housing quality and commuting costs. Since the work location is assumed to be fixed, the commuting tolerance of workers determines the residential location. Workers with lower incomes and therefore limited commuting tolerance tend to occupy high density, low quality urban housing, while those with higher incomes and a greater commuting tolerance move to low density, high quality housing in the suburbs.

The literature on migration and land use discussed so far has in common an assumption of workplace dominance. The residential location is adjusted to the location of the job. The concept of workplace dominance is implicitly based on traditional households with one male breadwinner. With the increase of female labour participation and dual earner households, this approach is clearly outdated (Hooimeijer, 1996). An alternative approach is exemplified in studies by labour economists of commuting in which the residential location is assumed to be

fixed. Such an approach is appealing, because the employment situation of workers is seen as the outcome of job search behaviour which starts from the residence. The mechanism that links labour market behaviour and the opportunity structure is therefore more explicitly conceptualized on the microlevel. Studies starting from the dominance of the residential locations are more capable of explaining the labour market outcomes of workers in dual earner households, particularly women, because they attach more importance to travel time in the spatial supply function. According to Madden and White (1980) such a spatial supply function is necessary for the understanding of the geographic dimensions of the labour market, particularly for women. Madden and White show that women opt for shorter commuting times than men and suggest that these shorter trips are related to the fact that they earn less than men, work in different occupations and industries, work shorter hours, and spend more time on household responsibilities. In general, women are thought to put a higher value on time, which has implications for their (spatial) labour market behaviour (Madden and White, 1980). The contribution of these insights goes beyond the conclusion that women behave differently. More generally, they have led to the supposition that the value of commuting time is crucial in understanding labour market outcomes in a spatial context.

Commuting is a core concept in the literature on the spatial mismatch hypothesis as originally formulated by Kain (1968). According to Kain, the high rate of unemployment among African-American inner city residents can be explained by the decentralization of employment opportunities in combination with a broad set of geographical barriers to these employment opportunities for inner city residents. The spatial mismatch hypothesis assumes residential locations to be fixed and explains underemployment mainly by commuting costs. The original formulation of the spatial mismatch hypothesis has stimulated research on the effect of poor job access on labour market outcomes over the past three decades. According to an overview of spatial mismatch research in the 1990s, research has shown major advancement in three areas (Preston and McLafferty, 1999). The first is the uncovering of selection bias in studies aimed at estimating the commuting tolerance of the unemployed (Cooke and Ross, 1999). The second is the widening of the issue to encompass not only ethnicity, but also gender (Preston and McLafferty, 1999). The third is the detailed measurement of geographic access to appropriate jobs using GIS, linking this access to the level of occupational achievement (Hanson *et al.*, 1997, Ong and Blumenberg, 1998).

Notwithstanding the advancements made over the past three decades, the spatial mismatch hypothesis does not in itself provide a theoretical foundation capable of explaining the link between the spatial distribution of job opportunities and underemployment. Commuting costs alone cannot provide a persuasive argument, because they are too small to explain the enormous level of underemployment (Simpson, 1992). By concentrating on commuting as the mecha-

nism that connects home and work, labour economists tend to forget that migration is possible. The spatial mismatch hypothesis identifies the link between job access and labour market outcomes, but fails to describe the mechanisms by which the spatial distribution of job opportunities influences the opportunity set of workers and how this opportunity set influences (spatial) labour market behaviour, especially spatial mobility (both commuting and migration). Madden and White (1980) suggest that a more general “urban/labour economic” model is needed to explain workplace-residence separation, without an a priori assumption of either workplace dominance or residence dominance.

Simpson’s approach in ‘Urban Structure and the Labour Market’ (1992) is based on modern labour economics that complement residential location theory. Simpson’s theory starts from the residential location, because workplace decisions are made with higher frequencies than residential location decisions. The location of the residence is more firmly fixed than the workplace because of high residential moving costs. However, Simpson also includes migration as an option, so neither workplace nor residence dominance is fixed beforehand. To account for spatial mismatch and underemployment, Simpson proposed a model of urban structure that incorporates workplace choice, commuting costs and job search behaviour and places job-worker matching in a spatial context. Simpson postulates that job search is crucial in the understanding of the link between the urban structure and individual labour market outcomes. Job search is a prerequisite for the labour market participation of the unemployed and the career advancement of those already in a job. Whether or not a search is successful depends on the arrival rate of job opportunities. According to Simpson, job search always has a spatial component, because the arrival rate of opportunities is determined by the spatial context. A worker’s labour career can be seen as a series of job searches and job matches over the life course and thus as a series of interactions between the labour market behaviour of the worker and the spatial context. To examine how the spatial context influences occupational achievement, Simpson addresses two problems: first, the interaction between microlevel labour market behaviour and the macrolevel availability of job opportunities; second, the temporal dimension in this interaction.

As a starting point for understanding the explicit spatial dimension of job search, Simpson uses Phelps’ ‘island parable’ (Phelps, 1970). Phelps pictured the economy as a group of ‘local labour-market islands’ between which moves are costly. The cost of covering the distances between islands inhibits workers on one island from accepting jobs located on any of the others. If the residential location is fixed, the commuting tolerance of workers determines the size of the labour market island and the extent of the job search area. For people who want to work, or who want to change jobs in order to make a career advancement, finding a job matching their skills which is close to where they live is not always easy. Faced with a poor opportunity structure on their own labour market island,

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a job searcher has three options (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. For the individual job searcher, the first and second options lead to underemployment: workers failing to utilize their investments in human capital fully. The third option of exercising workplace mobility leads to career advancement, but also to higher costs because people are required to be more spatially flexible: they must either stretch their commuting tolerance, or migrate. Assuming that everyone would prefer to maximize the return on human capital, the choice of option is a matter of restrictions rather than preference.

Simpson proposes an expanded human capital framework which extends the human capital framework to the spatial dimension. According to the human capital theory, workers invest in productivity enhancing skills over their labour career and strive to maximise the returns on this accumulated human capital over the life course (Becker, 1964). A spatial extension of the framework links job search and human capital accumulation in one theoretical framework of spatial labour market behaviour and provides an opportunity to solve both the problems identified above. The interaction between microlevel labour market behaviour and the macrolevel availability of job opportunities is included by means of the search area; the temporal dimension is included by means of human capital accumulation over the life course, implying a continuous interaction between labour market behaviour and the spatial context. Simpson's model of workplace choice rests on three crucial elements of workplace behaviour. The first is that workplace location behaviour is always a response to employment opportunities at either the local or the regional level. The second is that job search is spatially systematic in two ways: other factors being equal, all workers would prefer a job close to the place where they live to reduce search and relocation costs (commuting and migration) and workers search for jobs which match their skills. The third element is that skill acquisition widens the spatial extent of job search. Highly skilled job searchers require a larger market and, in terms of workplace choice, a more spatially extensive search than those with fewer skills. A more spatially extensive search for employment might lead to workplace mobility and is therefore more likely to imply interregional migration, or long-distance commuting.

By defining spatial mobility as an instrument leading to occupational achievement, and defining this behaviour as the outcome of a spatially systematic job search, Simpson provides a powerful model for the study of the relationship between access to employment and occupational achievement. However, Simpson's work is mainly theoretical with little backup from empirical evidence. The aim of this book is to test part of the theoretical framework developed by Simpson in order to gain more insight into the relationship between the spatial

context and individual (spatial) labour market behaviour. To accomplish this aim this book addresses the following three research questions:

1. *To what extent do spatial differences in job access explain underemployment?*
2. *Under what (spatial) circumstances do workers use workplace mobility as an instrument in career advancement?*
3. *To what extent do workplace mobility and job access actually help workers advance their careers?*

1.3 Problems to be solved

Before the research questions above could be addressed, three methodological problems had to be resolved. The first is how to measure access to employment. Blau and Duncan (1967) included access to employment by using a crude measure of the opportunity structure. They defined the opportunity structure as “the total distribution of occupations in a community” (1967: 260, footnote) and made the definition operational by including city size in their analysis. In essence, such a measure of access to employment is based on the monocentric city with all employment concentrated in the city centre, as in Alonso’s models (Alonso, 1964). These classic models have however tended to lose their significance. The deconcentration of employment has resulted in the emergence of sub-centres and with them more complex daily urban systems with multi-directed patterns of traffic flow. Increasingly, the commuter sheds of individual cities tend to overlap each other. This development leads to the emergence of large polynucleated metropolitan regions which do not contain a primate city and are often perceived as a single functional unit. Examples in Europe are the Rhine-Ruhr metropolitan region in Germany, the Flemish Diamond in Belgium and the Randstad in the Netherlands (Dieleman and Faludi 1998). The gradual shift from monocentric cities to polynucleated urban structures requires a more detailed conceptualization of the spatial level at which the interaction between microlevel labour market behaviour and the macrolevel availability of job opportunities take place.

A basic tool to facilitate understanding of the response to job opportunities is commuting tolerance (Hooimeijer, 1996). If the residential location is fixed, the commuting tolerance determines the size of the job search area and the jobs which can be considered. Since the commuting tolerance of most workers is limited, the number of job opportunities actually available, or worthy of serious consideration, is highly constrained spatially (Hanson and Pratt, 1992). Differences in resources and restrictions for various segments of the population lead to differences in commuting tolerances and the extent of the search area. In recent years, various authors have pointed to the fact that commuting tolerance is more limited for women than for men and that these differences have to be taken into

account in order to understand how the spatial context influences occupational achievement.

The above indicates that in a polynucleated urban region such as the Netherlands, urban size cannot provide a simple measure of job access; it has to be assessed more directly, starting from residential locations. Such a measure should take into account both the spatial distribution of job opportunities and the commuting tolerance of workers. Further, because only those jobs which match a worker's skills are suitable, a measure of job access has to take account of the fact that both workers and jobs are heterogeneous.

The second methodological problem to be dealt with is how to measure underemployment. Traditionally, non-employment has received considerable attention as the labour market status in which workers fail to make full use of their human capital. But non-employment is just one form of underemployment, one only used for people with no job at all. The term underemployment encompasses a much wider definition of the under utilization of skills (Simpson, 1992; Büchel, 2000). Considered from the point of view of human capital theory, the over-educated are also underemployed. Workers are over-educated if the skills they bring to their jobs exceed the skills required for that job so that they, too, fail to make full use of their human capital. In recent years, over-education has received considerable attention and there now exists an extensive body of literature (see Büchel, 1998; and Groot and Maassen van den Brink, 2000 for an overview). Much of the literature has concentrated on the development of several methods of measuring over-education. However, considered from an individual's point of view, the issue at hand is not whether the educational level achieved is too high for the job level, but what job level can be attained with a given educational level. The measurement of underemployment might therefore be improved by empirically examining the extent to which people are able to utilize their accumulated human capital, including non-employment and over-education.

Not only does the measurement of underemployment bring with it a methodological problem; the question of to what extent underemployment can be explained by access to employment also raises difficulties. Answering this question is complicated, because the relationship between job access and underemployment is not straightforward. Those who are able to escape underemployment are a selective category in the total potential labour force and a failure to take this selectivity into account might lead to biased results. The options mentioned by Simpson (1992) show that there are two main sources of selectivity. The first is an overall low chance of finding a(nother) job, a situation which encourages people to stay put in their present jobs, or in unemployment. The second is that people who are able to find another job, but are restricted in their search area, end up with a local job below their level. 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. Both factors lead to

underemployment, but the determinants of these two types of inflexibility are not necessarily the same. Further, only including those in employment or those willing to work (the unemployed) might also lead to biased results, because this category is also selective in the total potential labour force. People who are unwilling to work might be discouraged job searchers; for some of them, this discouragement might have been caused by poor access to employment and spatial inflexibility. This might be especially true for women with children who decide to stop working completely when they perceive the probability of finding a suitable job to be very low. In analysing the relationship between job access and underemployment, selection bias has therefore to be taken into account.

The third methodological problem which has to be dealt with is the measurement of workplace mobility. Because the migration tolerance of the population has decreased over the last few decades, migration has become less important as an instrument in occupational achievement. Instead, long-distance commuting has become increasingly important. Stretching one's commuting tolerance by accepting a job over a longer distance can also be regarded as an investment in human capital. Because the choice of workplace location is central in Simpson's (1992) spatial extension of the human capital framework, this shift from migration to long-distance commuting can readily be accounted for. Within this framework, neither the residence nor the workplace is assumed to be fixed and both long-distance commuting and migration are regarded as instruments in occupational achievement. The conclusion is that whether a worker commutes or migrates is not as important as whether the job searcher is spatially flexible and willing to accept a job over a greater distance. Therefore, to measure workplace mobility it is necessary to measure the distance over which a job is accepted.

1.4 Answers and solutions

The three research questions and the methodological problems are dealt with in chapters 2 to 7. Each of these chapters consists of a research paper with its own theoretical framework, data and methods section, results and conclusion. Chapter 8, the final chapter, includes an overall conclusion and a discussion of the results.

The first research question — To what extent do spatial differences in job access explain underemployment? — is dealt with in chapters 2 to 4. Chapter 2 is a paper entitled: *Urban form and job access: disparate realities in the Randstad*; in it, an instrument to measure the job access of residential locations is described. The instrument is applied to the Netherlands and measures which residential locations are favourable in terms of access to multiple jobs, given the spatial distribution of jobs and the level of commuting tolerance of workers. The conclusion of the paper is that, in polynucleated urban regions such as the Randstad where there is no central city, the highest job access is associated with the locations in between

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the larger concentrations of employment opportunities rather than the largest cities themselves. The resulting measure of job access is used as an independent variable in the analyses in the other chapters. Chapter 3 consists of a paper entitled: *The regional component of the match between educational and job levels*. In this chapter, the ways of measuring underemployment are explored. Further, the paper investigates whether region of residence or access to employment influences the underemployment of workers. The results show that underemployment varies with education, age, and gender. The results also show that region of residence and spatial variation in the number of suitable jobs within reach both contribute to the explanation of underemployment. In chapter 4, a paper entitled *Local underemployment and the discouraged worker effect*, the mechanisms behind underemployment are investigated. Not only is searching by employed and unemployed workers considered, but also non-participation resulting from discouragement as a source of underemployment. The empirical findings of this paper show that discouragement can enter the job search process at the stage of deciding whether to enter the labour force and also at the stage of deciding whether to engage actively in a job search. Poor labour market chances lead to less activity in job search, indicating an element of discouragement in the spatial mismatch. Individual qualifications and ascribed characteristics turn out to be more decisive than the local level of underemployment.

The second research question — Under what (spatial) circumstances do workers use workplace mobility as an instrument in career advancement? — is dealt with in Chapter 5. In the paper *Spatial flexibility in job mobility: macrolevel opportunities and microlevel restrictions*, workplace mobility is elaborated: a measure of spatial mobility which includes both commuting and migration. The paper addresses the question to what extent access to suitable employment influences workplace mobility. The results show that, in order to understand workplace mobility, it is important to understand the mechanisms behind job mobility in general. Within the category of people actually changing jobs, the variation in accepting a job at a great distance is wide, because of individual restrictions. The results show that that an ample availability of job opportunities stimulates general job mobility and reduces workplace mobility. This finding is important, because it shows that good job access reduces the need to be spatially flexible.

Chapters 6 and 7 deal with the third research question — To what extent do workplace mobility and job access actually help workers advance their careers? In chapter 6, in a paper entitled *Workplace mobility and occupational achievement*, the problem is investigated in a cross-sectional fashion: whether workplace mobility and access to employment are instrumental in getting a better job. The results show that workers accepting jobs over a longer distance obtained better jobs than workers accepting jobs closer to their residence. However, the analyses did not reveal any effect of job access on career advancement at the moment of a job change. The paper in chapter 7, *Job access at labour market entry and occupational*

achievement in the life course, describes a longitudinal approach to the relationship between access to employment opportunities and occupational achievement. The hypothesis tested was that good access to employment pays off after a number of job changes and so the effect is only measurable using a life course perspective. The results show that job access at labour market entry is indeed instrumental in occupational achievement over the life course. This finding leads to the conclusion that access to suitable employment not only helps avoid high spatial mobility costs, but also helps in career advancement.

References

- Alonso, W. (1964) *Location and Land Use: Toward a General Theory of Land Rent*. Cambridge, MA: Harvard University Press.
- Becker, G. (1964) *Human Capital: a Theoretical and Empirical Analysis, with Special Reference to Education*. New York and London: Columbia University Press.
- Blau, P.M. and Duncan, O.D. (1967) *The American Occupational Structure*. New York: John Wiley & Sons.
- Büchel, F. (1998) *Zuviel gelernt? Ausbildungsinadäquate Erwerbstätigkeit in Deutschland. [Learned too Much? Overeducation in Germany]*. Bielefeld: W. Bertelsman Verlag.
- Büchel, F. (2000) *Overeducation - a labour market status typologically similar to unemployment?* Berlin: Max Planck Institute for Human Development.
- Cooke, T.J. and Ross, S.L. (1999) Sample selection bias in models of commuting time. *Urban Studies* 36, 1597-1611.
- Dieleman, F.M. and Faludi, A. (1998) Randstad, Rhine-Ruhr and Flemish diamond as one polynucleated macroregion? *Tijdschrift voor Economische en Sociale Geografie* 89, 320-327.
- Fisher, M.M. and Nijkamp, P. (1987) Spatial labour market analysis: relevance and scope. In: Fisher, M.M. and Nijkamp, P. (Eds.) *Regional Labour Markets*, pp. 1-36. Amsterdam: North Holland.
- Groeneveld, S. (1996) Het meten van overscholing [Measuring over-education]. *Economisch-Statistische Berichten* 81, 11.
- Groot, W. and Maassen van den Brink, H. (2000) Overeducation in the labor market: a meta-analysis. *Economics of Education Review* 19, 149-158.
- Hanson, S. and Pratt, G. (1991) Job search and the occupational segregation of women. *Annals of the Association of American Geographers* 81, 229-253.
- Hanson, S. and Pratt, G. (1992) Dynamic dependencies: a geographic investigation of local labor markets. *Economic Geography* 68, 373-405.
- Hanson, S., T. Kominiak, and S. Carlin, (1997) Assessing the impact of location on women's labor market outcomes: a methodological explanation. *Geographical Analysis* 29, 281-297.

Chapter 1

- Hooimeijer, P. (1996) A life-course approach to urban dynamics: state of the art in and research design for the Netherlands. In: Clarke, G.P. (Ed.) *Microsimulation for Urban and Regional Policy Analysis*, pp. 28-63. London: Pion.
- Jarvis, H. (1999) Identifying the relative mobility prospects of a variety of household employment structures, 1981 - 1991. *Environment and Planning A* 31, 1031-1046.
- Kain, J. (1968) Housing segregation, Negro employment, and metropolitan decentralization. *Quarterly Journal of Economics* 82, 175-197.
- Madden, J.F. and White, M.J. (1980) Spatial implications of increases in the female labour force: a theoretical and empirical synthesis. *Land Economics* 56, 432-446.
- Mulder, C.H. (1993) *Migration Dynamics: a Life Course Approach*. PhD thesis. Amsterdam: Thesis Publishers.
- Mulder, C.H. and Hooimeijer, P. (1999) Residential relocations in the life course. In: Wissen, L.J.G. and Dykstra, P.A. (Eds.) *Population Issues. An interdisciplinary focus*, pp. 159-186. New York: Kluwer Academic/Plenum Publishers.
- Ong, P. and Blumenberg, E. (1998) Job access, commute, and travel burden among welfare recipients. *Urban Studies* 31, 77-93.
- Phelps, E.S. (1970) Introduction: The new microeconomics in employment and inflation theory. In: Phelps, E.S. (Ed.) *Microeconomic Foundations of Employment and Inflation Theory*, pp. 1-26. New York: Norton.
- Preston, V. and McLafferty, S. (1999) Spatial mismatch research in the 1990s: progress and potential. *Papers in Regional Science* 78, 387-402.
- Simpson, W. (1992) *Urban Structure and the Labour Market: Worker Mobility, Commuting and Underemployment in Cities*. Oxford: Clarendon Press.
- Sjaastad, L.A. (1962) The costs and returns of human migration. *Journal of Political Economy* 70, 80-93.
- Van der Laan, L. (1996) A review of regional labour supply and demand forecasting in the European union. *Environment and Planning A* 28, 2105-2123.

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Chapter 2

Urban form and job access: disparate realities in the Randstad

Abstract. Deconcentration of employment is the driving force behind the rise of the complex urban forms of the polycentric city and the polynucleated metropolis. It is often assumed that the deconcentration process improves job access for average and highly skilled workers, allowing them to move to peripheral residential locations and triggering a new round of urban sprawl. It is also hypothesised that access to suitable job opportunities is withheld from low-skilled workers living in inner-city neighbourhoods as a result of the deconcentration of low-skilled employment beyond their commuting tolerance. In this contribution we illustrate how network-oriented GIS provides an instrument to enable the evaluation of the job access of residential locations at varying levels of commuting tolerance and for various types of employment. Application of this instrument to the metropolitan area of the Randstad shows that suburban locations in between major employment centres are clearly superior for households with highly skilled workers, making urban sprawl towards residential locations outside the Randstad unlikely. It is also shown that for poorly skilled workers with limited commuting tolerance the central city is still the best place to live.

1. Introduction

The spatial mismatch between where workers live and where jobs are located is a cause of both wasteful commuting, creating inefficiencies, and of underemployment among those with limited commuting tolerance, creating inequities. The deconcentration of employment — the dominant process in the rise of polycentric urban forms — changes this spatial mismatch, bringing work closer to

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suburban residential locations and taking it farther away from inner-city neighbourhoods. New questions arise, such as whether these suburban locations now provide better job access leading to shorter commutes and whether poor workers in the inner-city become deprived of job opportunities. The answers to these questions would seem self-evidently to be in the affirmative; however, inspection reveals that reality is somewhat more complex.

The issue of varying commuting tolerance is prominent in the literature on urban land use. The classic land-use model (Alonso, 1964) is constructed on the monocentric city in which all jobs are assumed to be located in the CBD. A worker's choice of a residential location is made on the basis of a trade-off between housing quality and commuting costs. Workers with lower incomes and therefore limited commuting tolerance tend to occupy the high density, low quality urban housing while those with higher incomes and a greater commuting tolerance move to low density, high quality housing in the suburbs.

The deconcentration of employment has led to polycentric urban structures with multiple centres of employment and services and dispersed patterns of residential locations. It has repeatedly been claimed (Hall, 1984; Gordon *et al.*, 1989; Batten, 1995) that polycentric structures are more efficient than monocentric structures, because deconcentration reduces the gap between job locations and housing developments. The implicit assumption in this argument is that while employment is dynamic, residential locations remain fixed. Clark and Kuijpers-Linde (1994) question this assumption. In their view, the deconcentration of employment increases the scale of suburbanization. Sites for residential development at a greater distance from the city centre come within the range of the deconcentrated employment centres. The development of these sites over a wider area causes urban sprawl and commuters' increased automobile dependence, contributing to congestion.

This image of the expanding metropolis created by Clark and Kuijpers-Linde is based on an implicit assumption. Even though both residence and employment are dynamic, the authors assume the dominance of the workplace in the search for a residential location; people choose a dwelling within commuting range of their place of work. This assumption is increasingly becoming invalid. In an era when many dual-earner households have to combine more than one workplace with one place of residence and where people change jobs more often, the choice of residence depends less on one job in a fixed location than on the number of jobs (including the present ones) within reach of the residence. Rather than assume that within the radius of a given employment centre the residential location is immaterial, the location should be evaluated in terms of access to multiple centres. In polycentric urban structures residential locations will vary in job access depending on the distances to employment nodes and the transportation structures linking the residence to these nodes.

The first objective of this contribution is to describe an instrument to measure the job access of residential locations. Job access is the number of employment opportunities that can be reached within a fixed commuting time from the residence via the transportation network. The question addressed is: which (urban or suburban) residential locations are favourable in terms of access to multiple jobs, given the level of commuting tolerance of the households involved?

The issue of underemployment among those with limited commuting tolerance is incorporated in the literature on labour economics. Here the implicit assumption is one of residence place dominance. Job search is assumed to start at home and commuting enters the analyses in the form of monetary or time expense. According to Fisher and Nijkamp (1987), up to the late 1980s labour economists have neglected the spatial dimension of labour markets. In the more recent debate on the spatial mismatch for low-skilled workers, two aspects are pervasive; commuting tolerance and segmentation of the labour market (Preston and McLafferty, 1999). The first aspect, limited commuting tolerance, creates a spatial barrier to job access (Holzer *et al.*, 1994). Commuting tolerance might be a problem not only for low-skilled workers (because of the monetary costs of commuting relative to the wage level), but also for part-time employees (because of the time-costs relative to the number of working hours) (Madden and White, 1980). According to Hanson and Pratt (1992): "For the majority of the workforce, the set of job opportunities actually available, or seriously considered, is highly spatially constrained." It cannot be assumed that people can access any job within a regional labour market defined on the basis of average commuting tolerance. The second aspect is the segmentation of the labour market. The labour market consists of separate functional labour markets characterized by a specific demand for labour (Batenburg and De Witte, 1996). The segmentation is of particular relevance for workers with highly specialized human capital and for workers lacking the proper qualifications to enter jobs requiring higher skills. For this group, the relevant market is not determined by the total number of jobs within commuting tolerance, but by the number of opportunities for which they qualify.

The second objective of the paper is to describe the application of the instrument that measures job access in evaluating the effect of variation in commuting tolerance and of the spatial distribution of job opportunities in functional submarkets. The questions addressed are: which residential locations are more favourable to those with limited commuting tolerance in general; to those whose job search is constrained by a lack of higher skills in particular; to those with a high commuting tolerance, but specialized human capital.

The remainder of this paper is organized in five sections. The next section presents a theoretical framework within which the job access of individuals from the residence can be understood. This is followed by an assessment of variation in the job access of residential areas as a result of their location relative to the geo-

graphical distribution of job opportunities at two geographical levels: the single urban region; and the metropolitan region of the Randstad. There, the commuter sheds of several urban regions overlap, facilitating the evaluation of the effects of variation in urban form. The next section describes the instrument for measuring job access and the data. The next section presents the empirical results in the form of a series of map images; the final section puts forward a conclusion.

2. Commuting and migration tolerance

Job access depends on the geographical distribution of job opportunities and on the individual spatial flexibility in reaching these opportunities. Spatial flexibility can be split into commuting tolerance (the possibility of covering the distance between home and work) and migration tolerance (the possibility of adjusting the residential location) (Hooimeijer, 1996). We consider first commuting tolerance, then migration tolerance, moving to the geographical distribution of jobs in the next section.

In the neo-classical labour market approach, the concept of commuting tolerance takes the form of the monetary cost of commuting. Jobs are within reach as long as commuting costs do not exceed a certain percentage of the gross wage rate. Following this line of reasoning, Phelps (1970) pictured the economy as a group of *labour market islands* between which moves are costly. The cost of commuting deters workers on one island from accepting jobs located on other islands. Hägerstrand (1970) recognized that, besides monetary costs, commuting time is also an important constraint on spatial behaviour. From a fixed residential location, the journey to and from work is only possible when this occurs within the daily activity space of an individual. This constraint can seriously restrict people's access to suitable jobs (Hanson and Pratt, 1992).

By including skills in the definition of a worker's job search area, Simpson (1992) added an important principle to the theoretical framework within which the job access of individuals can be understood. According to the human capital theory (Becker, 1962), workers invest in productivity enhancing skills and strive to maximize the utility of this accumulated human capital. The stock of human capital people accumulate during their lifetime has three main components. The first is general human capital, commonly acquired through the education system and enhancing productivity equally in all firms. The second component is sector-specific human capital (Simpson, 1992). This human capital does not enhance productivity equally in all firms, but only in a specific sector of the economy. The third component is the enterprise-specific human capital acquired with tenure (on-the-job training) and, in contrast with general and sector specific human capital, is not transferable across employers. According to the human capital theory, people differ in the level and specialization of human capital.

Because the costs of a job change are considerable when a worker with specific human capital moves to a job where these specific skills cannot be utilized, not all jobs are valued equally and only a subset of the total jobs available is suitable.

The skills of workers also have an influence on their spatial flexibility or commuting tolerance. According to Börsch-Supan (1990), skills have a double-edged impact on labour mobility. With an increasing level and specialization of human capital, the probability of a job change decreases while at the same time geographic mobility increases. Highly specialized jobs have a lower spatial density so workers with specific skills have to be more flexible spatially. An important aspect of the human capital theory is that human capital accumulates over the life course. In order to obtain a better return on investments in human capital, people need to change jobs several times. They do so especially at the beginning of their labour career (Topel and Ward, 1992). This so-called job shopping enables individuals to try out several jobs to determine their comparative advantage, find higher quality job matches and achieve better pay. Especially for higher educated workers at the beginning of their labour career spatial flexibility is a necessity for career advancement. For low-skilled workers this is less the case. The costs of spatial flexibility relative to the potential increase in wage level are too high. Because jobs for low-skilled workers are more evenly spread there is less to gain from spatial flexibility. Their labour market flexibility consists of moving into another trade within the same local labour market. While the job mobility of lower-skilled workers is higher, their spatial flexibility is lower.

A generally accepted standard for commuting tolerance is 45 minutes for a single work trip (Wachs and Taylor, 1993; Van Ommeren, 1996). Research by Van Ommeren (1996) shows that for commutes up to 30–45 minutes, resistance does not increase much with commuting time. When commuting time exceeds 45 minutes, however, resistance to commuting increases sharply. A commuting tolerance of 45 minutes is just the average upper limit; however, since people differ markedly in their time-space restrictions, at the individual level large variations in commuting tolerance can be expected.

Until now, there has been little empirical research on differences in commuting tolerance between socio-economic groups. Much more is known about variations in the actual commuting times of workers. Wachs and Taylor (1993) find for the US that almost two-thirds of all employees spend less than 35 minutes commuting to work. Similar results can be obtained for the Netherlands. Based on the 1996 Netherlands Labour Force Survey (CBS, 1997) we found that nearly 50% of those employed in the Netherlands commute less than 15 minutes per single work trip. More than 80% commute less than 30 minutes. Fewer than 9% of the working population commute more than 45 minutes. These findings indicate that indeed only a very small proportion of the working population is prepared to undertake long commutes over 45 minutes.

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Many authors have pointed out that women have consistently shorter commuting trips than men (Madden, 1981; Gordon *et al.*, 1989). According to Hanson and Pratt (1992) this can be explained by the fact that women are faced with severe day-to-day space-time constraints, dictated in part by their domestic workload. The presence of young children in the household particularly restricts the daily activity space of women. The above indicates that the household situation is an important determinant of commuting tolerance.

Commuting tolerance is only one aspect of spatial flexibility; the alternative to long-distance commuting is migration. It has long been established that commuting both complements and substitutes for migration (Termote, 1980). Any change in workplace requires a concurrent decision either to change the residential location and the commuting (complements), or to adhere to the original residential location and change the commute (substitutes).

Over the last few decades commuting tolerance has increased and migration tolerance has decreased as a result of the rise in the share of dual-earner households. Dual-earner households have a lower propensity to a residential move than couples or families with a single breadwinner (Mulder, 1993; Mulder and Hooimeijer, 1999; Jarvis, 1999). Migration tolerance is lower for dual-earner households, since they have to combine more than one workplace with one residential location. The commuting tolerance of the partners in these households on the other hand is higher, because the household income provides a larger budget for fast modes of transportation. This effect has been exacerbated by the rising educational level of women as this leads to higher gross household wages, enabling the purchase of more efficient means of transportation. This rise in human capital also widens the job search area, triggering geographical mobility.

Lower migration tolerance makes the choice of a residential location more strategic. Locations providing easy access to multiple jobs permit maximum spatial flexibility using commuting as a substitute for migration. Even when people migrate because of an employment transition, the choice of a new residential location will depend not only on the location of the present job, but also on the access to other jobs (for the partner, or for jobs later in life). This strategy, which is perfectly rational at the level of the individual household, shows up as wasteful commuting at the aggregate level.

3. Job access of residential areas and the variation in urban form

The shift in micro-level decision-making resulting from decreasing migration tolerance has two important implications for the evaluation by individual households of the job access of residential locations. The first is that households in residential areas with access to numerous jobs migrate less in the case of an employment transition. The second is that households that do move find resi-

dential areas that provide access to a large number of jobs more favourable. The job access of residential areas depends on the location relative to the geographical distribution of employment opportunities and therefore on the macro-level development of urban form. In the Netherlands we observe a gradual shift from monocentric into polycentric urban structures.

The monocentric urban model is based on the city as a daily urban system with an urban core of employment and a surrounding suburban residential area (Van der Laan *et al.*, 1998). The deconcentration of employment has resulted in the emergence of sub-centres and therefore more complex daily urban systems with multi-directed patterns of traffic flow. Increasingly, commuter sheds of individual polycentric cities tend to overlap each other. At a higher spatial level, this development leads to the emergence of large polynucleated metropolitan regions which develop from the integration of several older nodes located relatively close to each other (Van der Laan, 1998). These large urban regions do not contain a primate city and are often perceived as a single functional unit. Examples in Europe are the Rhine-Ruhr metropolitan region in Germany, the Flemish Diamond in Belgium and the Randstad in the Netherlands (Dieleman and Faludi, 1998).

The Randstad is a classic example of a polynucleated metropolitan region (Figure 1). This complex urban region in the western part of the Netherlands contains the cities of Amsterdam, The Hague, Rotterdam and Utrecht — the four main cities of the Netherlands — and several additional smaller nodes. These cities are located in close proximity to each other and connected by intensive road and rail networks. The Randstad has 7 million inhabitants (almost 45% of the total population of the Netherlands) and contains a major concentration of jobs (over 50% of all the jobs in the Netherlands) on 20% of the territory. The centre of the Randstad is a large open central area, the *Green Heart*, where agriculture is still the dominant form of land-use. This characteristic has led the British planner Gerald Burke (1956) to designate the Randstad *Greenheart Metropolis*.

In the past 25 years, two major changes have taken place in the Netherlands' economy. At the level of individual cities, employment has become suburbanized, moving from the centre to the edge of cities, locating at motorway exits (Hessels, 1992). At the same time, a relative shift has taken place from the Randstad to adjacent areas (Van der Vegt and Manshanden, 1996). These major changes in the economy have led to a greater dispersal of job opportunities in absolute terms. However, according to Batenburg and De Witte (1992) there are still large regional differences in the Netherlands in the qualitative employment structure (sector and job level).

It is not self-evident how the continuing deconcentration of employment and the rise of polycentric structures will affect job access in various residential areas in the metropolis. Priemus (1998) observed that many residential locations have

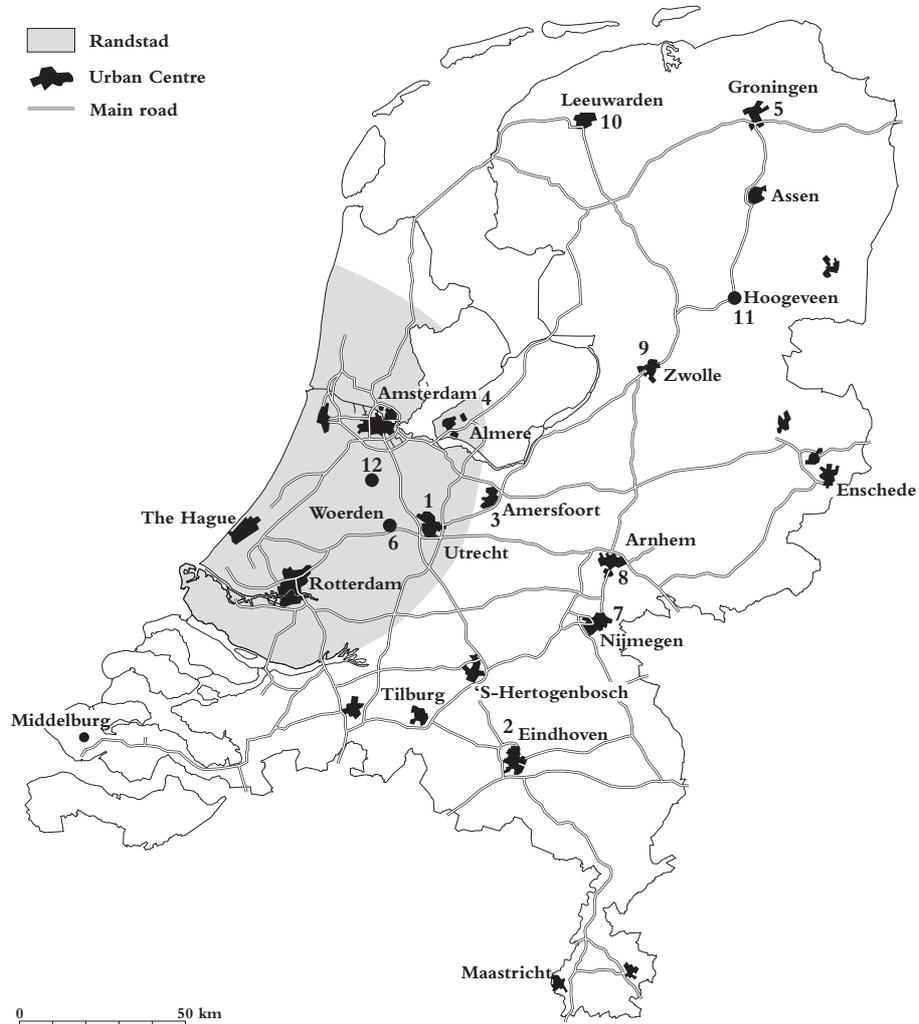


Figure 1. Map of the Netherlands.

been developed on the outer edge of the Randstad, whereas employment has mainly developed on the inner flank of the Randstad, between the four largest cities. These uneven spatial developments might be a cause of greatly increased inter-regional commuting (Atzema and Schutjens, 1995). This would indicate that the deconcentration of job opportunities does not automatically resolve the spatial mismatch of jobs and housing.

In short, access to jobs from residential areas depends on two macro-level factors. The first is the geographical location relative to the dispersed employment opportunities that have been suburbanized in specific directions. The

second is the position of the residential location with respect to the transportation infrastructure, which provides access to centres of employment, particularly to the road infrastructure since new employment centres tend to locate at accessible locations along the motorways.

In evaluating the job access of residential areas, the part played by micro-level factors must also be assessed. The first factor is the commuting tolerance of the workers involved. For those with limited commuting tolerance, job searching will be restricted to a single or limited number of employment concentrations, while those with a wide commuting tolerance may reach several employment centres. The second factor is the level of skill of the workers involved. Those with medium or high skill levels may choose to accept a job requiring less skill, but closer to home. Those with limited skills can only enter jobs for which they meet the requirements. The third factor is the sector of the economy in which the worker has specialized. The evaluation of the job access of a residential location will differ for different groups. In combination, these factors lead to job access values that differ substantially between socio-economic groups for a vast number of residential areas.

4. Methodology and data

From the above discussion it can be concluded that an instrument to measure the job access of a residential area for various socio-economic groups has to meet four requirements. The first is the spatial resolution. Both residential and employment locations should be measured at a detailed geographical level to evaluate variation in access to a large number of jobs in dispersed locations, taking into account the variation in commuting tolerance among the population. The second requirement is acknowledgement of the crucial role of the transportation networks linking residences to jobs, in particular the road networks, since nearly 90% of commuters in the Netherlands use private modes of transport (CBS, 1997). The quality of the connection, in terms of the speed on the segments, is decisive in determining the number of jobs that are within reach. The third requirement is that the instrument should be applicable at various spatial scales, measuring the effects of both the deconcentration of employment within a single urban region and also of the overlap of the commuter sheds of individual cities within a wider metropolitan region. The fourth requirement is that the instrument should be generic, that is to say no *a priori* delimitation of geographical area, functional sub-markets, or household groups should be needed.

To meet the first requirement, taking optimal account of individual spatial restrictions, the measurement would have to start from a very low spatial level (Louter, 1997). Four-digit postal codes were chosen as the starting point (almost 4,000 in the Netherlands). To handle this geographical detail the choice for a

geographical information system is obvious. However, few geographical information systems meet the second requirement, that distances should be measured in time spent using transportation infrastructure to get from one point to another. Flowmap, a network-oriented GIS extension developed at the Faculty of Geographical Sciences, Utrecht University (De Jong and Floor, 1993) meets this requirement. The database includes the full road network, including the average travelling speed on each segment. Algorithms to find the shortest path (measured in time) can be used to calculate the full matrix of travelling times between every postal code area, meeting the third requirement, as both short and long distances are included in the output. These distances can then be weighted on the basis of the total number of jobs, or a subset of jobs that require specific skills within commuting reach of each postal code area.

In order to apply the instrument to measure job access as described above to evaluate the effect of variation in commuting tolerance and the spatial distribution of job opportunities we made two choices. Because we want to answer the question which residential locations are more favourable to workers with different levels of commuting tolerance, the first choice is that we measure job access for three different values of commuting tolerance (15, 30 and 45 minutes one-way commuting). These three levels reflect a low, middle and high level of commuting tolerance. The second is that we use absolute measures of the number of jobs within reach instead of applying some correction for the competition for these jobs from other job searchers residing in the same area. We do so, because what we are interested in is a measure of the total opportunity set, which determines the probability of a suitable job becoming available.

The data on the spatial distribution of jobs in the Netherlands by sector come from a unique dataset: the National Information System on Employment (LISA).¹ This dataset is a registration of nearly all the establishments in the Netherlands, including government and other non-commercial organizations. An *establishment* is defined as an *individual plant, store, or office*; multi-establishment firms have separate listings for each establishment. The data set includes information about total employment per establishment (total number of full-time and part-time jobs), type of economic activity, and the location of each job site by address. To estimate job access on the basis of the LISA dataset, all establishments are geocoded to a postal code area using work site addresses. The data available was for 1997.

LISA does not contain information concerning job levels. To obtain this data an alternative source had to be used. We used a pooled sample of the Labour Force Surveys (EBBs) conducted by Statistics Netherlands in 1994, 1995 and 1996. This pooled set of about 300,000 respondents contains information on the work location and job level of all working respondents in almost 600 municipalities. With this information we estimated a distribution of job levels for all four-digit postal code areas (using the five job levels of Statistics Netherlands).

Job access was estimated in a two-step process. In the first step, the full matrix of travelling times between postal code areas was calculated. The travelling time between two locations depends on the travel mode used. For the purpose of this paper, travelling times by car over the road network² were used. This choice is justified because more than 55% of workers in the Netherlands commute by car (CBS, 1997). For workers who travel by bicycle or on foot this choice results in an overestimation of their job access. The road network used includes data on average driving speeds per road segment. With the software package Flowmap (De Jong and Floor, 1993), travelling times by car were calculated from the centroid of each postal code area to all other postal code areas over the road network. Unfortunately it was not feasible to include congestion. In the second step, for each postal code i Flowmap identified all other postal codes j whose centroids were within 15, 30, or 45 minutes travelling time by car over the road network (a proximity count) and added up all the jobs (full-time and part-time) within this area. This procedure was followed for all the almost 4,000 postal codes in the Netherlands, which resulted in a unique value of job access for each postal code area.

5. Job access in maps

In Table 1, the number of jobs within reach is shown for a selection of postal code areas (see the numbers in Figure 1 for their geographical location). For cities a postal code in the city centre was taken. The postal codes in the table have been selected to reflect the influence of variation in urban form in combination with variation in commuting tolerance on job access.

The first row of the table gives the average number of jobs that can be reached in the Netherlands. This row shows the overall effect of commuting tolerance on job access. At a tolerance of 15 minutes, an average for postal codes of 73,000 jobs are within reach. A tolerance of 30 minutes raises this number by a factor of 5 to 361,000 jobs. At 45 minutes the average number of jobs equals 862,000, twelve times the number at 15 minutes.

The subsequent rows give a first indication of the role of the spatial distribution of employment in job access. Three interesting phenomena appear. The first is, as expected, that the geographical distribution of job opportunities matters. At a tolerance of 15 minutes the number of jobs nearly follows the rank-size rule of the places involved. The highest number of jobs can be reached from Utrecht and Eindhoven (the largest cities in the table). The second is that the effect of the distribution shifts as commuting tolerance increases. The postal code area in the geographical centre of the Green Hart provides a perfect example. At 15 minutes only 6,000 jobs can be accessed, indicating a position at the bottom of the table. At 45 minutes this number has increased to 1.9 million, making this

Table 1. Number of jobs within reach by commuting tolerance (between brackets the multiplication factor compared with job access within 15 minutes).

	15 minutes	30 minutes		45 minutes	
Average job access	73,000	361,000	(5)	862,000	(12)
1 Utrecht	293,000	1,081,000	(4)	2,947,000	(10)
2 Eindhoven	206,000	470,000	(2)	961,000	(5)
3 Amersfoort	173,000	808,000	(5)	1,888,000	(11)
4 Almere	134,000	974,000	(7)	1,696,000	(13)
5 Groningen	128,000	267,000	(2)	433,000	(3)
6 Woerden	118,000	904,000	(8)	2,673,000	(23)
7 Nijmegen	106,000	400,000	(4)	874,000	(8)
8 Arnhem	96,000	398,000	(4)	1,139,000	(12)
9 Zwolle	69,000	233,000	(3)	626,000	(9)
10 Leeuwarden	65,000	173,000	(3)	323,000	(5)
11 Hoogeveen	28,000	134,000	(5)	456,000	(16)
12 Centre of green heart	6,000	217,000	(36)	1,897,000	(316)

Source: LISA 1997 (in cooperation with VROM).

postal code the third in the hierarchy of job access among the listed locations. More generally, rising commuting tolerance has a much larger effect in the poly-nucleated metropolitan region of the Randstad, where commuter sheds overlap, than in the single urban regions in the more peripheral parts of the country. In the city of Groningen (in the North) a rise from 15 to 45 minutes generates just over three times the number of jobs within reach, while in the city of Utrecht ten times as many jobs come within reach if commuting tolerance is raised from 15 to 45 minutes. The third phenomenon is that the position with respect to the major road infrastructure makes a difference. This is illustrated by comparing Woerden, a small town located on one of the motorways (A12 between the Hague and Utrecht) that cut through the Green Hart with the postal code at the centre of the Green Hart. The geometrical location of the two places hardly differs, but the location of Woerden on the motorway provides more jobs locally and facilitates access to other employment centres along the A12 (at 15 minutes) and connecting motorways (at higher levels of commuting tolerance).

An overall evaluation of the job access of residential areas in the Netherlands is possible when the job access of all areas is mapped at three levels of commuting tolerance (15, 30, and 45 minutes): Figures 2-4 show the results. The cutting points in the legend have been based on the average rise in the number of jobs within reach as a result of the change in commuting tolerance (5 times at 30 minutes, 12 times at 45 minutes). If commuting tolerance were the only factor determining job access the maps would be identical. The differences derive from the geometrical location relative to the distribution of employment and the position with respect to the road network.

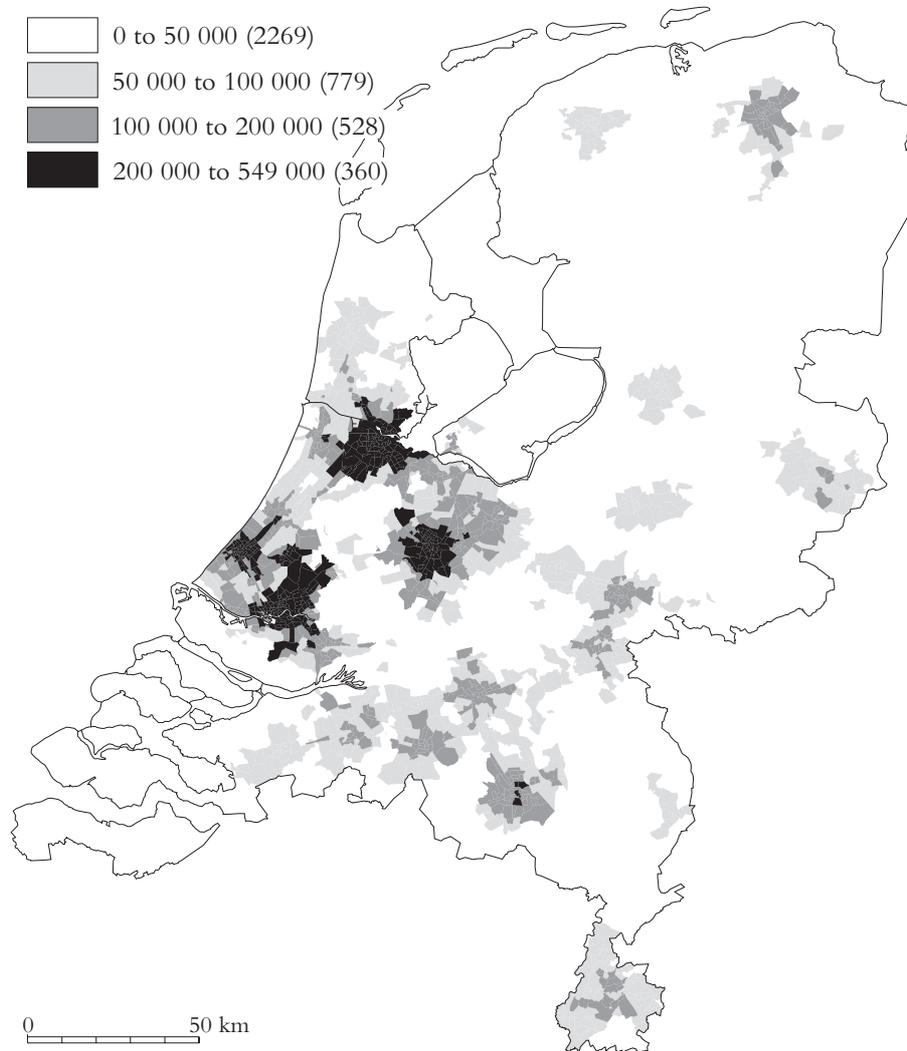


Figure 2. Jobs within reach, 15 minutes.
Source: LISA 1997 (in cooperation with VROM).

Job access within 15 minutes (Figure 2) shows the most fragmented image. The larger cities and their immediate surroundings pop up as labour market islands. Yet even at 15 minutes the effect of the transportation network shows up in the maps. The Hague in particular shows radiating job access towards the North East (along the A4 motorway to Amsterdam) and the South East (along the A13 towards Rotterdam). The transportation network has a double effect on job access. First, the motorways provide rapid access to a wider area. Second, the exits of the motorways have become favourable locations for new employment

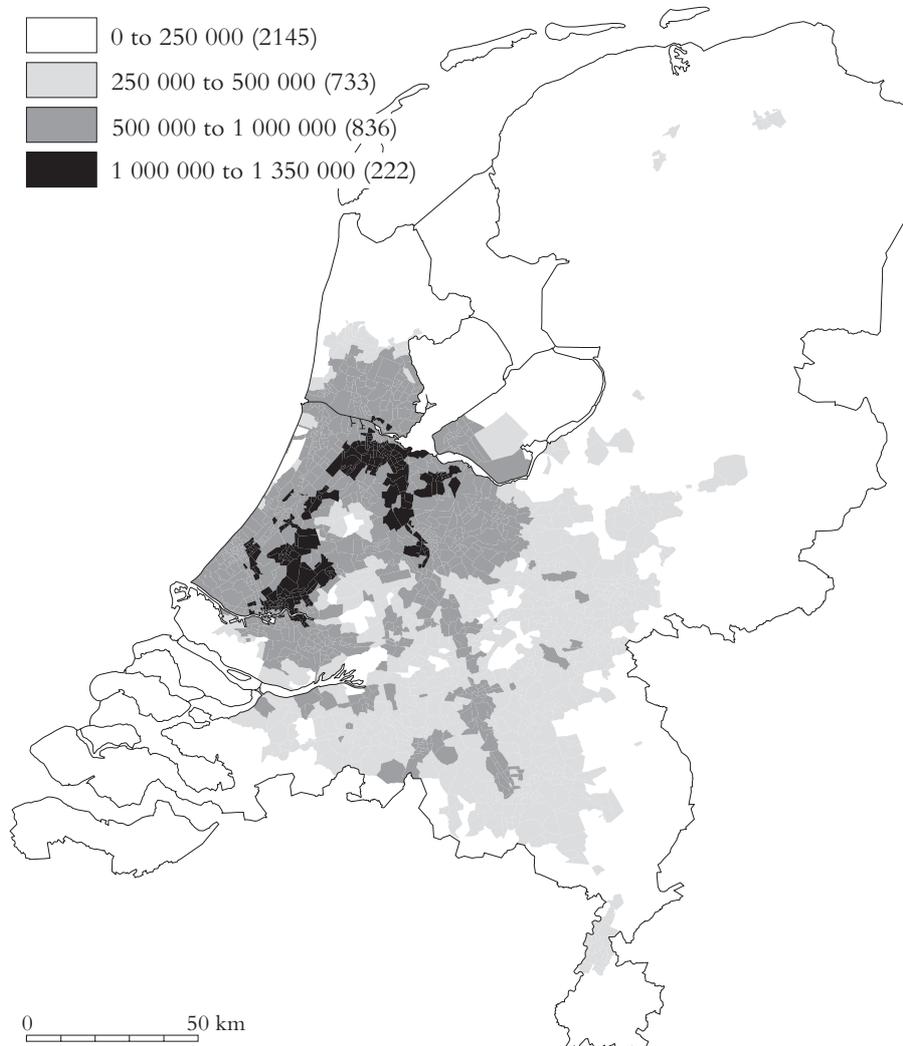


Figure 3. *Jobs within reach, 30 minutes.*
Source: LISA 1997 (in cooperation with VROM).

centres. This can be seen east of the Hague along the A12, in the postal code areas of Zoetermeer. These locations are at the nearest exit from the Hague and have developed as a local employment centre. The cities and part of their surrounding suburbs are favourable locations in terms of access to employment for people who can afford to own and use a car, but have restricted time budgets. The 15 minutes map also gives an indication of the number of jobs that can be reached by people who go to work by bicycle or on foot, although at a much higher level of commuting tolerance.

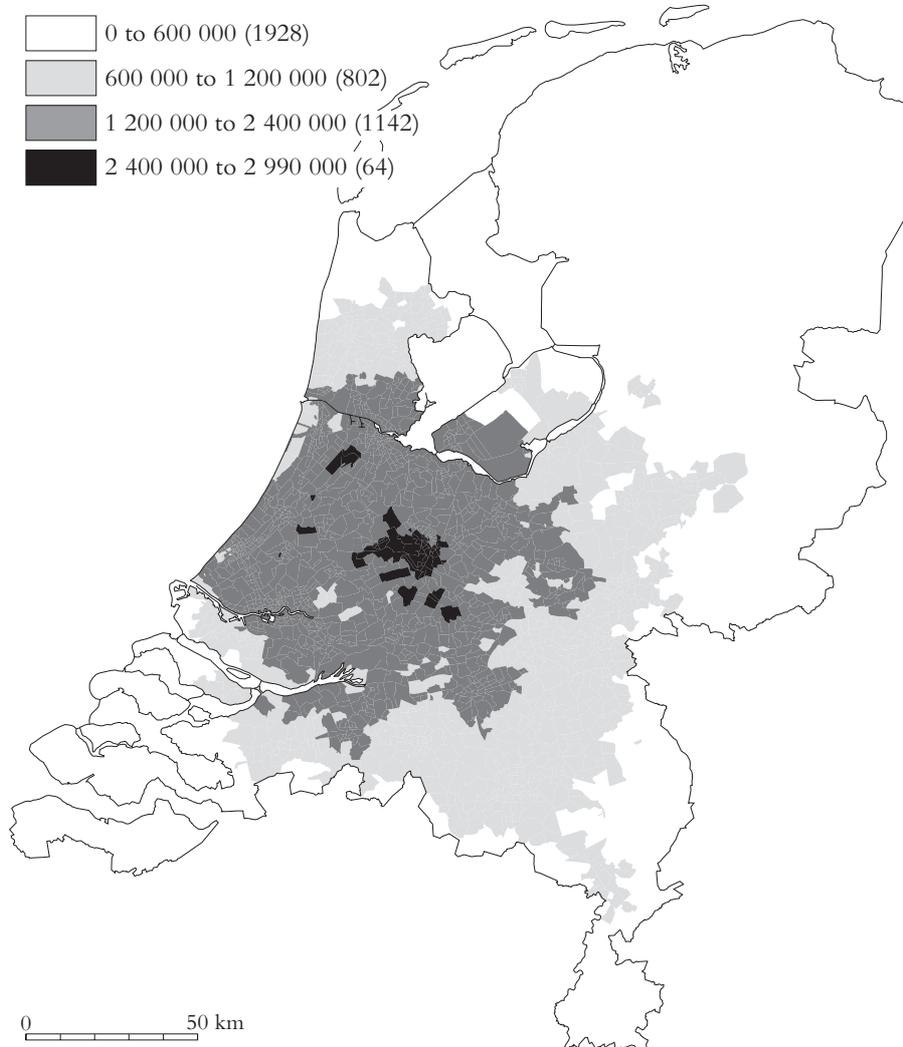


Figure 4. Jobs within reach, 45 minutes.
 Source: LISA 1997 (in cooperation with VROM).

Job access at 30 minutes (Figure 3) shows a radically different picture. At this level of commuting tolerance the cities lose their competitive advantage in terms of job access. The Randstad clearly shows up as the region with overall high job access, but the best locations are the suburban areas in between the larger employment centres and not the city centres. The major motorways become visible in the pattern of job access. In particular, the A2 from Amsterdam to Eindhoven in the South East shows up as a major corridor. The degree of fragmentation within the Randstad indicates that the image shows the effect of

the overlapping commuter sheds of numerous employment centres. However, within 30 minutes, even at the best location not more than 1.35 million jobs can be reached, close to 40% of all the jobs in the metropolis. Since 70% of even the highly skilled male workers commute 30 minutes or less, this map shows a realistic picture of the variation in the numbers of jobs within reach for large segments of the population.

Figure 4 shows that at 45 minutes the Randstad again has the highest values of job access, ranging from 1.2 million jobs (in the worst locations) to nearly 3 million (in the best locations). From most of the postal code areas in the Randstad, workers with a commuting tolerance of 45 minutes can access between 60% and 90% of all jobs in this part of the country. For them, the Randstad as a whole is close to being a single regional labour market. Combining or changing jobs without having to migrate is easy in this part of the country. Further away from the Randstad, the number of jobs within reach decreases rapidly, even at this level of commuting tolerance.

The conclusion so far is that job access is disparate within the Netherlands as a whole and in the Randstad in particular. For those with a high level of commuting tolerance the Randstad comes close to a single labour market. Moving from the centre of the Randstad to more peripheral areas, the gradient in the number of jobs that can be accessed is very steep. Because for many employees, working in the Randstad and living elsewhere would imply commuting times of well over 45 minutes, urban sprawl towards residential locations outside the Randstad is unlikely. At a 30 minute commuting tolerance — close to the average actual commuting time for better-skilled workers — suburban locations combine good quality housing and attractive residential surroundings with job access superior to that in the cities. For dual-earner households suburban locations provide advantages over urban living in most respects. Urban sprawl is bound to occur within the confines of the Randstad as a whole rather than in the form of an expanding metropolis. For those with the lowest level of commuting tolerance the Randstad does not exist; their labour market is the single urban region and not the metropolis (or parts of the polynuclear metropolis).

Low-skilled workers are constrained in their job search in two ways. The first is the effect of their limited commuting tolerance; the second is their inability to enter jobs requiring more skills. Only a subset of jobs is open to them. Assuming a commuting tolerance of 15 minutes for this group, we re-ran the analyses for Figure 2, including only the jobs that require elementary or basic skills. The results are displayed in Figure 5 for the Randstad.

The results indicate that in general terms only 40% of all job opportunities are within the reach of this group, with a maximum of 147,000 positions from the best location in the country. Also for this group, the cities and their immediate surroundings show up as the best locations. In particular the largest cities, Amsterdam and Rotterdam, show a high concentration of basic and elementary jobs.

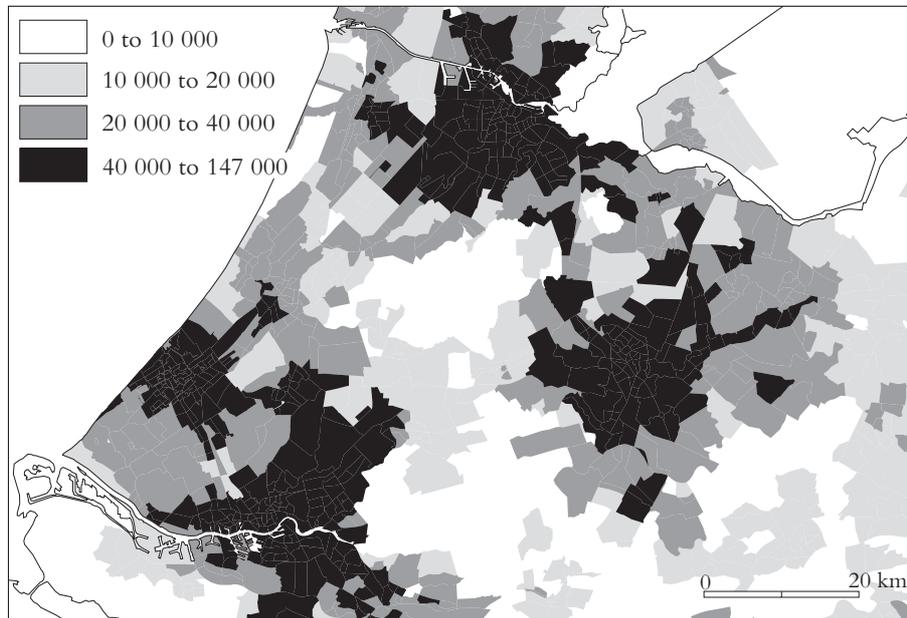


Figure 5. Basic and elementary jobs within reach of 15 minutes in the Randstad.
Source: LISA 1997, EBB 1994-1996.

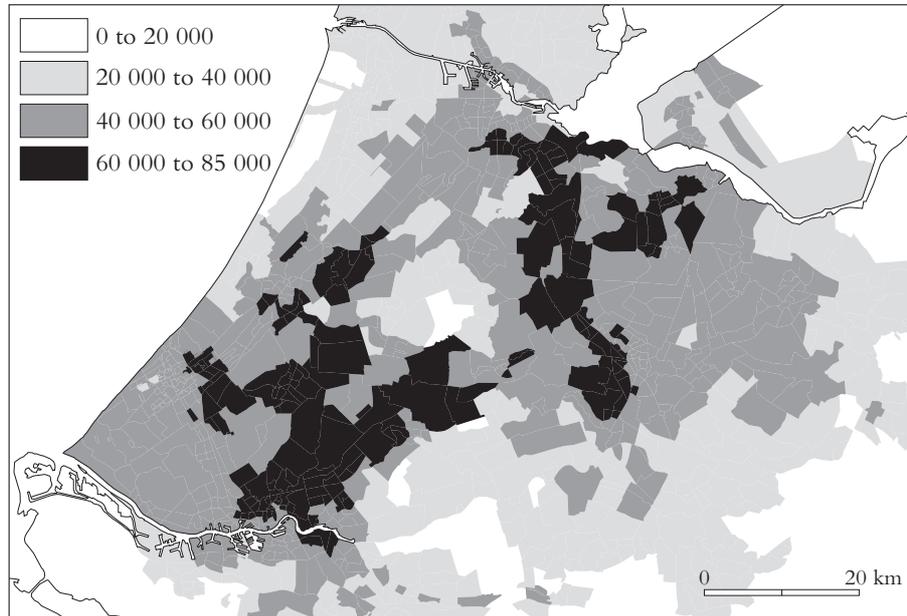


Figure 6. Jobs within reach, 30 minutes: Advanced Producer Services.
Source: LISA 1997 (in cooperation with VROM).

As labour mobility is high among those with low skills (fewer have tenured jobs and many move from one trade to another) the actual number of potential jobs to apply for is crucial for remaining in employment. In terms of numbers of jobs to choose from, the city itself therefore still seems the best place to live for people with limited skills and limited commuting tolerance. A policy aimed at improving access to suburban housing opportunities for these groups would seem to be less efficient, because this would entail their having to move to places where job access was lower. Increasing commuting tolerance to 30 minutes would be more effective since this would, on average, increase job access by a factor 5.

Not only does the lack of human capital play an important part in job access; so does the degree of specialization. On-the-job training and work experience (sector specific human capital) limit people in their job mobility. As an illustration, job access has been mapped for a sector that requires a high level of sector specific human capital: Advanced Producer Services (APS). The LISA 1997 data set contains about 240,000 jobs in this sector, including jobs in computer services, information technology, legal and financial services, architecture, and engineering. To map job access in this sector, 30 minutes of commuting tolerance was used.

The results reveal the tremendous effect of the level of specialization (Figure 6). Only 4% of all job opportunities are within the reach of this group. At 30 minutes commuting tolerance, the best location in the Randstad gives access to slightly more than 85,000 jobs in the sector (compared with 1.35 million if all jobs were equally relevant). Compared with the overall map at 30 minutes, the more peripheral areas of the Randstad (north and west of Amsterdam, south of Rotterdam) are less favourable and the best locations are even more concentrated in the corridors along the major motorways (the A2, Amsterdam to Eindhoven and the A20, Rotterdam to Utrecht). This reflects the favoured locations of the firms in the APS sector. Many of these firms work for a national market. Central locations in the country along major transport arteries provide them with easy access to their market.

6. Conclusion

The maps clearly show disparate spatial realities of job access for different values of commuting tolerance. Large differences in job access have been found between the Randstad and the rest of the Netherlands, especially for high levels of commuting tolerance. Outside the Randstad, employment is concentrated in and close to the central cities and cities are located at relatively large distances from each other. This means that an increase in commuting tolerance does not lead to a rise in job access as spectacularly as in the Randstad. The first conclusion there-

fore is that urban form indeed has a tremendous impact on job access, at least at higher levels of commuting tolerance.

The polynucleated character of the Randstad has a very strong influence on individual job access. People who are willing to commute for 30 minutes, especially from suburban residential areas in between the larger cities, can reach many jobs. The short distances between the cities in the Randstad make it possible to see the whole Randstad as one daily urban system, or one functional labour market for those willing to commute for 45 minutes or more. However, this image is only a reality for a small proportion of the working population.

For a large part of the working population a commuting tolerance of 15 minutes is more realistic. At 15 minutes the map shows islands of job access directly surrounding the main cities. This confirms the findings of Cortie *et al.* (1992), who state that the Randstad should not be viewed as an integrated region, but as a collection of separate urban centres which function as separate socio-spatial systems. This conclusion is particularly valid for low-skilled workers. In general terms they can only enter up to 40% of all job opportunities on the basis of their limited skills. Given a commuting tolerance of less than 15 minutes, the residential areas in the traditional cities still offer maximum job access for these groups.

What can be learned from this exercise? Differences in residential location, commuting tolerance and human capital result in completely different images of job access. In order to develop efficient spatial policy with regard to job access, it is important to take into consideration the residential location and commuting tolerance of different socio-economic groups. The deconcentration of low-skilled employment from the central cities is certainly to the detriment of the low-skilled workers living in inner-city neighbourhoods. Commuting to suburban locations simply takes too much time; the spatial barriers are too great. Concentration of employment in the cities is an effective strategy. However, improving the commuting tolerance of those with low skills would have an even greater effect, since it has been shown that the effects of commuting tolerance clearly outweigh the effects of the geographical distribution of job opportunities.

At first sight job access for highly skilled workers seems to be much greater because of their greater commuting tolerance. However, particularly for those with highly sector specific human capital, the number of potential job opportunities is limited as the case of advanced producer services exemplifies. Since these job opportunities are dispersed over various cities in the Randstad and the rest of the country, high commuting tolerance seems to be a necessary condition for changing jobs without having to change residence. Further specialization of parts of the Randstad might help to arrive at a higher concentration of this sort of employment.

Most of the dual-earner households in the Netherlands consist of one full-time and one part-time worker. For them, residential locations along the ring

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roads of the major cities are superior, because they combine the best access to jobs at both 15 minutes and 30 minutes commuting tolerance. The present policies of both residential development (on the outer side) and urban regeneration (on the inner side) provides them with good quality housing opportunities at the best locations in terms of job access. Continuation of these policies should therefore be favoured.

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Notes

1. The LISA data sets were made available by the Ministry of Housing, Spatial Planning and the Environment, which commissioned the empirical application of the research.
2. The *basisnetwerk* was purchased from Traffic and Transport Consultancy Group (Adviesgroep voor Verkeer en Vervoer, Nieuwegein) in 1989 and updated to the present day at the Faculty of Geographical Sciences of Utrecht University.

References

- Alonso, W. (1964) *Location and Land Use: Toward a General Theory of Land Rent*. Cambridge, MA: Harvard University Press.
- Atzema, O. and Schutjens, V. (1995) Gebrek aan werk: regionale variaties [Lack of work: regional variations]. In: Van der Velden, W. and Wever, E. (Eds.) *Nederland is meer dan de Randstad: de economische emancipatie van overig Nederland [The Netherlands are more than the Randstad: the economic emancipation of the rest of the Netherlands]*, pp. 105-127. Utrecht: Rabobank.
- Batenburg, R.S. and De Witte, M.C. (1996) Functiestructuur, verdringing en automatisering; regionale verschillen binnen Nederland [Occupational structure, downward displacement and automation; regional differences in the Netherlands]. In: Atzema, O. and Van Dijk, J. (Eds.) *Technologie en de regionale*

- arbeidsmarkt [Technology and the regional labour market], pp. 117-131. Assen: Van Gorcum.
- Batten, D.F. (1995) Network cities: creative urban agglomerations for the 21st century. *Urban Studies* 32, 313-327.
- Becker, G. (1962) Human capital: a theoretical and empirical analysis. *Journal of Political Economy* 70, 9-46.
- Börsch-Supan, A. (1990) Education and its double-edged impact on mobility. *Economics of Education Review* 9, 39-53.
- Burke, G.L. (1956) *The Making of Dutch Towns, a Study in Urban Development from the Tenth to the Seventeenth centuries*. London: Cleaver-Hume Press.
- CBS [Statistics Netherlands] (1997) *Enquête Beroepsbevolking 1996 [Labour Force Survey 1996]*. 'sGravenhage: Sdu.
- Clark, W.A.V. and Kuijpers-Linde, M. (1994) Commuting in restructuring urban regions. *Urban Studies* 31, 465-483.
- Cortie, C., Dijkstra, M. and Ostendorf, W. (1992) The randstad a metropolis? *Tijdschrift voor Economische en Sociale Geografie* 83, 278-288.
- De Jong, T. and Floor, H. (1993) Flowmap: een programma voor het weergeven en analyseren van interactiegegevens [Flowmap: A Software Package for Displaying and Analysing Interaction Data]. *Planning, methodiek en toepassing* 44, 16-31.
- Dieleman, F.M. and Faludi, A. (1998) Randstad, Rhine-Ruhr and Flemish Diamond as one polynucleated macroregion? *Tijdschrift voor Economische en Sociale Geografie* 89, 320-327.
- Fisher, M.M. and Nijkamp, P. (1987) Spatial labour market analysis: relevance and scope. In: Fisher, M.M. and Nijkamp, P. (Eds.) *Regional Labour Markets*, pp. 1-36. Amsterdam: North Holland.
- Gordon, P., Kumar, A. and Richardson, H.W. (1989) Gender differences in metropolitan travel behaviour. *Regional Studies* 23, 499-510.
- Hall, P. (1966) *The World Cities*. 3rd Ed., 1984. London: Weidenfeld and Nicolson.
- Hanson, S. and Pratt, G. (1992) Dynamic dependencies: a geographic investigation of local labor markets. *Economic Geography* 68, 373-405.
- Hägerstrand, T. (1970) What about people in regional science? *Papers of the Regional Science Association* 24, 7-21.
- Hessels, M. (1992) *Locational dynamics of business services, an intrametropolitan study of the Randstad Holland*. PhD thesis. University of Utrecht: Netherlands Geographical Studies, 147.
- Holzer, H., Ihlanfeldt, K. and Sjoquist, D. (1994) Work, search and travel among white and black youth. *Journal of Urban Economics* 35, 320-345.
- Hooimeijer, P. (1996) A life-course approach to urban dynamics: state of the art in and research design for the Netherlands. In: Clarke, G.P. (Ed.) *Microsimulation for Urban and Regional Policy Analysis*, pp. 28-63. London: Pion.

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- Jarvis, H. (1999) Identifying the relative mobility prospects of a variety of household employment structures, 1981 - 1991. *Environment and Planning A* 31, 1031-1046.
- Louter, P.J. (1997) Regionale data voor beleidsdoeleinden [Regional data for policy purposes]. In: De Graaff, W. and Boekema, F. (Eds.) *Regionale data: vraag, aanbod en toepassing* [Regional data: demand, supply and application], pp. 5-26. Assen: Van Gorcum.
- Madden, J.F. (1981) Why women work closer to home. *Urban Studies* 18, 181-194.
- Madden, J.F. and White, M.J. (1980) Spatial implications of increases in the female labour force: a theoretical and empirical synthesis. *Land Economics* 56, 432-446.
- Mulder, C.H. (1993) *Migration Dynamics: A Life Course Approach*. PhD thesis. University of Amsterdam: Thesis Publishers.
- Mulder, C.H. and Hooimeijer, P. (1999) Residential relocations in the life course. In: Van Wissen, L.J.G. and Dykstra, P.A. (Eds.) *Population Issues. An Interdisciplinary Focus*, pp. 159-186. New York: Kluwer Academic/Plenum Publishers.
- Phelps, E.S. (1970) Introduction: The new microeconomics in employment and inflation theory. In: Phelps, E.S. (Ed.) *Microeconomic Foundations of Employment and Inflation Theory*. pp. 1-26. New York: Norton.
- Preston, V. and McLafferty, S. (1999) Spatial mismatch research in the 1990s: progress and potential. *Papers in Regional Science* 78, 387-402.
- Priemus, H. (1998) The Randstad and the central Netherlands urban ring: planners waver between two concepts. *European Planning Studies* 6, 443-455.
- Simpson, W. (1992) *Urban Structure and the Labour Market: Worker Mobility, Commuting and Underemployment in Cities*. Oxford: Clarendon Press.
- Termote, M. (1980) *Migration and Commuting: A Theoretical Framework*. Laxenburg, Austria: IIASA.
- Topel, R.H. and Ward, M.P. (1992) Job mobility and the careers of young men. *Quarterly Journal of Economics* 107, 439-479.
- Van der Laan, L. (1998) Changing urban systems: an empirical analysis at two spatial levels. *Regional Studies* 32, 235-247.
- Van der Laan, L., Vogelzang, J. and Schalke, R. (1998) Commuting in multi-nodal urban systems: an empirical comparison of three alternative models. *Tijdschrift voor Economische en Sociale Geografie* 89, 384-400.
- Van der Vegt, C. and Manshanden, W.J.J. (1996) *Steden en stadsgewesten: economische ontwikkelingen 1970-2015* [Cities and urban regions: economic developments 1970-2015]. Den Haag: Sdu Uitgevers.
- Van Ommeren, J. (1996) *Commuting and Relocation of Jobs and Residences. A search Perspective*. PhD thesis. Vrije Universiteit Amsterdam.
- Wachs, M. and Taylor, B.D. (1993) The changing commute: a case study of the jobs-housing relationship over time. *Urban Studies* 30, 1711-1730.

De regionale component in de afstemming tussen opleiding en functieniveau, Van Ham M. and Mulder C.H., *Mens en Maatschappij* 74, 4, 392-406. Copyright © 1999 Amsterdam University Press.

Chapter 3

The regional component of the match between educational and job levels

Abstract. Although the average level of education of the Dutch population has risen over the last few decades, average job levels have not risen accordingly. This paper addresses the match between educational and job levels. The focus is on regional differences, using data from the 1995 and 1996 Labour Force Surveys. We show that people living in the Randstad (the key economic region of the Netherlands) are more likely to have a job — and to reach a certain job level — than those living in the peripheral regions. We also show that the probability of a good match between educational and job levels is greater in areas with better ‘job access’ (number of suitable jobs within reach).

1. Introduction

Considering the enormous expansion in education in the last few decades and the lag in the corresponding growth in the number of jobs for the highly qualified, it is hardly surprising that social scientists have become concerned about the match between educational and job levels. The problem of a lack of harmonization is referred to (according to the researcher’s perspective) either by the term *over-education* (Asselberghs *et al.*, 1998; Groot, 1993) or the term *under utilization* (Huijgen *et al.*, 1983; Wolbers, 1998). Where the emphasis is placed on change over time in this harmonization, the terms *diploma inflation* and *downward displacement* are used (Wolbers, 1998).

Much research into the match between educational and job levels makes use of normative, ‘correct’ job levels associated with the various actual educational levels of employees (the objective model). People with a higher level of edu-

cation than would be deemed appropriate for the job level attained are over-educated (or, their human capital is under utilized). By means of a model developed by Huijgen and colleagues (1983), Asselberghs and colleagues (1998) established that the share of over-educated employees increased in the Netherlands between 1971 and 1995 from 18% to almost 38%.

Considerable criticism has been levelled at the approach taken by Huijgen and colleagues. The criticism has been of both the method used and the conclusion drawn that the level of downward displacement in the Netherlands has increased. Groot and Maassen van den Brink (1996) qualified the picture of an increase in downward displacement by pointing out the selective character of over-education. Over-education is mostly found amongst young people, part-time workers, and returnees (people returning to work after some years' absence: mostly women). These authors assert that, for these groups, over-education operates as compensation for lack of experience and higher costs for the employer. Over-education is usually temporary for young people; they only attain the normative job level associated with their education later in their careers. Skills which at first are underused are finally made productive. Over-education only becomes a problem (for the individual and for society) if employees remain over-educated on a long-term or permanent basis (Groot and Maassen van den Brink, 1998).

Various authors have put forward the hypothesis that the *region of residence* also plays a part in being over-educated (Batenburg and De Witte, 1996; Simpson, 1992). Regional differences in supply and demand on the labour market make finding a job at one's level easier in one region than another. Much research on over-education has been carried out only at national level. This is remarkable, since from both scientific and policymaking viewpoints there is a need for better understanding of the background underlying over-education. Labour market policy is in practice strongly associated with the regions (Batenburg and De Witte, 1996).

In this contribution, we report our investigation of the explicit part played by the region of residence. We applied an alternative approach to the 'objective' model. An important addition with respect to that model is that we not only paid attention to the job level attained by those in work, but also on whether people were in work or not. A second improvement is the method used. Instead of considering over-education directly, we investigated the influence of a number of independent variables on having a job at all: a job at an elementary level (versus unemployment); a low level job (versus elementary level, or unemployment) and so on, up to and including having a job at university graduate level (versus a lower level, or unemployment). This method is known as *cumulative logit analysis*. Educational level is indeed included among the independent variables; the region of residence is also incorporated in the model. The age and gender of the respondents are included as control variables. In a further analysis, we investigated whether spatial differences in job access — the number of suitable jobs within a

respondent's reach — are capable of explaining whether one has a job and, if so, what job level has been attained. The analyses were carried out with data from the Labour Force Surveys of 1995 and 1996 of Statistics Netherlands.

2. Background, theory, and hypotheses

The educational level of the Netherlands labour force has increased markedly in the last few years. Between 1990 and 1997 the share of people in the labour force with higher vocational education increased from 14.6% to 17.1%. In the same period, the share of university graduates in the labour force increased from 6.8% to 8.5% (CBS, 1998). These rapid shifts in educational levels in the labour force came about for the most part because the new entrants on the labour market had a higher average level of education than the people leaving the labour market (Groot and Maassen van den Brink, 1998). The level of the available jobs has also risen in the last few years, although not at the same rate as the educational level of the labour force. As a result, many highly educated people have found themselves in jobs beneath their educational level (Asselberghs *et al.*, 1998).

Asselberghs and colleagues (1998) have shown that the occurrence of downward displacement in the Netherlands increased between 1977 and 1995. Over the course of time, people with a particular level of education have reached progressively lower job levels. Highly educated people more frequently occupy jobs beneath their level and as a result displace the less well educated. The result is over-education and unemployment.

Various researchers have arrived at different percentages for the extent of over-education in the Netherlands. The estimates range from 13% to 31% (Groeneveld, 1996). These contradictory conclusions are brought about through the use of different methods of determining over-education (Groeneveld, 1996; Van der Meer, 1993). Four methods can be distinguished. First, the previously mentioned 'objective' method (Huijgen *et al.*, 1983). Second, the method which proceeds from the average educational level of people working in a particular job. People with more education than this average are then deemed over-educated (Groot, 1993). Third, there is a method in which the educational level required for a particular job (by the employer) is compared with the educational level of the employee (Oosterbeek, 1992). The fourth method proceeds from employees' subjective evaluations. Employees are asked whether they consider that they have too high or too low an educational level for their job (Groot and Maassen van den Brink, 1996).

With the data available, it would have been possible to use methods one or two. We opted here for a variant of the first, the 'objective' method. The criticism levelled at the second method (in which the required qualification level for a particular job is compared with the average educational level of all employees

in such a job) is that the results reflect not so much the level of qualifications required, but rather the practical results of recruitment and selection. This method would not therefore be suitable for research into the match between educational levels and the labour market (Groeneveld, 1998). The main criticism of the first method is that it is not actually possible to assume a one-to-one relationship between educational level and job level (Groot and Maassen van den Brink, 1998). We have therefore improved the method by not restricting ourselves to the consideration of a one-to-one relationship and the calculation of percentages of over-education, but rather to examine the extent to which people are able to utilize their human capital. Considered from an individual's point of view, the question is not so much whether the educational level achieved is too high for the job level, but what job level can be attained with a given educational level.

A second improvement is that we have also considered whether or not a person has a job. The term *over-education* is only used for people working in a job which is below their level. Considered from the point of view of human capital theory, the unemployed are also over-educated. They too fail to make full use of their human capital. We have therefore opted here for a broader definition of over-education which includes unemployment: *underemployment* (Simpson, 1992). The term underemployment stands for the incomplete utilization of investments made in human capital. Here, we have sought regional differences in the extent to which people are able to utilize their human capital, or in other words, the extent to which people are able to find a job of at least a certain level. In doing so, we have remained conscious of the fact that educational level is not a fully satisfactory operationalization of human capital (see also Hövels, Den Boer and Frietman, 1999).

According to human capital theory, people invest in an assembly of knowledge, skills and capabilities which have a labour market value (see Becker, 1964). Employment income is the yield from the accumulated human capital. People strive to obtain a maximal yield from their human capital investments. The assumption then follows that both the unemployed and the over-educated will try to increase the yield from their human capital either through finding a job, or through finding a job at the appropriate level.

Young people, part-time workers, and employees who, whether from necessity or not, left the labour process temporarily and later returned are relatively frequently over-educated (Groot and Maassen van den Brink, 1996). Women are more often over-educated than men, because they more frequently work part-time and more frequently break off their labour careers. Therefore, when considering whether people are working or not, or what job level people have attained, age and gender must be controlled for (see also Batenburg and De Witte, 1999).

Almost by definition, highly educated people are more often underemployed than the less well educated, because of a glass ceiling effect. Highly educated people are at the top of the educational ladder and as a result can only have an

appropriate job, or a job below their level. A relative shortage of jobs at the highest levels leads to many highly educated people in jobs at too low a level.

The Netherlands labour market is not homogeneous; it consists of a number of regional labour markets each of which is characterized by a specific supply of employment opportunities. At the same time, regions accumulate specific labour forces through, for example, the presence of certain educational institutions (Batenburg and De Witte, 1996). Regional differences tend to occur in both supply and demand. In an idealized (neoclassical) labour market in which employees move house freely, there would be no question of any part being played by region of residence, because people would migrate to more favourable regional labour markets. But because labour forces are characterized by a limited commuting or migration tolerance, labour is to a large extent tied to a region. Phelps (1970) expresses this situation in terms of labour market islands. People first look for work on their own island, because of the costs involved (search costs, commuting or removal costs) in the search for work on other more distant islands.

Regional differences in the number of suitable jobs within reach therefore play a part in regional differences in underemployment. Areas where in an absolute sense many jobs are within reach, and in a relative sense high level jobs are over-represented, would be expected to have the least underemployment. Within the Netherlands, the Randstad is such an area (Van Ham, 1999). Less underemployment would therefore be expected in the Randstad than in the rest of the country.

A number of hypotheses can be derived from the above. Young people are more often underemployed than older people. Women are more often underemployed than men. Highly educated people are more often underemployed than the less well educated. And it is easier to obtain a job (at a good level) in the Randstad than in the rest of the Netherlands.

3. Regional differences in underemployment

Everyone who is over-educated, unemployed, or working in a job for less than 12 hours per week while actively looking for a job of more than 12 hours per week, is underemployed. To measure over-education, the over-education model used was based on the five job levels of the Standard Occupational Classification [*Standaard BeroepenClassificatie*] of Statistics Netherlands from 1992 (SBC'92; see CBS, 1993). This model is an alternative to the model developed by Huijgen and others which proceeds from seven job levels (which they define) (1983; see Asselberghs *et al.*, 1998). We have distinguished five job levels: elementary, low, middle, high, and graduate. Education is measured according to the Standard Education Classification [*Standaard OnderwijsIndeling*] 1978 (SOI'78) and is divided into five categories: primary (Basis), lower secondary (MAVO/VBO), secondary (HAVO/VWO/MBO), higher vocational (HBO), and university (WO).

Figure 1. *Over-education model according to SBC'92.*

Educational level	Job level				
	Elementary	Low	Middle	High	Graduate
Primary	0	0	0	0	0
Lower Secondary	1	0	0	0	0
Upper Secondary	1	1	0	0	0
Higher Vocational	1	1	1	0	0
University	1	1	1	1	0

The model used is shown in Figure 1. Below the diagonal there are indications of over-education. Above the diagonal signs of under education may be observed, but it is difficult to visualize this as a problem. The extent of over-education and underemployment according to education, age and gender was determined on the basis of the above model. In 1995-96, total over-education in the Netherlands amounted to 21.5% and total underemployment to 27.7%. The results in Table 1 are in agreement with the hypotheses. Both over-education and underemployment increase with education. Over-education and underemployment decrease with age. Older people work below their level less often than young people. As their careers proceed, people find themselves at a job level which has a better normative match with their educational level, although this age effect could also result to some extent from the lower educational levels of the older birth cohorts. Men are less often over-educated and underemployed than women.

Table 1. *Percentage of over-education and underemployment.*

	Over-education	Underemployment
Education		
Lower	0.0	16.0
Lower Secondary	15.1	23.3
Upper Secondary	25.9	30.8
Higher vocational	23.9	27.9
University	31.5	35.7
Age		
<25 years	30.6	37.8
25 to 29 years	27.5	33.1
30 to 34 years	22.7	28.5
35 to 39 years	19.6	26.3
40 to 44 years	17.6	24.3
45 to 49 years	16.4	22.5
>50 years	15.8	20.9
Gender		
Man	19.4	24.1
Woman	24.7	32.9

Source: Labour Force Surveys for 1995 and 1996, processed

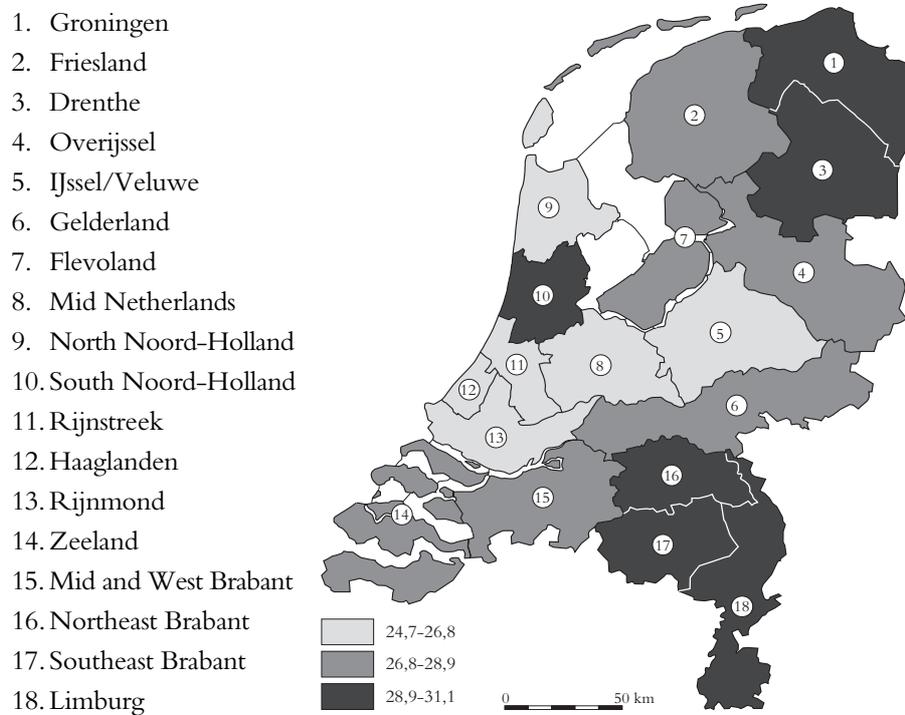


Figure 2. Percentage of underemployment according to RBA area.

In Figure 2, the regional differences in underemployment are given. For a regional classification, we used the 18 RBA areas (*Regionaal Bestuur voor de Arbeidsvoorziening*) [Regional Council for Labour Supply] of Labour Supply Netherlands [*Arbeidsvoorziening Nederland*]. The map reveals a clear centre-periphery picture. In general terms, underemployment is at its least in the Randstad and its most in the Northeast and Southeast. It is noteworthy that the percentage of underemployment in the South Noord-Holland RBA area (City of Amsterdam and surrounding district) is higher than in the rest of the Randstad.

A possible explanation for the regional differences in underemployment can be found in differences in the composition of the population. The poor score of South Noord-Holland may result from the fact that there, in comparison with the rest of the Randstad, relatively many highly educated young people live who are all at the beginning of their careers. To determine whether regional differences could indeed be accounted for by composition differences, a cumulative logit analysis was applied with region of residence and education included in the model and age and gender controlled for. The results of this analysis are described in the next section.

4. Cumulative logit analysis

4.1 Data and method

The data for the analyses were derived from the 1995 and 1996 Labour Force Surveys (EBB). The EBB is a continuous sample survey research carried out by Statistics Netherlands (CBS) of all people residing in the Netherlands with the exception of residents in institutions, resident care hostels and homes. Each year some 100,000 questionnaires are completed. The research population consists of the working population and the unemployed members of the labour force aged from 15 to 55 years, excluding schoolchildren/students, the disabled, self-employed, and the armed forces. All people carrying out at least 12 hours paid work per week are allocated to the working population. The unemployed population consists of all people who do not work at all, or work for less than 12 hours per week and are actively seeking work for at least 12 hours per week. In total, almost 120,000 respondents were included in the analyses.

To be able to calculate the influence of region of residence on whether or not one has a job of at least a certain level, we used a cumulative logit analysis applied here in the form of five logistic regression analyses. The cumulative character of the analysis becomes apparent in the coding of the five dependent variables (see Table 2). The first dependent variable distinguishes between people with a job of at least an elementary level from the unemployed. The second dependent variable distinguishes between people with a job of at least a low level from people with a job at the elementary level and the unemployed, and so forth. The last dependent variable distinguishes between people with a job at university graduate level from all the others. In this manner, we have measured the extent to which people are able to attain a particular job level, or in other words, the extent to which they are able to utilize their human capital.

Table 2. Coding scheme for the five dependent variables for job level.

	At least Elementary	At least Low	At least Middle	At least High	At least Graduate
Job level					
Unemployed	0	0	0	0	0
Elementary	1	0	0	0	0
Low	1	1	0	0	0
Middle	1	1	1	0	0
High	1	1	1	1	0
Graduate	1	1	1	1	1

In addition to the region of residence (according to the RBA classification: 17 dummies with Groningen as reference category) the analyses include as independent variables the educational level, age, and gender of the respondents. As for

job level, educational level is also measured cumulatively. Four dummies were used, coded as in Table 3. This coding gives each dummy in turn the added value of another educational level with respect to the preceding educational level. This manner of measurement allows optimal use to be made of the ordinal character of educational level.

Table 3. Coding scheme for the four independent educational dummies.

	Added value of Lower Secondary	Added value of Upper Secondary	Added value of Higher Vocational	Added value of University
Lower	0	0	0	0
Lower Secondary	1	0	0	0
Upper Secondary	1	1	0	0
Higher Vocational	1	1	1	0
University	1	1	1	1

A second analysis includes the number of jobs within reach of the residence location instead of the region of residence. The construction of this variable drew on the four-digit postcode areas which represent the respondents' residence locations. The number of jobs per level was estimated for each postcode area. The data relating to the number of jobs per four-digit postcode area were derived from the National Information System on Labour Supply [*Landelijk Informatie Systeem Arbeidsvoorziening*] (LISA) 1991 and 1994 (obtained through the RIVM, Bilthoven, in the context of the *Ruimtescanner project*). The data relating to job levels were derived from the EEBs for 1994, 1995 and 1996. The number of jobs at each level which could be reached within 30 minutes commuting was determined for each postcode.¹ Every respondent was allotted a value for the number of suitable jobs within reach depending on residence postcode and educational level.

4.2 Results

In Table 4 the results of the first cumulative logit analysis are shown. We were investigating the extent to which people could utilize their human capital, or in other words, the chance that a person has of a job of at least a certain level. The five models estimate the chance of a job of at least elementary, low, middle, high, or graduate level respectively.

In a labour market with no underemployment, according to the normative over-education model, the educational effect would appear as follows. Everyone would have work, so everyone would have a job at least at an elementary level. Model 1 is therefore meaningless; in theory, all parameters would be equal to 0. In model 2, the parameter for 'added value lower secondary' would be infinitely high and all other parameters would again be equal to 0. There is a perfect match between having had an education at lower secondary level and having a job at a

low job level. In models 3, 4 and 5 the parameters for ‘added value upper secondary’, ‘added value higher vocational’ and ‘added value university’ would be infinitely high, and the rest 0.

The analyses make it clear that in reality there is indeed evidence of under-employment. The first model shows that, for a job of at least elementary level, having had a lower secondary education has an added value with respect to primary education (see the positive parameter for ‘added value lower secondary’ in model 1). An upper secondary school education has a further added value with respect to a primary education and again, a higher vocational education has an added value with respect to an upper secondary school education. It is interesting to note that having had a university education has a *negative* added value with respect to a higher vocational education. That is to say, obtaining a job of at least an elementary level is more difficult for university graduates than for people with higher vocational qualifications. University graduates are thus more often unemployed than people with a higher vocational education diploma (but less often than the remaining educational categories; they score a 1 on all ‘added value dummies’).

The negative added value of a university education decreases as the minimal job level to be attained rises and becomes positive in model 4 for at least a high level job. A university education therefore already has an added value for obtaining a job of at least a high level. According to the over-education model in Figure 1 this reveals the existence of underemployment (compare the diagonal in Figure 1 with the diagonal in Table 4). This evidence can also be perceived in, for example, the added value of higher vocational education. To obtain a job of at least elementary, low, or middle level, a higher vocational education has an added value. This illustrates the occurrence of underemployment among people with a higher vocational education.

As the minimal job level increases (from model 1 to model 5) the added value of an additional educational level increases. The higher the minimal attained job level, the more the value on the diagonal in Table 4 increases. An appropriate education is thus more important for the higher job levels than for the lower job levels.

The age effect is in accordance with our expectations. Older people have a greater chance of obtaining a job at a certain level than young people, even after controlling for education. The chance of having a job of at least an elementary level is somewhat greater for people older than 40 years of age. Below the age of 40, the differences are not significant. It can be seen that the chance of obtaining a job of at least a low, middle, high, or graduate level respectively increases with age. The age effect is thus not accounted for by composition differences in the educational levels attained in the various birth cohorts.

It is interesting to note that, as the level of the minimal job level to be attained rises, the age effect becomes stronger. This finding indicates that the over-

Table 4. Cumulative logit analysis with region of residence (RBA area).

	Model 1	Model 2	Model 3	Model 4	Model 5
	At least elemen. level	At least low level	At least middle level	At least high level	At least graduate level
	<i>B</i>	<i>B</i>	<i>B</i>	<i>B</i>	<i>B</i>
Education					
Primary	0	0	0	0	0
Ad.val. Lower secondary ^a	0.64**	0.81**	0.83**	0.94**	0.71**
Ad.val. Upper secondary ^a	0.40**	0.80**	1.82**	1.37**	1.41**
Ad.val. Higher Vocational ^a	0.24**	0.52**	1.22**	3.20**	1.57**
Ad.val. University ^a	-0.34**	-0.29**	-0.10*	0.46**	3.15**
Age					
<25 years	0	0	0	0	0
25-29	0.05	0.12**	0.41**	0.61**	0.89**
30-34	0.05	0.16**	0.65**	1.04**	1.23**
35-39	-0.06	0.12**	0.70**	1.28**	1.48**
40-44	0.03	0.23**	0.74**	1.45**	1.67**
45-49	0.16**	0.33**	0.80**	1.56**	1.85**
>50 years	0.16**	0.33**	0.83**	1.66**	1.92**
Gender					
Man	0	0	0	0	0
Woman	-0.83**	-0.76**	-0.45**	-0.51**	-0.54**
RBA area					
1 Groningen	0	0	0	0	0
2 Friesland	0.13*	0.14**	0.10*	0.18*	0.10
3 Drenthe	0.24**	0.13*	0.07	0.13	0.23
4 Overijssel	0.41**	0.29**	0.23**	0.33**	0.15
5 IJssel-Veluwe	0.50**	0.35**	0.28**	0.37**	0.35**
6 Gelderland	0.34**	0.24**	0.18**	0.26**	0.18
7 Flevoland	0.39**	0.33**	0.43**	0.63**	0.52**
8 Mid Netherlands	0.60**	0.50**	0.51**	0.50**	0.23*
9 North Noord-Holland	0.48**	0.43**	0.40**	0.45**	0.30*
10 South Noord-Holland	0.43**	0.31**	0.37**	0.39**	0.20*
11 Rijnstreek	0.81**	0.57**	0.54**	0.64**	0.42**
12 Haaglanden	0.52**	0.49**	0.49**	0.54**	0.41**
13 Rijnmond	0.31**	0.29**	0.41**	0.45**	0.34**
14 Zeeland	0.52**	0.38**	0.30**	0.25**	0.21
15 Mid and West Brabant	0.41**	0.27**	0.27**	0.23**	0.19
16 Northeast Brabant	0.62**	0.36**	0.23**	0.23**	0.25*
17 Southeast Brabant	0.44**	0.28**	0.19**	0.22**	-0.04
18 Limburg	0.29**	0.20**	0.17**	0.19**	0.16
Constant	1.06**	0.03	-2.66**	-5.9**	-7.85**
-2 Log Likelihood:	89 152	116 328	162 156	122 948	53 603
Improvement:	4 123	9 823	37 491	55 211	25 492
	df = 28	df = 28	df = 28	df = 28	df = 28
	<i>p</i> =0.00	<i>p</i> =0.00	<i>p</i> =0.00	<i>p</i> =0.00	<i>p</i> =0.00

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

^a Added value with respect to one educational level lower

education of young people is indeed often temporary. Regardless of their education, people only reach the higher level jobs later in their careers (and so at a later age). Women always have a smaller chance of attaining a job at a certain level than men, so women are more often underemployed. The differences between men and women decrease as the minimal job level to be attained increases.

After controlling for education, age and gender there are still significant regional differences in the chance of obtaining a job of at least a certain level. These results agree closely with the map in Figure 1 (the numbers in Table 4 correspond with the numbering of the RBA areas in the figure). There is still a marked centre-periphery picture to be seen. The Groningen RBA area is the reference category and, as the results indicate, all the other regions outperform Groningen for all minimal job levels to be attained. People living in the Groningen, Friesland, Drenthe and Limburg RBA areas have the smallest chance of attaining a certain minimal job level. People living in the Haaglanden, Rijnstreek, Mid Netherlands, Flevoland and North Holland-Noord RBA areas have the greatest chance. It is noteworthy that, after controlling for education, age, and gender, the South Noord-Holland RBA area (Amsterdam and surroundings) once more scores lower than the neighbouring Randstad RBA areas. In absolute terms there are many higher level jobs in Amsterdam and the surrounding district, but competition among young highly educated people (new entrants) is so intense, it remains relatively difficult to obtain a high level job.

A possible explanation of the regional differences found is provided by regional differences in the number of suitable jobs within reach. In Table 5 the results are shown of a further cumulative logit analysis, this time with job access as the independent variable instead of region of residence. The effects of education, age and gender remain more or less the same. The number of suitable jobs within reach has a significant positive effect on the minimal job level to be attained. The greater the number of accessible jobs at one's own job level, the greater the chance of a job (at a certain level).

It is interesting to note the doubling of the effect of job access on having a job at least at the middle level in comparison with the effect on having a job at least at the low level. The accessibility of suitable job opportunities is more important for jobs at the higher levels than for jobs at the lower levels. At first sight this may seem contradictory when one considers that the highly educated are usually more prepared to commute or move house. But when one remembers that high level jobs are spread more thinly and are more strongly spatially concentrated than those at lower levels, the situation can be more readily understood (Simpson, 1992).

In a third analysis (the results of which are not reported here) we investigated whether the inclusion of both region of residence and job access leads to the disappearance of the regional effect. This is not in fact the case; the regional effect remains much the same. This finding suggests the presence of other factors leading to regional differences in the job level to be attained besides the number

Table 5. Cumulative logit analysis with suitable jobs within reach.

	Model 1	Model 2	Model 3	Model 4	Model 5
	At least				
	elemen.	low	middle	high	graduate
	level	level	level	level	level
	<i>B</i>	<i>B</i>	<i>B</i>	<i>B</i>	<i>B</i>
Education					
Primary	0	0	0	0	0
Ad.val. Lower Secondary ^a	0.62**	0.78**	0.75**	0.85**	0.65**
Ad.val. Upper Secondary ^a	0.38**	0.77**	1.75**	1.29**	1.35**
Ad.val. Higher Vocational ^a	0.27**	0.57**	1.30**	3.28**	1.64**
Ad.val. University ^a	-0.30**	-0.25**	-0.03	0.53**	3.19**
Age					
<25 years	0	0	0	0	0
25-29	0.04	0.11**	0.40**	0.60**	0.88
30-34	0.05	0.16**	0.64**	1.04**	1.23
35-39	-0.05	0.12**	0.70**	1.28**	1.48
40-44	0.03	0.23**	0.73**	1.44**	1.67
45-49	0.17**	0.33**	0.79**	1.56**	1.85
>50 years	0.17**	0.33**	0.83**	1.66**	1.92
Gender					
Man	0	0	0	0	0
Woman	-0.82**	-0.75**	-0.45**	-0.51**	-0.54**
Job access *100,000	0.03**	0.05**	0.10**	0.11**	0.09**
Constant	1.44**	0.31**	-2.39**	-5.60**	-7.64**
-2 Log Likelihood:	89 135	116 308	162 126	122 933	53 594
Improvement:	3 788	9 589	37 260	55 071	25 451
	df = 12				
	p=0.00	p=0.00	p=0.00	p=0.00	p=0.00

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

^aAdded value with respect to one educational level lower

of accessible jobs. The finding could also be an indication of the inadequate operationalization of the number of suitable jobs within reach: the suitability of a job is determined not only by educational level, but also by educational specialization and work experience.

5. Conclusion

Region of residence and the number of suitable jobs within reach have a significant influence on the extent to which people are able to utilize their human capital. The analyses reveal clear regional differences which evoke a strong centre-periphery image. The further people live from the Randstad, the more difficult it is to obtain a job at a certain level. The RBA area South Noord-

Holland (Amsterdam and surroundings) forms an exception. It is relatively more difficult to obtain a job at a certain level here than in the surrounding RBA areas. A possible explanation is that, although many high level jobs are located in Amsterdam and surroundings, competition is fierce. The over-representation of young highly educated starters leads to more underemployment than in the rest of the Randstad. The Groningen RBA area has the poorest scores on all job levels. Everything passes Groningen by! The regional policy of the mid 1980s (including the relocation of the Royal PTT Post) aimed to reduce regional inequalities within the Netherlands has apparently not come to fruition. In Groningen, there are few accessible jobs for university graduates in either absolute or relative terms. The presence of a university in Groningen leads to intense competition on the labour market. Obtaining a job at a certain level remains difficult at the periphery of the Netherlands.

The number of suitable jobs within reach has a significant positive influence on the job level attained. The greater the number of suitable jobs that are accessible, the easier it is to obtain a minimal certain job level. The analyses further suggest that underemployment varies with education, age, and gender. Highly educated people are more often underemployed than less well educated people, young people more often than older people, and women more often than men. These findings are in agreement with the expectations based on the theory.

The method that we applied yields an improvement on two points with respect to the so-called 'objective' method of determining over-education. First, we did not immediately assume a one-to-one relationship between educational and job levels. Instead, we considered directly the extent to which people are able to utilize their human capital, and involved in that the role of educational level. A second point of improvement is that we also considered whether or not people have a job. The unemployed also fail to make full use of their human capital. We have therefore used the broader term of underemployment, which stands for the incomplete utilization of investments made in human capital.

It appears from the results that regional differences in underemployment cannot be completely accounted for by differences in the number of suitable jobs within reach. To some extent that may be the fault of the necessarily inadequate operationalization of the number of suitable jobs. Another possible explanation is the part played by differences in the competition encountered on the labour market. A person may well have many suitable jobs within reach, but if the same jobs are also within the reach of others it is still difficult to get a job at a certain level. To obtain more insight into the regional component of the match between education and job level future research must also be concentrated on other regional characteristics.

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Notes

1. The calculations were made with the aid of the GIS extension Flowmap developed in the Faculty of Geographical Sciences, Utrecht University by Tom de Jong and Jan Ritsema van Eck. For a more detailed description of data and method, see Van Ham (1999).

References

- Asselberghs, K., Batenburg, R., Huijgen, F., and De Witte, M.C. (1998) *De kwalitatieve structuur van de werkgelegenheid in Nederland: deel IV. [The qualitative structure of employment in the Netherlands: part IV]*. The Hague: OSA (OSA preparatory study V44).
- Batenburg, R.S., and De Witte, M.C. (1996) Functiestructuur, verdringing en automatisering; regionale verschillen binnen Nederland [Occupational structure, downward displacement and automation: regional differences within the Netherlands]. In: Atzema, O. and Van Dijk, J. (Eds.) *Technologie en de regionale arbeidsmarkt [Technology and the regional labour market]*, pp. 117-131. Assen: Van Gorcum.
- Batenburg, R.S., and De Witte, M.C. (1999) Overscholing in Nederland: trends en scheidslijnen in de periode 1977-1995 [Over-education in The Netherlands: trends and dividing lines in the period 1977-1995]. *Tijdschrift voor arbeidsvraagstukken* 15, 95-110.
- Becker, G. (1964) *Human Capital: A Theoretical and Empirical Analysis, With Special Reference to Education*. New York and London: Colombia University Press.
- CBS [Statistics Netherlands] (1993) *Standaard Beroepenclassificatie 1992 [Standard occupational classification 1992]*. Voorburg/Heerlen: Centraal Bureau voor de Statistiek.
- CBS [Statistics Netherlands] (1998) *Enquête Beroepsbevolking 1997 [Labour Force Survey 1997]*. Voorburg/Heerlen: Centraal Bureau voor de Statistiek.
- Groeneveld, S. (1996) Het meten van overscholing [The measurement of over-education]. *Economisch-Statistische Berichten*, 81, 511.
- Groeneveld, S. (1998) Overscholing gemeten [Over-education measured]. Paper for SISWO meeting 'Overscholing gemeten', Amsterdam, 23 September 1998.
- Groot, W. (1993) Overscholing, onderscholing en het rendement op bedrijfsopleiding [Over-education, under-education and the success of business education]. *Mens en Maatschappij* 68, 386-405.

- Groot, W., and Maassen van den Brink, H. (1996) Overscholing en verdringing op de arbeidsmarkt [Over-education and downward displacement on the labour market]. *Economisch-Statistische Berichten* 81, 74-77.
- Groot, W., and Maassen van den Brink, H. (1998) Overscholing op de arbeidsmarkt: een meta-analyse [Over-education on the labour market: a meta-analysis]. In: Groot, W., Maassen van den Brink, H., Oosterbeek, H., Webbink, D. and Hartog, J. (Eds.) *Overscholing en verdringing op de arbeidsmarkt [Over-education and downward displacement on the labour market]*, pp. 11-30. The Hague: Welboom.
- Groot, W., and Maassen van den Brink, H. (1998) Neemt overscholing op de arbeidsmarkt toe? [Is over-education on the labour market increasing?] In: Groot, W., Maassen van den Brink, H., Oosterbeek, H., Webbink, D. and Hartog, J. (Eds.) *Overscholing en verdringing op de arbeidsmarkt [Over-education and downward displacement on the labour market]*, pp. 55-62. The Hague: Welboom.
- Hövels, B., Den Boer, P., and Frietman, J. (1999) Formele opleidingskwalificaties en competenties: wat telt voor laagopgeleiden? [Formal educational qualifications and capabilities: what counts for the poorly educated?]. *Tijdschrift voor arbeidsvraagstukken* 15, 124-134.
- Huijgen, F., Riesewijk, B.J.P., and Conen, G.J.M. (1983) *De kwalitatieve structuur van de werkgelegenheid in Nederland. Bevolking in loondienst en functieniveau-structuur in de periode 1960-1970 [The qualitative structure of employment in the Netherlands. The population in paid employment and occupational level structure in the period 1960-1970]*. Nationaal Programma Arbeidsmarkt Onderzoek-publicatie nr. 17 [National Programme of Labour Market Research publication nr. 17]. The Hague: Staatsuitgeverij.
- Oosterbeek, H. (1992) *Essays on Human Capital Theory*. PhD thesis. Amsterdam: UvA.
- Phelps, E.S. (1970) Introduction: The new microeconomics in employment and inflation theory. In: E. S. Phelps (Ed.) *Microeconomic Foundations of Employment and Inflation Theory*, pp. 1-26. New York: Norton.
- Simpson, W. (1992) *Urban Structure and the Labour Market: Worker Mobility, Commuting and Underemployment in Cities*. Oxford: Clarendon Press.
- Van der Meer, P. (1993) *Verdringing op de Nederlandse arbeidsmarkt [Downward displacement on the Dutch labour market]*. PhD thesis. Groningen: RuG.
- Van Ham, M. (1999) *Job access in a polynucleated metropolitan region; commuting tolerance and job access in the Netherlands*. Paper for European Network of Housing Research –Young Housing Researchers, May 1999, Istanbul.
- Wolbers, M.H.J. (1998) *Diploma-inflatie en verdringing op de arbeidsmarkt: een studie naar ontwikkelingen in de opbrengsten van diploma's in Nederland [Diploma inflation and downward displacement on the labour market: a study of developments in the benefits of diplomas in the Netherlands]*. PhD thesis. Amsterdam: Thela Thesis.

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Chapter 4

Local underemployment and the discouraged worker effect

Abstract. The effect of poor local labour market opportunities on occupational achievement is an important aspect of the spatial mismatch hypothesis. Much of the research has concentrated on the direct link between geographical access to jobs and employment outcomes. In contrast, little attention has been given to the discouraging effect of poor chances on job search activities. The discouraged worker effect is defined as the decision to refrain from job search as a result of poor chances on the labour market. Discouragement effects can arise from a lack of individual qualifications, from discrimination in the labour market or from a high local level of underemployment. The empirical findings of this paper, based on the Netherlands Labour Force Surveys 1994-97, show that discouragement can enter the job search process both at the stage of deciding to enter the labour force and at the stage of deciding to engage actively in a job search. Gender differentials in discouragement are revealed in the process of self-selection into the labour force. Poor labour market chances lead to less activity in both off-the-job and on-the-job search, indicating a role of discouragement in the spatial mismatch. Individual qualifications and ascribed characteristics turn out to be more decisive than the local level of underemployment.

1. Introduction

Even though Kain's 'spatial mismatch hypothesis' (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: 388) it has also stimulated more general research on the effect of poor job access on occu-

pational achievement. This research helps to understand the variety of mechanisms that underlie the original hypothesis. Research in the 1990s has shown major advancement in three areas. The first is uncovering selection bias in studies aimed at estimating the commuting tolerance of the unemployed (Cooke and Ross, 1998). The second is the widening of the issue to encompass not only race but also gender (Preston and McLafferty, 1999). The third is the detailed measurement of geographical access to appropriate jobs using GIS, linking this access to the level of occupational achievement (Hanson *et al.*, 1997; Ong and Blumenberg, 1998; Van Ham *et al.*, 2001).

Several empirical studies have focused on the influence of spatial restrictions on employment rates (for example, Ong and Blumenberg, 1998; Immergluck, 1998) and gender differences in labour participation (for example Hanson and Pratt, 1988, 1990, 1991). However, no direct empirical evidence has been found of a relationship between spatial restrictions and job search. Yet this relation is crucial, as job search is a prerequisite for labour market participation and career advancement. The jobless search to escape unemployment and those already in a job search to find a better one (Mortensen, 1986). The relationship between poor chances in the labour market and the intensity of job search has been expressed in the discouraged worker hypothesis (Fisher and Nijkamp, 1987). The hypothesis states that people with poor labour market expectations become discouraged in their job search and leave or fail to enter the labour force, because the probability of finding a suitable job after a certain period of time is low.

Poor labour market chances can result from individual characteristics, from discrimination in the labour market, and from a high level of local underemployment, which indicates a mismatch between demand and supply on the local labour market (Simpson, 1992). Evidence from studies using US data (Parsons, 1991; Keith and McWilliams, 1999) and British data (Van Ophem, 1991) indicates that women are less likely than men to be engaged in job search. Women are more spatially restricted than men (Hanson and Pratt, 1988), so gender differences in search behaviour may be explained in part by gender differences in the discouraged worker effect. In general, discouragement can be regarded as an extra mechanism that hampers the occupational achievement of groups with poor chances on the labour market, like Kain's inner-city African-American residents, and research on discouragement might therefore contribute to a more general understanding of spatial mismatches.

The aim of this paper is to find empirical evidence for the discouraged worker hypothesis by looking at direct evidence of job search activity. The main issue is the extent to which poor labour market chances have a discouraging effect on the probability of being engaged in job search. Individual characteristics (either real or ascribed) and the local level of underemployment are both considered potential sources of discouragement. We show that discouragement can enter the job search process at two different stages. The first stage concerns the decision to par-

ticipate in the labour market. At this stage, people select themselves into or out of the active labour force. This selection clearly has an effect on their chances of employment, as the potentially less successful will refrain from participation more often. The second stage is the decision to engage actively in job search, either on or off the job, once one is in the active labour force. In this second stage, selection effects are expected, as the discouraged worker hypothesis stipulates that low chances of being unemployed will have a negative effect on the search intensity.

The remainder of this paper is organized in four parts. Section 2 describes a theoretical framework within which (gender-related) discouragement effects in the various stages of the search process can be understood. Section 3 introduces the data and methodology. The method consists of a series of three logistic regression models which are used to estimate: the chances of being in the active labour force; the chances of being unemployed, given the fact that people are participating on the labour market; the chances of being in search of a job dependent on whether one is employed. Section 4 reports the results of the empirical validation of the models. Selection effects are measured, using the two-step Heckman procedure, and also given a substantive interpretation in terms of discouragement. The final section comprises a summary and a discussion of the implications.

2. Job search: theory and background

To explain job search and the influence of local underemployment on job search, we use insights from various theoretical points of view. We commence with job search theory and human capital theory. Individual and household restrictions are considered, paying special attention to racial and gender differences. Finally, job search is placed in a spatial context and the discouraged worker effect is worked out in more detail.

2.1 Job search theory

Since the seminal papers of Stigler (1961, 1962), job search theory has conclusively become one of the main theoretical and empirical tools for understanding the working of the labour market. In the past four decades, labour economists have produced an extensive body of research related to job search theory (Lippman and McCall, 1976; Kiefer and Neumann, 1989; Devine and Kiefer, 1991). In the basic sequential job search model, individuals choose a reservation wage; this is the lowest wage level at which they would be willing to accept a job. A job offer would only be accepted if the wage offer were at least as high as the reservation wage. The arrival rate of job offers depends on an individual's search intensity; this in turn depends on the potential gains of the search (see Mortensen, 1986). By varying search intensity, individuals can influence the search outcome. If an offer is accepted, a worker may continue to search on-the-

job until a better job is found. Job search theory is based on the idea that individuals maximize lifetime utility by moving through different states; the theory is explicitly dynamic. Over their lifetime, people adjust their reservation wage. They increase their job search intensity when they are underemployed — that is, when their present income falls under their reservation wage.

2.2 Human capital and underemployment

According to the human capital theory (Becker, 1962), people invest in productivity-enhancing skills and strive to maximize the utility of this accumulated capital. Human capital accumulates over a lifetime in the form of (formal) education and working experience. When, given past investments in human capital, the labour market position of an individual is sub-optimal this leads to job search; people search in order to avoid underemployment. For unemployed people, there are no returns on previous investments in human capital. The higher the level to which an unemployed person has been educated, the greater is the loss of income, so the more intensive is the job search. For the employed, the effect of human capital on job search cannot be seen independently from the level of their present job. The human capital of an employed person is best utilized when that person's job level and education level are in keeping. Workers therefore search more intensively when the educational requirements of their job are lower than their level of education (see Simpson, 1992). On the basis of the foregoing, it can be hypothesised that the probability of being engaged in an off-the-job search increases with educational level. It is further expected that, for a given level of education, the probability of being engaged in on-the-job search decreases with the level of the job.

In addition to job level, other job characteristics can also indicate that a worker's present job is sub-optimal, given past investments in human capital. According to Blau (1991), the number of hours worked per week is an important determinant of on-the-job search, because the returns on investments in human capital are maximized when a worker is employed full-time. The returns on previous investments in human capital are best assured in a secure job, so job security also plays an important part in job search (Van Ophem, 1991). Jobs with a permanent employment contract and regular working hours offer this security. It is therefore to be expected that the probability of being engaged in job search increases when a person is employed part-time, works irregular hours or does not have an employment contract.

Most job mobility occurs in the first decade of work experience (Topel and Ward, 1992). Job shopping enables individuals to try out several jobs to determine their comparative advantage (Johnson, 1978); find higher-quality job matches (Jovanovic, 1979); and achieve better pay (Parsons, 1973; Burdett, 1978). People accumulate human capital with age through their work experience; their human capital becomes more specific. The costs of a job change are

considerable when a worker with accumulated specific human capital moves to a job where these specific skills cannot be utilized. Furthermore, the pay-off period for search and job change costs becomes shorter as age increases. The probability of being engaged in job search is therefore expected to decrease with age.

2.3 Household situation and gender

The labour force participation of women is much lower than that of men. Women are also less often engaged in job search than men (Keith and McWilliams, 1999). Men traditionally have a full-time job and only a small proportion of the male labour force would voluntarily step out of the labour market. In contrast, many women seem to have other priorities than paid work. For a woman to stay outside the active labour force and become a full-time housewife is an acceptable alternative, especially when there are young children in the household. Making such a choice is inconsistent with the assumption that *all* individuals maximize the utility of their accumulated human capital. The new home economics theory (Becker, 1976, 1991) offers a theoretical framework that resolves this inconsistency. According to this theory, the labour participation decision of a mother is purely financial and depends on her earning capacity. If a mother's earning capacity is low, she will decide to become a full-time housewife. Mothers who have a high earning capacity may decide to participate on the labour market and contract out part of the domestic workload.

According to Hanson and Pratt (1990; Pratt and Hanson, 1991) neo-classical theory pays insufficient attention to the part played by constraints in the explanation of female labour participation. Although female labour participation has risen spectacularly in the past few decades, many households are still traditional in the sense that women undertake most of the household and childcare responsibilities. Many women are placed outside the labour market as a result, because of their domestic responsibilities and restricted access to childcare facilities (Bowlby, 1990). Restrictions also cause women to prefer part-time jobs, because these enable them to combine domestic work with paid employment.

We deduce from the above that, even when women decide to participate on the labour market, the domestic workload in combination with the presence of young children may restrict the opportunities of searching for a suitable job. We expect women to participate less in the labour market than men, and for women who do participate to be less frequently engaged in job search than men. We further expect the probability of women being engaged in job search to decrease if young children are present in the household and the effect on job search of working part-time to be less strong for women than for men.

2.4 Spatial restrictions and discouragement

Labour economists traditionally look at spatial restrictions in terms of the monetary costs of migration and commuting. Commuting costs lead, for example, to

adjustment of the reservation wage — the minimum wage a worker is willing to accept for a job at a certain location, given his or her location of residence. Therefore job search intensity rises significantly with rising commuting time (Van Ommeren, 1996).

Spatial restrictions are, however, more than just the costs of covering distance. For the majority of the workforce, the set of job opportunities that is actually available or seriously considered is highly constrained spatially (Hanson and Pratt, 1992). Spatial restrictions influence the arrival rate of suitable job opportunities. The quantity and quality of jobs within one's job search area depend on both its location and its size (see also Simpson, 1992). For most people, the location of their job search area is fixed in the space around their current residence. During their lifetime, people build up location-specific capital at their current residence (DaVanzo, 1981) — for example, contacts with family and friends upon which they rely for social support. A residential move may engender considerable costs, because of the loss of location specific capital (Hey and McKenna, 1979, see also Sjaastad, 1962). In addition, in households where both partners are engaged in paid work, a residential move may lead to job loss and thereby to loss of income for one of them (Mincer, 1978). As a consequence, most people only search for jobs in the vicinity that would not necessitate a residential move. The size of the job search area is therefore determined for most people by their commuting tolerance — the time they are willing to spend on commuting.

Apart from the coupling constraints described above, authority constraints can also impose restrictions on job search (see Hägerstrand, 1970). For the migrant population, racial discrimination in the labour market may severely hamper access to labour opportunities. As a result, people become more dependent on ethnic networks that provide more localised forms of employment. We therefore expect that migrants and their offspring have lower chances of finding employment.

Spatial restrictions may lead people to become discouraged in their search for jobs. According to the discouraged worker hypothesis, people with a small chance of finding a suitable job may become discouraged in their job search and leave or fail to enter the labour force because the probability of finding a suitable job after a reasonable period of time is too low (Fisher and Nijkamp, 1987). In other words: if, given the expected returns of search, the costs of job search are too high people may give up searching. Poor chances in the labour market may result from a high level of underemployment in one's job search area, which would indicate a local mismatch between demand and supply (Simpson, 1992). Poor labour market chances may also result from individual characteristics, either real or ascribed. For example, a 52-year-old man with a low level of education and little work experience may become discouraged in his job search, because past attempts to find a job were fruitless. This effect might be exacerbated if the person stems from the migrant population. Discouragement may be intensified when other men with the same characteristics are also seen to be unemployed.

Discouragement is most obvious when a person states that he or she wants to work, but does not employ any job search activities. However, discouragement might also occur in the decision to participate in the labour market. When people state that they do not want to work, the underlying reason can still be discouragement. Consider, for example, a woman with a child who is looking for a part-time job. If she cannot find a suitable job close to her home, she may decide not to enter the labour market and to become a full-time housewife instead. This phenomenon can be understood with the social-psychological theory of cognitive dissonance (Festinger, 1957; for a geographical application of the theory, see Adams, 1973). The woman in our example has committed herself to being active on the labour market. When faced with information that is discordant with that commitment (she does not succeed in getting the job she wants because of the high local level of underemployment), she can reduce the dissonance by changing her commitment. Becoming a full-time housewife leads to a greater cognitive consistency.

Research shows that men and women differ in their commuting tolerance, so their job search areas differ in size: men will tolerate longer commuting times than women (Madden, 1981; Gordon *et al.*, 1989; Johnston-Anumonwo, 1992). Women with children have been shown to be particularly averse to long commuting times (Rouwendal, 1999). Compared with men, women are more likely to have to cope with severe day-to-day space and time constraints dictated by their domestic workload (Hanson and Pratt, 1991). We therefore expect a high local level of underemployment to discourage women in particular. We further hypothesise that women in regions with a high local level of underemployment, state that they do not want to work more often than women in more favourable labour markets.

The rationale of discouragement can be summarized in three statements. First, discouragement can arise from two sources: a lack of individual qualifications or ascribed negative characteristics at the micro level, and a lack of job offers at the local or regional level. We expect an extra effect of discouragement among the migrant population due to their extra-poor chances on the labour market and their residential location in areas with a high level of underemployment. Secondly, discouragement can enter the job search process at two different stages: the stage of deciding to enter the labour force (avoid underemployment by choosing not to work), and the stage of deciding to engage actively in job search (become resigned to underemployment and stop searching). Thirdly, the choice of strategy not to enter the labour force or to acquiesce in underemployment can be expected to be gender-related. If the chances of employment are low, women choose more often than men not to enter the labour force. To some extent, this option is triggered by the earning capacity of the partner. If this were the only factor, one might expect that people whose partners had high earning capacity would participate less, irrespective of gender. However, since it is less socially acceptable for men not to work, gender differentials are bound to occur.

3. Data and methodology

3.1 Method

In a methodological sense, the second statement above — that discouragement can enter the job search process at two stages — is far-reaching. If indeed some categories of people refrain from entering the labour force altogether as a result of discouragement, the outcomes of an analysis of whether people search or not will be biased. The substantive argument is that the category of people not in employment consists of two sub-groups: those who are unemployed and will therefore search hard; those who have decided not to work and will therefore not search at all. In statistical analysis, this leads to selection bias. People who decide not to work select themselves out of the population at risk of job search.

To deal with these effects, we decided to split the analyses into three steps (Figure 1). The first is an analysis of participation in the labour market among the potential labour force. In this analysis, we examined the extent to which the local level of underemployment influences participation. Should it be influenced, we would have an indication of discouragement in the participation decision (that is, in wanting a job apart from deciding to search). The dependent variable indicates whether (1) or not (0) a respondent is in the active labour force. Respondents in the active labour force either have a job of more than 12 hours a week (the employed labour force), or state they would like to have such a job (the unemployed labour force). In the second analysis, the probability of being in the unemployed labour force was estimated for those in the active labour force. The dependent variable indicates whether (1) or not (0) a respondent is unemployed. The function of this analysis was to produce a variable predicting the probability of being unemployed from the independent variables, including ethnic origin, in the model. This variable was used in the search analyses to test whether having a poor chance of finding a job leads to discouragement in searching for one. The third analysis is the analysis of job search. The dependent variable indicates whether (1) or not (0) the respondents had searched for work in the four weeks preceding the interview among those in the employed and unemployed labour force — those who are either working or state that they would like to work. In this analysis, we excluded those people who did not want to work at all (and so by definition were not engaged in job search). So this analysis is of discouragement in searching among those who have decided to participate on the labour market. We wish to include the job characteristics of the employed labour population, so the analyses for on-the-job and off-the-job search have been separated. In all three analyses, the dependent variable is binary. We have therefore used logistic regression models.

If discouragement enters the decision to participate, then the active labour force becomes a selective category. Those with a low chance of employment, as a result of personal characteristics or a lack of job offers, will be underrepresented.

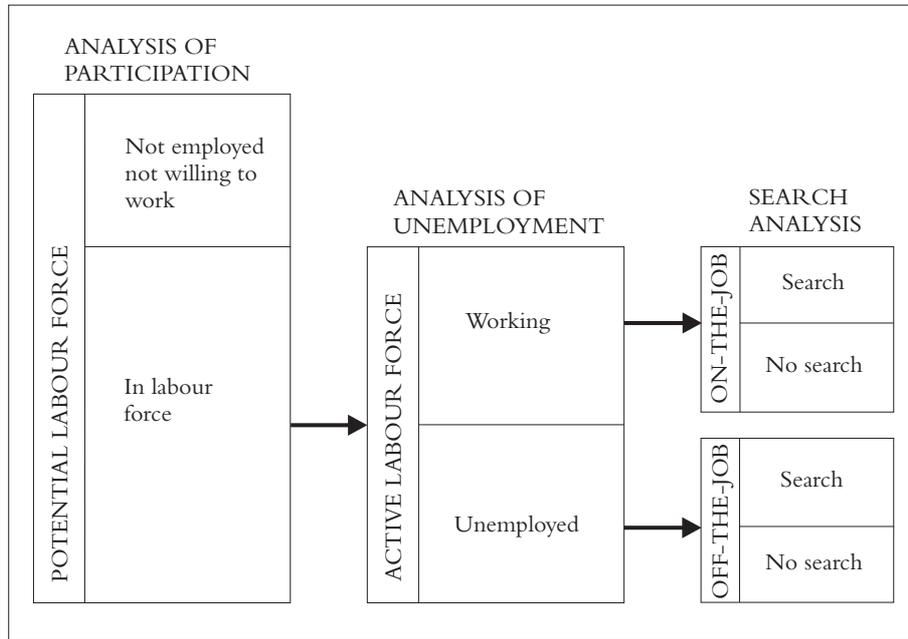


Figure 1. *The three analyses.*

To correct for this selectivity, we have used Heckman’s two-step procedure (Heckman, 1979), by including a correction-factor λ_1 in the analysis of unemployment. In its transformed form λ_1 represents the predicted values of participation from the first model and ranges from 0 to infinity. The higher the predicted probability of participation, the lower is λ_1 . Two conclusions can be inferred from the coefficient of λ_1 in the unemployment model. If the coefficient is significant, then it is evident that (self)selection exists. If the coefficient is positive, then it is clear that people with a small predicted probability of participating have a high chance of being unemployed. In other words, a category of people might have been indicated which has chosen not to participate, because their chances of unemployment are high: they have been discouraged.

The predicted values of the second model represent the chances of unemployment on the basis of the personal characteristics included in the model. These values enter the analyses of the search in step three in their transformed form λ_2 . λ_2 does not just serve as a correction factor; it also measures an individual’s chances in the labour market. λ_2 can also range from 0 to infinity; the higher the predicted probability of being unemployed in model 2, the lower λ_2 will be. In the search analyses, we expect respondents with poor chances in the labour market to be discouraged in job search. The coefficient for λ_2 is therefore expected to be positive: respondents

with a low predicted probability of being unemployed are expected to be more likely to search than respondents with a high probability of being unemployed.

An important condition for the application of the two-stage Heckman procedure is that the model is sufficiently identified in order to avoid multi-colinearity and unstable parameter estimates. The first, second and third analyses therefore have slightly different sets of independent variables. The ethnicity variable has been included in the second step, the analysis of unemployment, as its effect was most marked in this step.

3.2 Data and variables

The data used in this paper were derived from Dutch Labour Force Surveys conducted in 1994, 1995, 1996 and 1997 by Statistics Netherlands. The Labour Force Survey is representative of the Netherlands population aged 15 and above and not living in an institution. The data-set 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 location of residence. Further, the data-set includes a direct question regarding job search. Respondents were asked, "Have you undertaken any activity to find a(nother) job in the last four weeks?" Merely looking at job advertisements in the newspaper could count as search activity.

The analyses are restricted to respondents aged between 15 and 54 years excluding students, the armed services, the self-employed and the disabled. The potential labour force in the data-set amounts to 143,930 men and 156,196 women. The unemployed labour force consists of 16,366 men and 30,490 women, while the employed labour force consists of 125,202 men and 79,094 women.

In the analysis of participation, 8 independent variables have been included. Level of education is in 5 categories: primary education; lower-level secondary education (vbo, mavo); upper-level secondary education (mbo, havo, vwo); higher vocational education (hbo); and university. Age is in 4 categories: younger than 25; 25-34 years; 35-44 years; and 45-54 years. A dummy has been used which indicates whether (1) or not (0) there is a child younger than 5 years old present.

Four variables measure the characteristics of the partner. A dummy indicates whether (1) or not (0) the respondent has a partner. Another dummy indicates whether (1) or not (0) the partner works. For the respondents without a partner, the average of the respondents with a partner is substituted for this dummy. Because the model contains a variable indicating whether a partner is present, this substitution of the means leads to unbiased coefficients of the 'partner works' dummy for those with a working partner (compare Cohen and Cohen, 1975, chapter 7). The educational level of the partner is measured in five categories. Substitution of the means is used to deal with respondents without a partner. The job level of the partner is allotted to one of the five levels of the Standard Job Classification (SBC-1992) of Statistics Netherlands: elementary; low; middle;

high; academic. The substitution of means method has again been used to deal with respondents without a partner, or without a working partner.

Local underemployment was calculated as a percentage of the local potential labour force, using the 1994-97 Labour Force Surveys. Being underemployed is defined as having no job at all, having a job of less than 12 hours a week or having a job which level is too low with respect to the educational level of the respondent. With the GIS extension Flowmap (de Jong and Floor, 1993; Van Ham *et al.*, 2001) we have calculated a measure of underemployment on the local labour market for every respondent in the data set. The starting-point was a very low spatial level; the almost 4000 4-digit postcode areas. This is the finest measurement of residential locations in our data-set. For every postcode, we calculated the percentage of underemployment in an area that could be reached within 30 minutes by car. Since in the Netherlands 80 per cent of the working population travels less than 30 minutes per single journey to work, this was thought to be a reasonable approach to the local labour markets. The local percentage of underemployment ranges from 41 to 54 per cent of the potential labour force. Two areas stand out in having above-average levels of underemployment: the inner-city neighbourhoods of the two largest cities (Amsterdam and Rotterdam) and the more peripheral rural areas. Below-average underemployment is found in the suburban areas in between the cities.

In the analysis of unemployment, seven independent variables have been included. Level of education and age are measured in the same way as in the first analysis. Type of household is categorized as: single; couple with unemployed partner; couple with working partner; and others. A dummy indicates whether (1) or not (0) a respondent is a migrant, or a descendant from a migrant. A dummy indicates whether (1) or not (0) the respondent left school in the year before the interview. The year of interview is indicated in four categories: 1994; 1995; 1996; 1997. Lambda-1 is a continuous variable ranging from 0 to infinity.

In the off-the-job search analyses, six independent variables are included. Level of education, age and local underemployment are measured in the same way as before. Working experience is measured in a two-category variable, indicating whether (1) or not (0) respondents have ever had a job of more than 12 hours a week. The type of household is categorized as: single unemployed; unemployed with working partner; both partners unemployed; others. The control factor Lambda-2 is a continuous variable ranging from 0 to infinity.

In the on-the-job search analyses, the same variables as in the off-the-job search analyses are included, together with the presence of children and some additional job characteristics. The presence of children is categorized as: no children; youngest child under 6 years old; youngest child between 6 and 12 years old; and youngest child between 12 and 17 years old. Hours worked per week are in four categories: 12-20 hours; 21-35 hours; 36-40 hours; and more than 40 hours a week. Commuting time is measured in five categories: 0-30

minutes; 31–45 minutes; 46–60 minutes; more than 60 minutes; unknown. Regularity of working times has been reduced to a two-category variable, indicating whether (1) or not (0) the respondents have irregular working times. Job security has also been reduced to a two-category variable, indicating whether (1) or not (0) respondents have a permanent employment contract.

4. Results

As expected, men have a higher probability of participating on the labour market than women. From our data, we find that 98 per cent of the male potential labour force either have a job or would like a job of at least 12 hours a week. In contrast, only 70 per cent of the female potential labour force is in the active labour force. As expected, men have a higher probability of being engaged in job search than women: from the unemployed labour force, 73 per cent of the male respondents compared with only 52 per cent of the female respondents are engaged in job search. For on-the-job search there are no gender differences; 10 per cent of those in the employed labour force are engaged in job search.

4.1 Analysis of participation

Table 1 gives the results of the analysis of participation in the active labour force. For both men and women, the probability of being in the active labour force increases with level of education and decreases with age. Tests showed only a slight effect of ethnicity on participation. The variable is not included in the model to avoid multi-collinearity in the second step.

Having a child under the age of 5 has a significant negative effect on the probability of being in the active labour force. This was as expected for women, but the fact that there is also an effect for men was not. The effect is much stronger for women than for men.

Four variables were entered into the model to indicate a partner's earning capacity: having a partner, whether the partner works, the partner's educational level, and job level. For women, having a partner has a negative effect and this is exacerbated if the partner's job level is high. The educational level of the partner yields a u-shaped effect. People whose partner has a medium level of education have a higher probability of participating than those with a partner whose level of education is either high or low. This indicates that the effect of being a two-wage-earner couple is most prominent among couples with average earning capacity. For men, having a partner has a positive effect on participation, which is offset to some extent if the partner works and in particular if the level of the partner's job is high.

To test the hypothesis on discouragement in the participation decision, the local percentage of underemployment is included as an independent variable. For

Table 1. Logistic regression of being in the active labour force, by gender.

	Men			Women		
	B	s.e.	Exp(B)	B	s.e.	Exp(B)
Education						
Primary	0		1	0		1
Lower secondary	0.800***	0.056	2.226	0.433***	0.019	1.542
Upper secondary	1.274***	0.056	3.573	1.129***	0.019	3.090
High vocational	1.585***	0.085	4.878	2.005***	0.028	7.428
University	1.945***	0.126	6.995	2.829***	0.059	16.917
Age						
<25	0		1	0		1
25-34	-0.246***	0.081	0.782	-0.718***	0.031	0.488
35-44	-0.809***	0.080	0.445	-1.384***	0.030	0.251
45-54	-1.593***	0.080	0.203	-2.267***	0.031	0.104
Child under 5 years						
No	0		1	0		1
Yes	-0.277***	0.066	0.758	-1.435***	0.017	0.238
Partner						
No	0		1	0		1
Yes	1.225***	0.051	3.404	-0.840***	0.019	0.432
Partner works						
No	0		1	0		1
Yes	-0.240***	0.061	0.787	0.047**	0.019	1.048
Education of partner						
Primary	0		1	0		1
Lower secondary	0.634***	0.074	1.885	0.118***	0.023	1.125
Upper secondary	0.670***	0.080	1.953	0.302***	0.023	1.352
High vocational	0.500***	0.127	1.643	0.382***	0.031	1.466
University	0.019	0.211	1.020	0.282***	0.043	1.326
Job level of partner						
Elementary	0		1	0		1
Low	0.058	0.133	1.060	-0.224***	0.035	0.799
Middle	-0.371***	0.130	0.690	-0.230***	0.034	0.795
High	-0.577***	0.161	0.562	-0.287***	0.039	0.751
Academic	-0.429*	0.259	0.652	-0.486***	0.048	0.615
Local underempl. (%)	-0.008	0.010	0.992	-0.027***	0.003	0.973
Constant	3.413***	0.472		3.674***	0.143	
Initial-2 log likelihood	24 590			190 409		
Model-2 log likelihood	22 561			156 406		
Improvement	2 029, df=19, p=0.00			34 003, df=19, p=0.00		

*= $p < 0.10$; **= $p < 0.05$; ***= $p < 0.01$

women, the results are as expected: the local level of underemployment has a negative effect on the participation decision of women. Women living in areas with a high local level of underemployment state that they do not want to work

more often than women in more favourable labour markets. For men there is no effect. The results show that women are indeed more easily discouraged than men by poor local labour market conditions.

The analysis of participation results in a correction factor known as Lambda-1 which is used as an independent variable in the second model to control for selection effects. The results from the analyses of participation show the plausibility of the effect of discouragement on the decision to refrain from working. Personal characteristics that indicate poor chances on the labour market (low education, high age) and a lack of job offers in the local economy both have a negative impact on the decision to participate. It is shown, by entering the Lambda-1 score as an independent variable in the unemployment model, that non-participation is a way of avoiding unemployment (see next section).

4.2 Analysis of unemployment

Table 2 presents the results of the analysis of unemployment among those in the active labour force. The main function of this second analysis is to construct Lambda-2, which measures an individual's chances in the labour market. Lambda-2 is used as an independent variable in the search analyses.

The likelihood of being unemployed is increased by having a low level of education, being a school leaver, an immigrant, the descendant of an immigrant, or by living alone. The ethnicity variable in particular shows a striking effect that is more substantial than the educational variable. The poor chances in the labour market of the migrant population cannot be attributed to an overall skill-mismatch.

People interviewed in more recent years have a lower probability of being unemployed. This finding can be explained by the fact that, from the mid 1990s the economy in the Netherlands has shown an upward tendency. For both men and women, Lambda-1 has a significant effect on the probability of being unemployed: this means that (self) selection exists. The fact that the parameter for Lambda-1 is positive indicates that people who stated that they wanted to work for at least 12 hours a week, but who had characteristics similar to those who have chosen not to participate, have a high probability of being unemployed. This means that there is a category of people who have used the decision not to participate as a means of avoiding unemployment: they have been discouraged.

4.3 Off-the-job search

Table 3 presents the off-the-job search results by gender. The research population consists of unemployed respondents who stated that they would like to have a job for at least 12 hours a week.

Men

As expected, level of education has a positive effect for men on the probability of being engaged in off-the-job search. Work experience also has a positive effect

Table 2. Logistic regression of being unemployed, by gender.

	Men			Women		
	B	s.e.	Exp(B)	B	s.e.	Exp(B)
Education						
Primary	0		1	0		1
Lower secondary	-0.691***	0.034	0.501	-0.183***	0.026	0.832
Upper secondary	-0.980***	0.039	0.375	-0.439***	0.028	0.645
High vocational	-1.201***	0.048	0.301	-0.627***	0.036	0.535
University	-0.989***	0.054	0.372	-0.630***	0.049	0.533
School leaver						
No	0		1	0		1
Yes	0.960***	0.041	2.611	0.864***	0.040	2.373
Age						
<25	0		1	0		1
25-34	0.128***	0.034	1.136	0.116***	0.030	1.123
35-44	0.097**	0.040	1.102	0.397***	0.031	1.487
45-54	0.044	0.050	1.045	-0.068*	0.036	0.935
Immigr.or descendant						
No	0		1	0		1
Yes	1.425***	0.022	4.157	0.664***	0.022	1.943
Household situation						
Single	0		1	0		1
Couple, partner unemployed	-1.214***	0.033	0.297	-0.552***	0.030	0.576
Couple, partner employed	-1.562***	0.033	0.210	-0.777***	0.021	0.460
Other	-0.705***	0.032	0.494	-0.864***	0.036	0.422
Year of interview						
1994	0		1	0		1
1995	-0.109***	0.024	0.896	-0.067***	0.020	0.935
1996	-0.219***	0.025	0.804	-0.133***	0.020	0.876
1997	-0.423***	0.026	0.655	-0.284***	0.021	0.753
Lambda-1	1.403***	0.407	4.066	1.672***	0.044	5.323
Constant	-0.480***	0.060		-0.855***	0.040	
Initial-2 log likelihood	101 255			129 589		
Model-2 log likelihood	88 688			118 849		
Improvement	12 567, df=16, p=0.00			10 739, df=16, p=0.00		

*= $p < 0.10$; **= $p < 0.05$; ***= $p < 0.01$

on job search. Both findings confirm the idea that unemployed people have a higher probability of being engaged in job search as the level of human capital rises. With rising age, men are less likely to be engaged in job search. This is also as we expected. The effect of household situation shows that unemployed men with a partner have a higher probability of being engaged in job search than single men.

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It was expected that people living in areas with a high local level of underemployment would have the lowest probability of being engaged in job search. However, the results show that for men there is no significant effect of local underemployment on job search. To test whether poor labour market expectations resulting from individual characteristics have a discouraging effect on job search, Lambda-2 has been included in the search analysis. The higher the predicted probability of being unemployed, the lower was Lambda-2. As expected, the coefficient of Lambda-2 was positive and significant for men. This means that men with a high probability of being unemployed search less than men with a low probability of being unemployed. This finding indicates discouragement for unemployed men with poor chances on the labour market.

Women

For women, the effects of level of education, work experience and age were all found to be in the expected direction and correspond with the effects found for men. Women with a partner have a lower probability of being engaged in job search than single women. Some women apparently find that having a partner makes it less necessary to search for a job.

The results show that, just as for men, there is no significant effect of local underemployment on job search for women. Apparently, local labour market conditions do not lead to discouragement in job search by the unemployed. Once people decide they want to participate in the labour market, they do not allow themselves to become discouraged by poor local labour market conditions. For women, the positive effect of Lambda-2 is also in line with the expected effect. Women with a high probability of being unemployed search less than women with a low probability to be unemployed. Unemployed women with poor chances are likely to be discouraged in job search.

4.4 On-the-job search

The logistic regression results for the on-the-job search model are presented in Table 4. The research population consists of employed respondents who work for at least 12 hours a week.

Men

Men with a higher level of education were more likely to be engaged in job search. This is in accordance with the expectations based on human capital theory. The probability of being engaged in job search decreased with age. Again, this is as expected because as age increases the pay-off period decreases for job search and job change costs. Men with a child between 0 and 5 years old search the most and men with children in the 12-17 age-group search the least. A possible explanation might be that men with young children feel more responsible for the family income and so search for better-paid jobs. The effect might

Table 3. Logistic regression of off-the-job search, by gender.

	Men			Women		
	B	s.e.	Exp(B)	B	s.e.	Exp(B)
Education						
Primary	0		1	0		1
Lower secondary	0.278***	0.054	1.320	0.112***	0.038	1.118
Upper secondary	0.553***	0.059	1.740	0.211***	0.046	1.235
High vocational	0.704***	0.083	2.022	0.346***	0.064	1.413
University	1.102***	0.098	3.011	0.805***	0.088	2.236
Working experience						
No	0		1	0		1
Yes	0.397***	0.049	1.487	0.199***	0.036	1.220
Age						
<25	0		1	0		1
25-34	-0.309***	0.066	0.734	-0.431***	0.052	0.650
35-44	-0.636***	0.073	0.530	-0.538***	0.055	0.584
45-54	-0.810***	0.077	0.445	-1.790***	0.056	0.454
Household situation						
Single	0		1	0		1
Couple, partner employed	0.130**	0.077	1.139	-0.542***	0.032	0.582
Couple, partner unemployed	0.960**	0.066	1.101	-0.551***	0.041	0.576
Other	0.161***	0.067	1.175	0.394***	0.075	1.483
Local underempl.(%)	-0.012	0.008	0.988	-0.005	0.006	1.005
Lambda-2	0.265***	0.067	1.304	0.471***	0.070	1.602
Constant	0.882***	0.394		-0.097	0.265	
Initial-2 log likelihood	19 021			42 206		
Model-2 log likelihood	18 413			40 191		
Improvement	607, df=13, p=0.00			2 015, df=13, p=0.00		

*= $p < 0.10$; **= $p < 0.05$; ***= $p < 0.01$

also be an effect of the age of the men themselves. As the age of the children rises, so does the age of the parents and as people get older they search less frequently. The effect of household situations shows that men with a partner search less frequently than single men.

For men, the number of hours worked per week had a negative influence on job search. This is as expected; most men want a full-time job. After controlling for level of education, every higher job level reached led people to be less likely to search. This is according to what would be expected on the basis of the human capital theory. People whose job level is not known search the most. Many respondents in this category have not been asked for their job level, because they had short-term contracts; since a short-term contract offers little job security, people with an unknown job level are often engaged in job search. As

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expected, job search intensity increases with increasing commuting time. The category 'commuting time unknown' consists mainly of respondents with short-term contracts. In contrast with what was expected, having irregular working hours was not found to have a positive effect on job search. But, as expected, men search more when they have little job security.

Again, the local percentage of underemployment and Lambda-2 have been included to test whether poor labour market expectations have a discouraging effect on the probability of being engaged in job search. As expected on the basis of the discouraged worker hypothesis, for men the local percentage of underemployment has a negative effect on on-the-job search. For men Lambda-2 does not have a significant effect on job search; we did not find evidence for an effect of poor labour market expectations resulting from individual characteristics on on-the-job search by men.

Women

For women, the effects of level of education and age are in the expected direction and correspond with the effects found for men. For women, the effect of the presence of children was as expected. Employed women without children search the most. When they have children the probability of being engaged in job search increases with the increasing age of the youngest child. Being single has a positive effect on job search.

As expected, for women the effect of hours worked per week is much smaller than is the case for men. Women more often prefer small (part-time) jobs, because they often have to combine a paid job with domestic work. The effects of job level and commuting time are as expected and correspond with the effects found for men. However, the effect of commuting time is somewhat stronger on women than on men. This confirms the idea that women are more sensitive to spatial restrictions than men. Surprisingly, women with irregular working hours search less frequently than women with regular working hours. This is contrary to what was expected, but may be explained by the fact that irregular working hours may be more convenient when domestic work and paid employment have to be combined. As for men, having a permanent employment contract has a negative influence on job search.

The local level of underemployment does not have an effect on job search for women. Apparently, poor local labour market conditions do not discourage women in their on-the-job search. However, the coefficient for Lambda-2 is positive and significant: the lower a woman's predicted probability of being unemployed, the higher her probability of being engaged in job search. In other words, women with poor chances on the labour market search less frequently than women with good chances on the labour market, possibly because of discouragement.

Table 4. Logistic regression of on-the-job search, by gender.

	Men			Women		
	<i>B</i>	s.e.	Exp(<i>B</i>)	<i>B</i>	s.e.	Exp(<i>B</i>)
Education						
Primary	0		1	0		1
Lower secondary	0.234***	0.051	1.263	0.095	0.065	1.100
Upper secondary	0.680***	0.053	1.974	0.424***	0.072	1.528
High vocational	1.097***	0.062	2.996	0.820***	0.087	2.270
University	1.215***	0.069	3.370	1.299***	0.100	3.664
Age						
<25	0		1	0		1
25-34	-0.051	0.038	0.951	-0.273***	0.038	0.761
35-44	-0.340***	0.042	0.712	-0.462***	0.051	0.630
45-54	-1.053***	0.048	0.349	-1.149***	0.056	0.317
Children under 18						
No children	0		1	0		1
Youngest < 6 years	0.101***	0.029	1.107	-0.332***	0.045	0.717
Youngest 6-12 years	0.043	0.036	1.044	-0.132***	0.044	0.877
Youngest 13-17 years	-0.138***	0.042	0.872	-0.041	0.046	0.960
Household situation						
Single	0		1	0		1
Couple prtn unempl	-0.342***	0.048	0.710	-0.441***	0.055	0.643
Couple prtn empl	-0.107**	0.050	0.899	-0.622***	0.040	0.537
Other	-0.434***	0.047	0.648	-0.511***	0.058	0.600
Hours per week						
13-20 hours	0		1	0		1
21-35 hours	-0.676***	0.061	0.509	-0.036	0.033	0.965
36-40 hours	-0.869***	0.054	0.419	-0.291***	0.036	0.748
>40 hours	-0.824***	0.066	0.439	-0.072	0.083	0.931
Job level						
Elementary	0		1	0		1
Low	-0.341***	0.041	0.711	-0.266***	0.046	0.767
Middle	-0.435***	0.042	0.647	-0.586***	0.049	0.557
High	-0.596***	0.051	0.551	-0.775***	0.061	0.461
Academic	-0.701***	0.064	0.496	-0.879***	0.084	0.415
Unknown	0.077	0.057	1.080	0.111	0.067	1.118
Commuting time						
0-30 minutes	0		1	0		1
31-45 minutes	0.089**	0.035	1.093	0.096**	0.042	1.101
46-60 minutes	0.133***	0.031	1.142	0.152***	0.038	1.165
>61 minutes	0.305***	0.030	1.357	0.468***	0.037	1.597
Unknown	0.065**	0.029	1.068	0.219***	0.039	1.244
Irregular hours						
No	0		1	0		1
Yes	0.023	0.021	1.023	-0.098***	0.025	0.907
Permanent contract						
No	0		1	0		1
Yes	-1.215***	0.031	0.297	-0.785***	0.032	0.456
Local underempl. (%)	-0.017***	0.005	0.983	-0.002	0.006	0.998
Lambda-2	-0.032	0.053	0.968	0.331***	0.091	1.392
Constant	-0.572**	0.238		-1.762***	0.296	
Initial-2 log likelihood	77 779			51 919		
Model-2 log likelihood	71 624			48 213		
Improvement	6 155, df=29, $p=0.00$			3 705, df=29, $p=0.00$		

*= $p<0.10$; **= $p<0.05$; ***= $p<0.01$

5. Summary and discussion

In this contribution, we have elaborated the concept of the discouraged worker effect and reported our empirical testing. The discouraged worker effect has been defined as the decision to refrain from job search as a result of poor chances on the labour market. Two sources of discouragement were identified: a lack of individual qualifications or ascribed characteristics that make a worker less competitive in the job market; and a lack of suitable job offers resulting from the level of underemployment in the local economy. In elaborating the concept, we hypothesised that discouragement can enter the job search process at two stages. The first stage is the decision to participate in the labour force. We have tested the hypothesis that people in general and women in particular who have poor chances in the (regional) labour market more often refrain from participating. The second stage is the decision to become actively engaged in job search once one is active in the labour market.

In the empirical tests, we have used direct measures of participation and job search, using data from the Labour Force Surveys 1994–97. In this survey, people were asked whether or not they were willing to work for more than 12 hours per week. The category ‘out of employment’ could therefore be split into the group that did not participate and the unemployed. Both the unemployed and the employed were asked whether they had been active in job searching in the 4 weeks preceding the interview. Three models were specified: one for the probability of participating, another for the probability of unemployment given participation; a third for the probability of engaging in on-the-job or off-the-job search.

The results indicate the existence of a discouraged worker effect in the stage of deciding to participate. For both men and women, personal characteristics that indicate poor chances in the labour market were negatively related to the decision to participate in the labour force. Discouragement at this stage appeared to be gender-related. Not only were the effects of poor chances much stronger for women; they were also put off from participation in places with a high level of local underemployment. For men, the effect of local underemployment level was insignificant.

In the analysis of the chances of unemployment, a correction factor was entered to account for the selectivity of the group participating in the labour force. The substantive interpretation of this correction factor showed that people who refrain from participating would have had a high chance of being unemployed if they had put their labour on offer. Not participating is a strategy for avoiding unemployment chosen by women in particular.

The results of the discouragement effect in job search among those in the active labour force are slightly less convincing. For the unemployed, it could be shown that personal characteristics (low education, older age, lack of work experience) were negatively related to job search. Inclusion of the correction

factor that indicates the overall chance of being unemployed showed that poor changes in the labour market have a strong impact on the intensity of job search. This conclusion is particularly relevant for the occupational achievement of migrants and their descendants. As their chances of unemployment are much higher than those of the indigenous population with the same qualifications, the intensity of their job search is lower, further hampering social mobility of this population. No effect was found from the local level of underemployment.

For the employed, the overall probability of job search is much lower. Again, personal characteristics (including the level of the present job, job security and the number of hours worked) account for the major part of the differentiation in job search. Yet among men a high local level of underemployment also led to reduced search activity.

In general terms, we have found discouragement effects at both stages of the search process. The dominant source of discouragement is an individual's lack of qualifications or other personal and ascribed characteristics that reduce the chances in the labour market. We found mixed evidence of a discouragement effect arising from a lack of suitable job offers in the local economy. The decision by women to participate and the decision of on-the-job search by men are negatively influenced by a high local level of underemployment. Apparently, women outside the labour force and working men have something in common that makes them more likely than other categories to be discouraged by local labour market conditions. It may be that both groups have an alternative to search and can 'afford' to be discouraged. For women, being a full-time housewife is socially accepted, especially when (young) children are present. Men in the employed labour force also have a reasonable alternative to search. They already have a job so they can stay put until the labour market becomes more favourable.

5.1 Implications and limitations

The finding that local levels of underemployment only contribute incidentally to the discouraged worker effect could be a particular characteristic of the Netherlands. Even though both peripheral rural areas and inner-city neighbourhoods have above-average levels of local underemployment, regional differences in economic performance and underemployment are low in this country. The findings might be radically different in other, larger countries. The reason why personal characteristics are more dominant might also be an effect of the rapidly decreasing levels of unemployment. In a tight labour market there is a problem of the unemployed rather than of unemployment. The category of the unemployed is becoming increasingly selective. Only those people with really poor chances on the labour market remain unemployed in a growing economy. This selectivity in unemployment goes beyond a lack of educational achievement. Also, after controlling for formal education, the changes of the migrant population turned out to be exceptionally low. This indicates that ascribed characteristics may play a

role, both through poor chances and through discouragement in reaching occupational achievement. It also indicates that the high level of local underemployment in the larger towns is more than just a 'skills-mismatch'.

Obviously, the poor results on the discouraging effect of the local economy could also arise from the limitations in our analyses. First, although we had the unique opportunity of using a direct question on job search, this is no guarantee that we had a sharp measurement of discouragement. Not all those who stated that they had not searched in the four weeks preceding the interview might have been discouraged. Some might have just returned from a holiday, or have been ill. Secondly, the way we measured local labour market conditions might not be the best approach. The optimal solution would be to construct a variable to indicate the number of vacancies in a certain area relative to the number of unemployed people in that area. Unfortunately, data on vacancies is hard to obtain, seldom available at a low spatial level and of questionable reliability. A third limitation of our analyses might be the way we measured discouragement by individual characteristics. With our data, we can only show there is a statistical relationship between job search and a high predicted probability of being unemployed. We have no idea of the extent to which people are really aware of their own poor chances on the labour market.

Given these possible shortcomings, future research could improve on the present effort by using data that overcome some of these limitations. The use of data collected for the purpose of research on job search might give better insights. However, such a data-set would have to be large enough to be able to incorporate variables on spatial differences in the local labour market situation. While quantitative research helps to gain more insight into the statistical relationship between job search and local labour market conditions, qualitative methods could help us to understand labour market behaviour in more detail. Questions could address why people do or do not search, how often they search and where they search. Such qualitative research could lead to a better understanding of the labour market behaviour of women, explain some of the current confounding findings and lead to new hypotheses.

We have, however, shown that future research should include the stage of deciding not to participate in the labour force at all. Poor chances affect the decision to participate and the people at risk of searching for a (better) job are a selective group.

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References

- Adams, R.L.A. (1973) Uncertainty in nature, cognitive dissonance, and the perceptual distortion of environmental information: weather forecasts and New England beach trip decisions. *Economic Geography* 49, 287-297.
- Becker, G. (1962) Human capital: a theoretical and empirical analysis. *Journal of Political Economy* 70, 9-46.
- Becker, G. (1976) *The Economic Approach to Human Behavior*. Chicago: The University of Chicago Press.
- Becker, G. (1991) *A Treatise on the Family. Enlarged Edition*. Cambridge, MA: Harvard University Press.
- Blau, D.M. (1991) Search for non-wage job characteristics: a test of the reservation wage hypothesis. *Journal of Labor Economics* 9, 187-205.
- Bowlby, S. (1990) Women, work and the family: control and constraints. *Geography* 76, 17-26.
- Burdett, K. (1978) A theory of employee job search and quit rates. *American Economic Review* 68, 212-220.
- Cohen, J. and Cohen, P. (1975) *Applied Multiple Regression/Correlation Analysis for the Behavioural Science*. New York: John Wiley & Sons.
- Cooke, T.J. and Ross, S.L. (1999) Sample selection bias in models of commuting time. *Urban Studies* 36, 1597-1611.
- DaVanzo, J. (1981) Microeconomic approaches to studying migration decisions. In: De Jong, G.F. and Gardner, R.W. (Eds.) *Migration Decision Making: Multidisciplinary Approaches to Microlevel Studies in Developed and Developing Countries*, pp. 90-129. New York: Pergamon Press.
- De Jong, T. and Floor, H. (1993) Flowmap: een programma voor het weergeven en analyseren van interactiegegevens (Flowmap: a software package for displaying and analysing interaction data). *Planning, methodiek en toepassing* 44, 16-31.
- Devine, Th.J. and Kiefer, N.M. (1991) *Empirical Labour Economics: The Search Approach*. New York: Oxford University Press.
- Festinger, L. (1957) *A Theory of Cognitive Dissonance*. Stanford, CA: Stanford University Press.
- Fisher, M.M. and Nijkamp, P. (1987) Spatial labour market analysis: relevance and scope. In: Fisher, M.M. and Nijkamp, P. (Eds.) *Regional Labour Markets*, pp. 1-36. Amsterdam: North Holland.
- Gordon, P., Kumar, A. and Richardson, H.W. (1989) Gender differences in metropolitan travel behaviour. *Regional Studies* 23, 499-510.
- Hägerstrand, T. (1970) What about people in regional science? *Papers of the Regional Science Association* 24, 7-21.
- Hanson, S. and Pratt, G. (1988) Spatial dimensions of the gender division of labour in a local labour market. *Urban Geography* 9, 180-202.

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- Hanson, S. and Pratt, G. (1990) Geographic perspectives on the occupational segregation of woman. *National Geographic Research* 6, 376-399.
- Hanson, S. and Pratt, G. (1991) Job search and the occupational segregation of women. *Annals of the Association of American Geographers* 81, 229-253.
- Hanson, S. and Pratt, G. (1992) Dynamic dependencies: a geographic investigation of local labor markets. *Economic Geography* 68, 373-405.
- Hanson, S., Kominiak, T. and Carlin, S. (1997) Assessing the impact of location on women's labor market outcomes: a methodological explanation. *Geographical Analysis* 29, 281-297.
- Heckman, J. (1979) Sample selection bias as a specification error. *Econometrica* 47, 153-161.
- Hey, J.D. and Mckenna, C.J. (1979) To move or not to move. *Economica* 46, 175-185.
- Immergluck, D. (1998) Job proximity and the urban employment problem: do suitable nearby jobs improve neighbourhood employment rates? *Urban Studies* 35, 7-23.
- Johnson, W.R. (1978) A theory of job shopping. *Quarterly Journal of Economics* 92, 261-277.
- Johnston-Anumonwo, I. (1992) The influence of household type on gender differences in work trip distance. *Professional Geographer* 44, 161-169.
- Jovanovic, B. (1979) Job matching and the theory of turnover. *Journal of Political Economy* 87, 972-990.
- Kain, J. (1968) Housing segregation, negro employment, and metropolitan decentralization. *Quarterly Journal of Economics* 82, 175-197.
- Keith, K. and McWilliams, A. (1999) The returns to mobility and job search by gender. *Industrial and Labor Relations Review* 52, 460-477.
- Kiefer, N.M. and Neumann, G.R. (1989) *Search Models and Applied Labour Economics*. Cambridge: Cambridge University Press.
- Lippman, S.A. and McCall, J.J. (1976) The economics of job search: a survey. *Economic Inquiry* 14, 155-189.
- Madden, J.F. (1981) Why women work closer to home. *Urban Studies* 18, 181-194.
- Mincer, J. (1978) Family migration decisions. *Journal of Political Economy* 86, 749-773.
- Mortensen, D.T. (1986) Job search and labor market analysis. In: Ashenfelter, O. and Layard, R. (Eds.) *Handbook of Labor Economics*, pp. 849-919. Amsterdam: North-Holland.
- Ong, P. and Blumenberg, E. (1998) Job access, commute, and travel burden among welfare recipients. *Urban Studies* 31, 77-93.
- Ophem, H. van (1991) Wages, nonwage job characteristics, and the search behaviour of employees. *Review of Economics and Statistics* 73, 145-151.

- Parsons, D.O. (1973) Quit rates over time: a search and information approach. *American Economic Review* 63, 390-401.
- Parsons, D.O. (1991) The job search behaviour of employed youth. *Review of Economics and Statistics* 73, 597-604.
- Pratt, G. and Hanson, S. (1991) Time, space, and the occupational segregation of women: a critique of human capital theory. *Geoforum* 22, 149-157.
- Preston, V. and McLafferty, S. (1999) Spatial mismatch research in the 1990s: progress and potential. *Papers in Regional Science* 78, 387-402.
- Rouwendal, J. (1999) Spatial job search and commuting distances. *Regional Science and Urban Economics* 29, 491-517.
- Simpson, W. (1992) *Urban Structure and the Labour Market: Worker Mobility, Commuting and Underemployment in Cities*. Oxford: Clarendon Press.
- Sjaastad, L.A. (1962) The costs and returns of human migration. *Journal of Political Economy* 70, 80-93.
- Stigler, G.J. (1961) The economics of information. *Journal of Political Economy* 69, 213-225.
- Stigler, G.J. (1962) Information in the labor market. *Journal of Political Economy* 70, 94-105.
- Topel, R.H. and Ward, M.P. (1992) Job mobility and the careers of young men. *Quarterly Journal of Economics* 107, 439-479.
- Van Ham, M., Hooimeijer, P. and Mulder, C.H. (2001) Urban form and job access: disparate realities in the Randstad. *Tijdschrift voor Economische en Sociale Geografie* 92, 231-246.
- Van Ommeren, J. (1996) *Commuting and Relocation of Jobs and Residences: A Search Perspective*. PhD thesis. Amsterdam: Vrije Universiteit Amsterdam.

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Chapter 5

Spatial flexibility in job mobility: macrolevel opportunities and microlevel restrictions

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 maximize 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 plays 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.*, 2001a). The variable is matched to the behavioural data 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 educational level; widening the search area. The starting point for our conceptualization 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 maximize 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 the sector-specific human capital (Simpson, 1992). This human capital enhances productivity only in a specific sector of the economy. The third component is the 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 utilize 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.*, 2001b). 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 Hovarth, 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 Niemeijer, 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 Hovarth, 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, while 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 Hovarth, 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 specialized 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.*, 2001a). 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 maximize the returns on previous investments in human capital, they will search for jobs where these returns can be maximized (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) recognized 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.*, 2001a). 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 reasonable commuting time would have to be more spatially flexible and, as a consequence, be more likely to accept jobs at a greater distance.

Summarizing, 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 particular 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 multi-collinearity 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 only included 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; 25-29 years; 30-34 years; 35-39 years; 40-44 years; 45-49 years; 50-54 years. The type of household is categorized as: single; couple with non-employed 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 categorized 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: 12-20 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 categorized 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 ‘previous 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.*, 2001a). 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 job 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 measurement 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 geo-

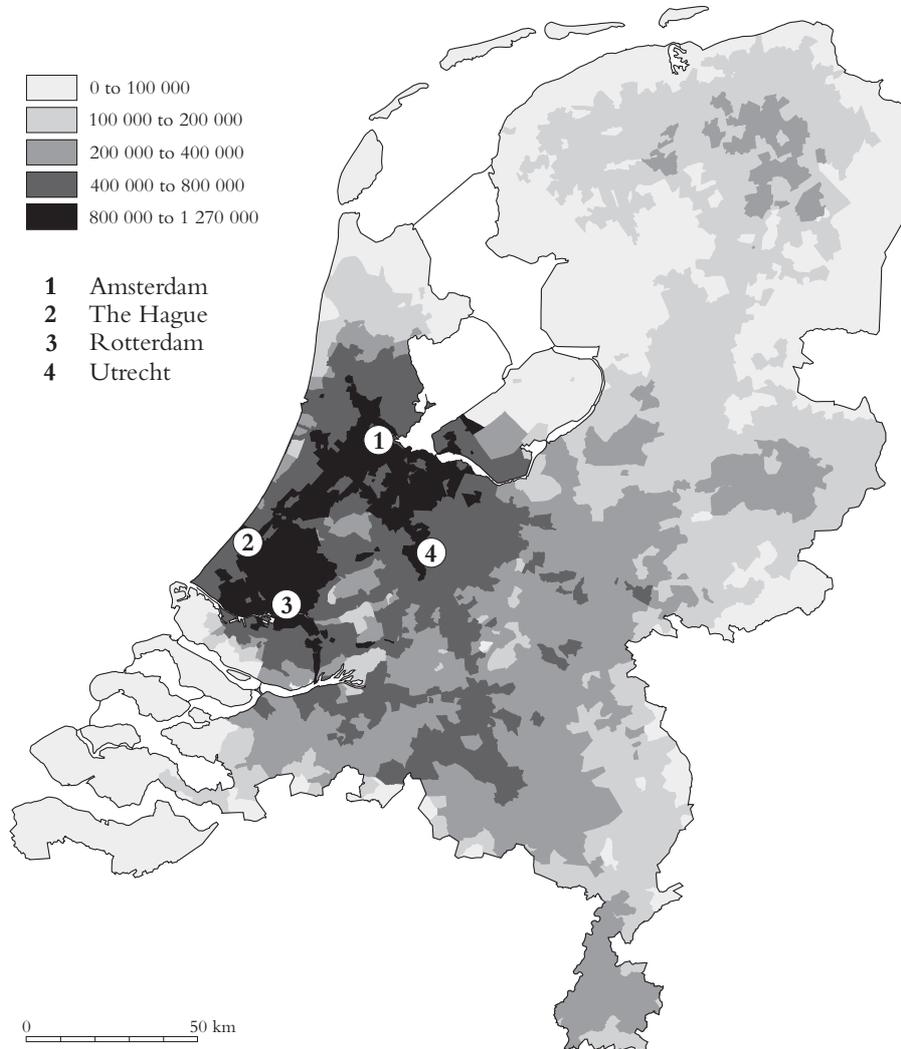


Figure 1. Job access within 30 minutes (number of jobs).

Source: National Information System of Employment 1991 and 1994, based on own calculations.

graphical detail and the measurement of travelling times over the road network, the choice for 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 non-commercial organizations. An establishment is defined as an individual plant, store, or office; multi-establishment 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 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 five 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.*, 2001a 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.*, 2001a). 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).

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 gives the results of the analysis of job mobility. The analyses were run separately for men and 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 change jobs more often. As expected, employed people find another job less often than un-

Table 2. *Logistic regression of job mobility by gender.*

	Men			Women		
	B	s.e.	Exp(B)	B	s.e.	Exp(B)
Age						
<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						
Non-employed	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 non-employed	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, df=20, p=0.00			16 012, df=20, p=0.00		

*= $p < 0.10$; **= $p < 0.05$; ***= $p < 0.01$

employed people. Previous work on job search behaviour (Van Ham *et al.*, 2001b) 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 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 for 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 for 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 for 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 for 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 non-immigrants. 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 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.

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 for a woman aged between 50 and 54 accepting a job at a greater distance are 0.16 times the odds for a woman aged under 25 accepting a job at a greater distance (and not 0.05, as in general job mobility). The odds for 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

Table 3. Logistic regression of workplace mobility by gender.

	Men			Women		
	B	s.e.	Exp(B)	B	s.e.	Exp(B)
Age						
<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 non-employed	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						
no children	0		1	0		1
Youngest < 6 years	0.083	0.084	1.084	-0.530***	0.153	0.589
Youngest 6-12	0.007	0.104	1.007	-0.676***	0.172	0.509
Youngest 13-17	0.011	0.111	1.010	-0.313**	0.167	0.731
Hours per week						
13-20 hours	0		1	0		1
21-35 hours	-0.077	0.172	0.926	0.298***	0.112	1.347
36-40 hours	0.127	0.156	1.135	0.468***	0.116	1.596
>40 hours	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
Academic	1.733***	0.190	5.660	1.511***	0.250	4.532
Sector						
Manufact./agric.	0		1	0		1
Construction	0.353***	0.109	1.423	0.100	0.330	1.105
Transp./Communic.	0.038	0.124	1.038	0.551***	0.204	1.735
Wholes./retail trade	0.045	0.092	1.046	0.116	0.157	1.123
Hotel and restaurant	0.238	0.161	1.268	0.448***	0.220	1.565

Continues on next page

Table 3. *Logistic regression of workplace mobility by gender (continued).*

	Men			Women		
	<i>B</i>	s.e.	Exp(<i>B</i>)	<i>B</i>	s.e.	Exp(<i>B</i>)
Finan./business ser.	0.265***	0.085	1.304	0.155	0.146	1.168
Public administr.	0.516***	0.097	1.676	0.045	0.176	1.046
Educ./health care	-0.295***	0.109	0.745	0.150	0.143	1.162
Other soc. Services	0.072	0.159	1.074	0.317	0.197	1.373
Previous labour-force status						
Employed	0		1	0		1
Non-employed	0.392**	0.208	1.480	0.105	0.154	1.111
Previous commuting						
Not long distance	0		1	0		1
Long distance	2.661***	0.082	14.308	2.709***	0.129	15.019
Job access (* 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, df=35, <i>p</i> =0.00			1 617, df=35, <i>p</i> =0.00		

*=*p*<0.10; **=*p*<0.05; ***=*p*<0.01

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 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 specialized 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 for 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 macrolevel phenomenon, microlevel behaviour should be included in the conceptualization 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 conceptualized more clearly than when commuting or job related migration is 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 with both the spatial mismatch hypotheses 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 flexibility; for women, it does. The conclusion is therefore that spatial inflexibility 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 specialized 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 operationalizing 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 to 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, since 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 of 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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References

- Baccaïni, B. (1997) Commuting and residential strategies in the Île-de-France: individual behaviour and spatial constraints. *Environment and Planning A* 29, 1801-1829.
- Ballard, K.P. and Clark, G.L. (1981) The short run dynamics of interstate migration: a space-time economic adjustment model of in-migration to fast-growing states. *Regional Studies* 15, 213-228.
- Bartel, A.P. (1979) The migration decision: What role does job mobility play? *The American Economic Review* 69, 775-786.
- Bartel, A.P. and Lichtenberg F.R. (1987) The comparative advantage of educated workers in implementing new technologies. *Review of Economics and Statistics* 69, 1-11.
- Becker, G.S. (1962) Human capital: a theoretical and empirical analysis. *Journal of Political Economy* 70, 9-46.
- Becker, G.S. (1975) *The Economic Approach to Human Behaviour*. Chicago, IL: University of Chicago Press.
- Becker, G.S. (1991) *A Treatise on the Family. Enlarged Edition*. Cambridge, MA: Harvard University Press.
- Blumen, O. (1994) Gender differences in the journey to work. *Urban Geography* 15, 223-245.
- Booth, A.L., Francesconi M. and Garcia-Serrano C. (1999) Job tenure and job mobility in Britain. *Industrial and Labor Relations Review* 53, 43-70.
- Börsch-Supan, A. (1990) Education and its double-edged impact on mobility. *Economics of Education review* 9, 39-53.

- CBS [Statistics Netherlands] (1993) *Standaard Beroepenclassificatie 1992 [Standard job classification 1992]*. The Hague: Sdu.
- Cohen, J. and Cohen, P. (1975) *Applied Multiple Regression/Correlation Analysis for the Behavioural Science*. New York: John Wiley & Sons.
- Crampton, G.R. (1997) Labour-market search and urban residential structure. *Environment and Planning A* 29, 989-1002.
- DaVanzo, J. (1978) Does unemployment affect migration? Evidence from micro data. *The Review of Economics and Statistics* 60, 504-514.
- DaVanzo, J. (1981) Microeconomic approaches to studying migration decisions. In: De Jong, G. F. and Gardner, R.W. (Eds.) *Migration Decision Making: Multidisciplinary Approaches to Microlevel Studies in Developed and Developing Countries*, pp. 90-129. New York: Pergamon Press.
- De Jong, T. and Floor, H. (1993) Flowmap: een programma voor het weergeven en analyseren van interactiegegevens [Flowmap: a software package for displaying and analysing interaction data]. *Planning, Methodiek en Toepassing* 44, 16-31.
- Duncan, P.R. and Perrucci, C.C. (1976) Dual career families and migration. *American Sociological Review* 41, 252-261.
- Fernandez, J.P. (1981) *Racism and Sexism in Corporate Life: Changing Values in American Business*. Lexington, MA: Lexington Books.
- Fielding, A.J. (1992) Migration and social mobility: South East England as an escalator region. *Regional Studies* 26, 1-15.
- Fielding, A.J. and Halford, S. (1993) Geographies of opportunity: a regional analysis of gender-specific social and spatial mobilities in England and Wales, 1971-81. *Environment and Planning A* 25, 1421-1440.
- Fisher, M.M. and Nijkamp, P. (1987) Spatial labour market analysis: relevance and scope. In: Fisher, M.M. and Nijkamp, P. (Eds.) *Regional Labour Markets*, pp. 1-36. Amsterdam: North Holland.
- Gilbert, M.R. (1998) Race, space, and power: the survival strategies of working poor women. *Annals of the Association of American Geographers* 88, 595-621.
- Giuliano, G. (1998) Information technology, work patterns and intra-metropolitan location: a case study. *Urban Studies* 35, 1077-1095.
- Gordon, P., Kumar, A. and Richardson, H.W. (1989) Gender differences in metropolitan travel behaviour. *Regional Studies* 23, 499-510.
- Hägerstrand, T. (1970) What about people in regional science? *Papers of the Regional Science Association* 24, 7-21.
- Hanson, S. and Pratt, G. (1990) Geographic perspectives on the occupational segregation of woman. *National Geographic Research* 6, 376-399.
- Hanson, S. and Pratt, G. (1991) Job search and the occupational segregation of women. *Annals of the Association of American Geographers* 81, 229-253.
- Hanson, S. and Pratt, G. (1995) *Gender, Work, and Space*. London: Routledge.

- Hanson, S. Kominiak, T. and Carlin, S. (1997) Assessing the impact of location on women's labor market outcomes: a methodological explanation. *Geographical Analysis* 29, 281-297.
- Heckman, J. (1979) Sample selection bias as a specification error. *Econometrica* 47, 153-161.
- Johnston-Anumonwo, I. (1992) The influence of household type on gender differences in work trip distance. *The Professional Geographer* 44, 161-169.
- Jarvis, H. (1999) Identifying the relative mobility prospects of a variety of household employment structures, 1981 - 1991. *Environment and Planning A* 31, 1031-1046.
- Kain, J. (1968) Housing segregation, negro employment, and metropolitan decentralization. *Quarterly Journal of Economics* 82, 175-197.
- Keith, K. and McWilliams, A. (1999) The returns to mobility and job search by gender. *Industrial and Labor Relations Review* 52, 460-477.
- Lichter, D.T. (1980) Household migration and the market position of married women. *Social Science Research* 9, 83-97.
- Lichter, D.T. (1982) The migration of dual worker families: does the wife's job matter? *Social Science Quarterly* 63, 48-57.
- Lichter, D.T. (1983) Socioeconomic returns to migration among married women. *Social Forces* 62, 487-503.
- McLafferty, S. and Preston, V. (1997) Gender, race, and the determinants of commuting: New York in 1990. *Urban Geography* 18, 192-212.
- Madden, J.F. (1981) Why women work closer to home. *Urban Studies* 18, 181-194.
- March, J.G. and Simon, H.A. (1958) *Organizations*. New York: John Wiley & Sons.
- Markham, W.T. and Pleck, J. H. (1986) Sex and willingness to move for occupational advancement: some national sample results. *Social Science Quarterly* 27, 121-143.
- Markham, W.T., Macken, P. O., Bonjean, C. M. and Corder, J. (1983) A note on sex, geographic mobility, and career advancement. *Social Forces* 61, 1138-1146.
- Mincer, J. (1962) On the job training: costs, returns, and some implications. *Journal of Political Economy* 70, 50-79.
- Mincer, J. (1978) Family migration decisions. *Journal of Political Economy* 86, 749-773.
- Mulder, C.H. (1993) *Migration Dynamics: a Life Course Approach*. PhD thesis. Amsterdam: Thesis Publishers.
- Mulder, C.H. and Hooimeijer, P. (1999) Residential relocations in the life course. In: Van Wissen, L.J.G. and Dykstra, P.A. (Eds.) *Population Issues. An Interdisciplinary Focus*, pp. 159-186. New York: Kluwer Academic/Plenum Publishers.

- Ong, P. and Blumenberg, E. (1998) Job access, commute, and travel burden among welfare recipients. *Urban Studies* 31, 77-93.
- Phelps, E.S. (1970) Introduction: The new microeconomics in employment and inflation theory. In: Phelps, E.S. (Ed.) *Microeconomic Foundations of Employment and Inflation Theory*, pp. 1-26. New York: Norton.
- Polachek, S.W. and Horvath, F.W. (1977) A life cycle approach to migration: analysis of the perspicacious peregrinator. In: Ehrenberg, R.G. (Ed.) *Research in Labor Economics: An Annual Compilation of Research (Volume 1)*, pp. 103 – 150. Greenwich, CT: JAI Press.
- Pratt, G. and Hanson, S. (1991) Time, space, and the occupational segregation of women: a critique of human capital theory. *Geoforum* 22, 149-157.
- Preston, V. and McLafferty, S. (1999) Spatial mismatch research in the 1990s: progress and potential. *Papers in Regional Science* 78, 387-402.
- Ritchey, P.N. (1976) Explanations of migration. *Annual Review of Sociology* 2, 363-404.
- Rouwendal, J. (1999) Spatial job search and commuting distances. *Regional Science and Urban Economics* 29, 491-517.
- Shaklee, H. (1989) Geographic mobility and the two-earner couple: expected costs of a family move. *Journal of Applied Social Psychology* 19, 728-743.
- Simpson, W. (1992) *Urban Structure and the Labour Market: Worker Mobility, Commuting and Underemployment in Cities*. Oxford: Clarendon Press.
- Sjaastad, L.A. (1962) The costs and returns of human migration. *Journal of Political Economy* 70, 80-93.
- Topel, R.H. and Ward, M.P. (1992) Job mobility and the careers of young men. *Quarterly Journal of Economics* 107, 439-479.
- Turner, T. and Niemeier, D.A. (1997) Travel to work and household responsibility: new evidence. *Transportation* 24, 397-419.
- Van Ham, M., Hooimeijer, P. and Mulder, C.H. (2001a) Urban form and job access: disparate realities in the Randstad. *Tijdschrift voor Economische en Sociale Geografie* 92, 231-246.
- Van Ham, M., Mulder, C.H. and Hooimeijer, P. (2001b) Job search, underemployment and the discouraged worker effect. *Urban Studies* 38, 1733-1751.
- Van Ommeren, J. (1996) *Commuting and Relocation of Jobs and Residences: A Search Perspective*. PhD thesis. Amsterdam: Vrije Universiteit.
- Van Ommeren, J., Rietveld, P. and Nijkamp, P. (1999) Impacts of employed spouses on job-moving behaviour. *International Regional Science Review* 22, 54-68.
- Wachs, M. and Taylor, B.D. (1993) The changing commute: a case study of the jobs-housing relationship over time. *Urban Studies* 30, 1711-1730.
- Wagner, M. (1989) *Räumliche Mobilität im Lebensverlauf: Eine empirische Untersuchung sozialer Bedingungen der Migration [Spatial mobility in the life course: an empirical investigation of the social determinants of migration]*. Stuttgart: Enke.

Chapter 6

Workplace mobility and occupational achievement

Abstract. This paper reports an investigation of the effects on occupational achievement of workplace mobility, that is, accepting a job over a longer distance. We extend the classical conceptualization of the relationship between spatial flexibility and occupational achievement by including not only long-distance migration, but also long-distance commuting as an instrument of career advancement. Using longitudinal data, with job change as the unit of analysis, career advancement is measured directly by comparing the level of the accepted job with the level of the former job. The results show that workplace mobility is indeed instrumental in career advancement. Workers who accept jobs over a longer distance make more career advancement after a job change than workers who accept jobs closer to their residence. Women with a partner form an exception. For them, workplace mobility has no effect on career advancement. A probable explanation is a tied-mover effect. Some women with a partner accept a job over a longer distance for the sake of the career of the male spouse and because the household as a whole migrates. So the conclusion is that for women, workplace mobility is only instrumental in career advancement when a job is accepted over a long distance for their own career.

1. Introduction

A high level of occupational achievement can hardly be obtained by staying in just one job. Instead, occupational achievement develops over the life course through job changes that are accompanied by career advancement. A job searcher faced with a lack of suitable job opportunities on the local labour market has to

be spatially flexible to make career advancement through a job change. Workers who are prepared to broaden their search area can take advantage of job opportunities elsewhere and compete for more jobs (Mincer, 1978; Lichter, 1983; Markham and Pleck, 1986). The classical conceptualization of the relationship between spatial flexibility and occupational achievement is human capital related migration. Since Sjaastad's (1962) seminal article 'The costs and returns of human migration', long-distance migration is often referred to as a form of investment in human capital that is expected to pay for itself in the form of career advancement: increased income; better employment prospects; and/or higher occupational status (Sjaastad, 1962; Blau and Duncan, 1967; Greenwood, 1975; see also Smits, 1999).

Over the past few decades, migration tolerance — people's willingness to migrate — has decreased, partly as a result of the rise in the share of dual-earner households. Dual-earner households have a lower propensity to migrate than couples or families with a single breadwinner (Mulder, 1993; Mulder and Hooimeijer, 1999; Jarvis, 1999), but may accept a longer commute. Long-distance commuting might therefore become an increasingly important substitute for migration. Measured in terms of distance, commuting tolerance has undoubtedly grown over the past few decades, through faster means of transport (Rouwendal and Rietveld, 1994). Long-distance migration and commuting are both means of enlarging one's job search area.

This article describes a more comprehensive approach to the relationship between occupational achievement and spatial flexibility by looking not only at long-distance migration, but also at long-distance commuting. We use the concept of *workplace mobility*: accepting a job a long distance away from the residence (Van Ham *et al.*, 2001c). Being prepared to commute over a long distance increases the probability of finding a better job quite as much as being prepared to migrate (Simpson, 1992). Stretching one's commuting tolerance by accepting a job over a longer distance can also be regarded as an investment in human capital.

The paper describes the instrumental nature of workplace mobility in career advancement: to what extent does accepting a job further away from the residence help? Answering this question with cross sectional data, comparing the job characteristics of those who have accepted a job over a long distance with those who have not, has the disadvantage that it is not possible to observe change at the individual level. For that, longitudinal data is needed. The data we have used come from a retrospective survey of aspects of life-event history of the Netherlands population conducted in 1993. A feature of our data is that it includes information on the complete labour market histories of the respondents. We use job change as the unit of analysis, which makes it possible to measure career advancement directly by comparing the level of the accepted job with the level of the former job.

2. Theory

The theoretical framework commences with the relationship between job mobility and occupational achievement. Central in this conceptualization is human capital theory. Next, we place the relationship between job mobility and occupational achievement in a spatial context. What are the spatial determinants of career advancement? Finally, we include gender and the household context in the discussion.

2.1 Job mobility, human capital and career advancement

Job mobility is a prerequisite for career advancement. Changing jobs allows individuals to try out several jobs to ascertain their comparative advantages (Johnson, 1978); find higher quality job matches (Jovanovic, 1979); and achieve better pay (Parsons 1973; Burdett 1978). Job mobility allows individuals to take advantage of alternative job opportunities, thereby serving as a mechanism for upward social mobility (Lichter, 1983), or as a means of avoiding or reducing underemployment (Simpson, 1992).

Conceptually, job mobility is a cost which is instrumental in career advancement. Workers bear this cost in order to maximize the returns on their accumulated human capital (Becker, 1962). The stock of human capital that 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 only enhances productivity in a particular 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. Sector and enterprise-specific human capital may be lost when workers change jobs. Assuming that workers want to maximize utility, we would expect all job changes to lead to career advancement. Since workers with substantial accumulated specific human capital have higher costs when they change jobs, we expected that when they did change jobs they would achieve more career advancement than was the case for the less well educated. The more highly educated simply cannot afford to change jobs without making a career advancement.

Research reveals a negative relationship between age and job mobility (Mincer, 1962; Van Ham *et al.*, 2001c). The costs of a job change increase as age rises. Older workers have longer tenures and therefore more specific human capital. They also have fewer remaining years of work in which to recoup the costs of a job change. These high costs led us to expect that older workers only changed jobs when they could make a career advancement. We therefore anticipated a positive relationship between age and career advancement among those who do change jobs.

Workers who have not been employed for a substantial period of time may find that potential employers value their accumulated level of human capital less highly than that of workers who take a new job immediately after they leave their old one. This potential loss of human capital led us to expect a period of non-employment to have a negative influence on career advancement.

Finding a suitable job is more difficult in a period of economic recession, when the overall level of unemployment is high. In the Netherlands, registered unemployment increased from 0.9% in 1970 to almost 4% in 1979. In 1984, unemployment reached its highest point of more than 11%; in the early 1990s the rate decreased again to about 6% (CBS, 1999). We expected job changes taking place after the early 1970s to have led to less career advancement than those taking place in earlier years.

2.2 Workplace mobility, job access and career advancement

Career advancement through job mobility is only possible if suitable employment is available and accessible. The availability of employment opportunities largely depends on the spatial configuration of suitable employment relative to the location where one lives (Van Ham *et al.*, 2001a). In discussing job availability, the segmentation of the labour market should be taken into account. Workers differ in their level and degree of specialization of human capital, and jobs differ by level. Only a subset of all the jobs within reach is suitable for an individual job searcher. Assuming that workers want to maximize their returns on previous investments in human capital, they will only consider jobs where this human capital can be maximized (see also Becker, 1962).

The accessibility of jobs is determined by the spatial flexibility of individual workers: migration and commuting tolerance. Workers' migration tolerance is limited because of the high costs of a residential move. People build up location specific capital and this inhibits spatial mobility (DaVanzo, 1981). Home ownership and family obligations come to mind, as do the high psychological costs of leaving familiar surroundings (Sjaastad, 1962; Polachek and Hovarth, 1977). People's commuting tolerance is limited: for most employees, the maximum is 45 minutes travel time (Wachs and Taylor, 1993; Van Ommeren, 1996). In practice, Wachs and Taylor (1993) found that in the US, 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.*, 2001a).

The effect of the availability and accessibility of jobs on career advancement is a wider issue that also plays a part in the spatial mismatch debate. 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: 387). It has, however, much to offer in a broader conceptualization of the relationship between space, distance and labour market outcomes for larger groups on the labour market. Central in

the spatial mismatch debate is that poor geographical access to jobs reduces employment opportunities and negatively influences labour market outcomes. Kain has already acknowledged how space is connected and embedded in social structures and labour market processes and has described the importance of transportation in shaping access to employment (Preston and McLafferty, 1999).

Our two main hypotheses derive from the discussion above. Since access to suitable local jobs increases the probability of finding a better job, we hypothesise that living on a location with good job access leads to more career advancement when people change jobs. Spatial mismatch research in the 1990s underwent major advances in the detailed measurement of geographical access to suitable employment using GIS (Hanson *et al.* 1997, Ong and Blumenberg 1998, Van Ham *et al.*, 2001a).

We further deduced from the spatial mismatch hypothesis that, if geographical barriers hamper individual labour careers, workplace mobility is instrumental in career advancement. Workplace mobility enables workers to take advantage of job opportunities elsewhere and provides the opportunity of competing for more jobs. The second, and main, hypothesis is thus that workplace mobility has a positive effect on career advancement.

2.3 Gender, household and career advancement

The presence of a working partner and the traditional division in many households of housekeeping and childcare responsibilities restricts women in their job search (Van Ham *et al.*, 2001b). There are several reasons for believing that the household context also restricts women in their occupational achievement. One of the reasons is that restricted search might lead to less optimal search outcomes, leading to less career advancement when changing jobs. In a household with two income providers, job search has to be optimized for two workers. According to the theory of differential over-qualification, this situation is almost incapable of resolution, so the search is likely to be optimized for the main income provider, who is often the husband (Frank, 1978; Büchel, 1998). It is also possible that some women with spouses, particularly those with working spouses, place a low priority on pursuing a career (Van Ommeren *et al.*, 1999). This attitude might also lead to less career advancement. Furthermore, women, and especially women with children, are over-represented in the supplementary labour market. These jobs are often low-paid, part-time and with little security, and so offer few career opportunities (Hanson and Pratt, 1988, 1990, 1991; Droogleever-Fortuijn, 1993). We therefore expected that, for women changing jobs, having a partner and children would lead to less career advancement.

Gender was also expected to have an effect on the relationship between availability and accessibility of employment opportunities and career advancement. In the literature, two gender-related aspects of the effect of geography on career advancement prevail. The first is that the job search areas of men and women

differ in size. Men tolerate longer commuting times than women (Madden, 1981; Gordon *et al.*, 1989; Turner and Niemeijer, 1997). Furthermore, research by Van Ham *et al.* (2001c) has revealed that women show less workplace mobility than men. According to Madden (1981), gender differences in household roles strongly influence women to accept jobs closer to home (see also Johnston-Anumonwo, 1992, on the household responsibility hypothesis). Because women are more spatially restricted, we expected that for women, access to suitable local employment would have a stronger effect on career advancement than for men.

The second aspect is that research reveals an exception to the rule that workplace mobility helps career advancement. In the case of job-related migration, the rule only applies to individuals who migrate for their *own* career. It is a different story for people who migrate for the sake of somebody else's career (Smits, 1999). For these *tied movers*, migration can be expected to have a negative effect on occupational achievement (Mincer, 1978; Bielby and Bielby, 1992). In many households the husband is still the main income provider, so most long-distance moves take place for the sake of his career (Markham and Pleck, 1986; Bonney and Love, 1991). Most tied movers are therefore women who migrate along with their male partners (Shihadeh, 1991). We therefore expected that, for women with a partner, workplace mobility would lead to less career advancement than for single women.

3. Data and methods

The data were taken from the Netherlands SSCW survey.¹ This retrospective survey was conducted in 1993 with a sample population from around 3,000 members of about 1,600 households. The sample of this retrospective survey is representative of the Netherlands population aged 18 and over at the beginning of the 1990s. Respondents answered questions on a wide variety of topics in several rounds. This procedure led the response level to vary between the topics; some respondents left or entered the sample during the survey period. The set contains data about the respondents' residential, educational, household, and labour market histories.

Since our interest lies in the influence of workplace mobility on change in job level, the unit of analysis chosen was a job change. We excluded first jobs, since a change in job level can only be observed if people have had at least two jobs. After selection on the number of hours worked (at least 12 hours a week) and missing values, the data set contained 4,436 job changes. The 868 men in the data set changed jobs 2,743 times (average 3.2 job changes per male respondent) and the 668 women changed jobs 1,693 times (average 2.5 job changes per female respondent). We estimated separate models for men and women.

More than one job change per individual might enter the analyses, thereby violating the standard assumption of the independence of observations. This clustering of data can be handled by using multilevel models. Our model has two levels: the level of the job change and the individual level. We estimated a random-effects model in which the intercept was assumed to vary randomly across workers. The model specification is given in the Appendix.

We sought a model of career advancement: the difference in job level between the former job and the newly accepted job. Using the difference between the job level score of the accepted and former jobs as the dependent variable is not an advisable strategy, because there is a negative correlation between the job level of the former job and the change in job level (Markus, 1979). We therefore used the job level of the accepted job as the dependent variable and included the level of the former job as an independent variable. By doing this, the effects of the other independent variables can be interpreted as their effect on the change in job level (Johnson, 1988).

Despite the advantage of including job level of the former job as an independent variable, it also has a major disadvantage: it violates one of the standard assumptions underlying the use of a random-effects model. The random-effects model assumes the error terms at the job level and at the individual level to be uncorrelated. Because we use information about the previous job belonging to the same person, unmeasured characteristics of that person undoubtedly cause part of the effect we measure; our estimate is subject to omitted variable bias. So, in our model it is very likely that job level of the former job is correlated with the person-specific component of the error term u_j (see Appendix for model specification).

To test to what extent our approach produces biased parameter estimates we compared the estimates resulting from the random-effects model (GLS) with those resulting from a fixed-effects model (OLS), which produces more conservative estimates (Jones and Bullen, 1994). The fixed-effects model allows each individual to have an independent intercept. By including a series of dummies representing the individual workers in the data set, unobserved individual characteristics are controlled for. The advantage is that all of the explanatory variables can be correlated with the person-specific component of the error term u_j , while the fixed-effects estimator is still consistent. The only practical problem with this technique is that it is costly in terms of losing degrees of freedom.

3.1 Dependent variable

The dependent variable of job level is as developed by Conen and Huijgen (1980). They assigned skill levels to jobs on the basis of the classification of occupations by Statistics Netherlands (BRC-84). Skill levels are defined by training time, autonomy, and the amount of theoretical or practical schooling needed to perform the task adequately. Seven levels are distinguished, ranging from unskilled work (level 1) to specialized work at an academic level (level 7). Strictly,

the measurement level of the dependent variable is ordinal, but it can be assumed that the variable approaches the interval level sufficiently (Huijgen *et al.*, 1983).

3.2 Independent variables

Besides the job level of the former job, nine other independent variables enter the models. Age at the time of accepting the job is measured in years. To control for non-linearity of the age effect, both a linear and a quadratic term of the age variable is included. Level of education is measured in five categories: primary education; lower-level secondary education; upper-level secondary education; higher vocational education; university. The presence of a partner at the time of accepting a job is measured by a dummy. The presence and age of children at the time of accepting a job is recorded in four categories: no children; youngest child under 5 years old; youngest child between 5 and 10 years old; youngest child between 10 and 15 years old. The period in which the job was accepted is classified according to the following four categories: 1950-1959; 1960-1969; 1970-1979; 1980-1992. Whether or not there was a period of non-employment of at least one year between the accepted and the former job is measured by a dummy variable.

Another dummy is used to indicate workplace mobility: whether or not the job was accepted over a long distance. We defined long distance as 45 kilometres or more, which is equivalent to some 30-40 minutes of travel time (Van Ham *et al.*, 2001c). This is a reasonable approximation of the maximum time people are willing to commute. For all job changes, we calculated the distance between the place of residence one year before the interview and the location of the accepted job; this is the distance over which workers accepted a job.

Access to suitable employment from the residential location one year before accepting the job is measured as the number of jobs, by job level, which can be reached within 30 minutes by car over the transport network (see Van Ham *et al.*, 2001a, for a detailed description of the method used). The measure of job access is calculated with the GIS extension Flowmap (De Jong and Floor, 1993). We allotted a measure of job access to all the job changes on the basis of the municipality of residence one year before accepting the job. The data on job opportunities were derived from the National Information System of Employment² (LISA 1991 and 1994) and the Netherlands labour force survey (EBB 1994, 1995, 1996) conducted by Statistics Netherlands (CBS, 1997).

4. Results

Just over 18% of all job changes in our data-set led to a decrease in job level; in 53% the level of the job did not change; and 29% of the changes led to an increase in job level. There were no significant differences between men and women in this respect. With regard to workplace mobility, more than 15% of all

jobs were accepted over a long distance from the residence. As expected, for men the proportion of jobs accepted over a long distance is higher than for women (18% and 11% respectively).

Table 1 shows the impact of the explanatory variables on the level of the accepted job. Because the job level of the former job has also been entered in the analyses, other parameter estimates can be interpreted as effects on career advancement: the change in job level. To test to what extent this approach produces biased parameter estimates in a random-effects model (GLS), we compared the estimates with those resulting from a fixed-effects model (OLS).

We did not find large differences between the random-effects and fixed-effects estimates. The effect of workplace mobility — the main independent variable — appeared to be even more significant in the more conservative fixed-effects model. We are therefore confident only to show the random-effects estimates. Furthermore, the random-effects estimates are preferred because they are more efficient — they use both the within-person and between-person variation.

There is, however, one main difference between the random-effects and fixed-effects estimates which is worth discussing. As expected, in the random-effects model, for both men and women the level of the former job has a positive effect on the level of the accepted job. In the fixed-effects model, however, for men, the effect of the level of the former job level is still positive and significant, but much smaller. For women the effect is not even significant. This finding is not surprising since using a fixed-effects model is known for decreasing the probability of omitted variable bias: level of the former job captures a lot of unobserved characteristics of the individual worker.

Career advancement is related non-linearly to worker's age. As expected, with increasing age the extent to which workers make career advancement through a job change first rises and subsequently falls. Men are estimated to reach the top of their careers at the age of 56, and women at the age of 47. A possible explanation for this non-linear effect might be that older workers at the end of their labour career do not always change jobs to make a career advancement. Since they are already at the top of their careers, they might change jobs for other reasons, for example, for a job at the same level but closer to home.

Level of education is positively related to career advancement. Women with a university degree form an exception; they make less career advancement than women with higher vocational education.

As expected, for women, the presence of children in the household has a negative effect on career advancement. Contrary to what was expected, however, women with older children make less career advancement than women with younger children. Also as expected, for women the presence of a partner has a negative effect on career advancement. For men, the presence of children and partner has no effect on career advancement. These results confirm the hypothesised gendered effect of the household context.

Table 1. Multilevel model of change in job level.

	Men model 1		Women model 1	
	B	s.e.	B	s.e.
Job level, former job (level 1 to 7) ^a	0.411	0.018***	0.420	0.022***
Age (in years) ^a	0.092	0.019***	0.107	0.022***
Age (squared) ^a	-0.001	0.000***	-0.001	0.000***
Education (primary = 0) ^b				
Lower secondary ^b	0.489	0.097***	0.434	0.095***
Upper secondary ^b	0.909	0.107***	0.760	0.112***
High vocational ^b	1.292	0.115***	1.460	0.134***
University ^b	1.626	0.014***	1.228	0.167***
Children (no children = 0) ^a				
Child 0-5 ^a	0.055	0.072	-0.100	0.114
Child 6-10 ^a	0.002	0.102	-0.216	0.120*
Child 11-15 ^a	-0.188	0.134	-0.443	0.134***
Partner ^a	0.031	0.069	-0.163	0.066***
Period of unemployment ^a	-0.180	0.088**	-0.377	0.086***
Period (1950-1959 = 0) ^a				
Period 1960-1969 ^a	-0.070	0.080	-0.038	0.088
Period 1970-1979 ^a	-0.206	0.080***	-0.054	0.088
Period 1980-1992 ^a	-0.245	0.081***	-0.160	0.095*
Job access (millions of jobs) ^a	0.121	0.077	0.016	0.085
Workplace mobility ^a	0.266	0.064***	0.066	0.084
Constant	-0.031	0.031	-0.013	0.326
Variance job change level	0.152	0.029***	0.131	0.030***
Variance worker level	1.318	0.042***	0.962	0.040***

*= $p < 0.10$; **= $p < 0.05$; ***= $p < 0.01$

^aVariable at job level

^bVariable at worker level

More than 25% of those who accepted a job after a period of non-employment experienced a decrease in job level, compared with 17% of those who took a new job immediately upon leaving the old one. The multivariate results in Table 1 show that a period of non-employment of at least a year between the accepted and the former job does indeed have a negative effect on career advancement. This effect is much stronger for women than for men. Apparently, women lose more of their accumulated human capital in a period of non-employment.

As expected, workers who accepted a job after 1970 made less career advancement than those who accepted a job before 1970. This can be explained by the fact that the level of registered unemployment in the Netherlands increased

Table 2. Multilevel model of change in job level with interaction effect.

	Men model 1		Women model 1	
	B	s.e.	B	s.e.
Job level former job (level 1 to 7) ^a	0.411	0.018***	0.418	0.022***
Age (in years) ^a	0.092	0.019***	0.105	0.022***
Age (squared) ^a	-0.001	0.000***	-0.001	0.000***
Education (primary = 0) ^b				
Lower secondary ^b	0.486	0.097***	0.437	0.095***
upper secondary ^b	0.904	0.107***	0.767	0.112***
high vocational ^b	1.288	0.116***	1.465	0.134***
University ^b	1.621	0.144***	1.237	0.168***
Children (no children = 0) ^a				
Child 0-5 ^a	0.053	0.072	-0.101	0.114
Child 6-10 ^a	0.001	0.102	-0.219	0.120*
Child 11-15 ^a	-0.193	0.135	-0.442	0.134***
Period of unemployment ^a	-0.181	0.088**	-0.375	0.086***
Period (1950-1959 = 0) ^a				
Period 1960-1969 ^a	-0.071	0.080	-0.036	0.088
Period 1970-1979 ^a	-0.206	0.080***	-0.050	0.089
Period 1980-1992 ^a	-0.245	0.081***	-0.157	0.095*
Job access (millions of jobs) ^a	0.119	0.077	0.015	0.085
Interaction effect ^a				
(No workplace mob. with prtn = 0)				
No workplace mob. without prtn ^a	-0.019	0.073	0.141	0.069**
Workplace mobility with partner ^a	0.256	0.081***	-0.022	0.116
Workplace mobility without prtn ^a	0.162	0.109	0.301	0.128***
Constant	-0.007	0.337	-0.134	0.350
Variance job change level	0.151	0.029***	0.134	0.030***
Variance worker level	1.318	0.041***	0.958	0.040***

*= $p < 0.10$; **= $p < 0.05$; ***= $p < 0.01$

^aVariable at job level

^bVariable at worker level

markedly from 1970 onwards. We found a smaller effect for intervening period for women than for men.

We hypothesised that workers who live on locations with good access to suitable employment make more career advancement than workers who live on locations with poor job access. Although the parameters of job access were in the right direction, we did not find that job access had a significant effect on career advancement for either men or women. The selectivity of those who change jobs might explain the absence of a job access effect. Van Ham and Mulder (1999)

showed that job access has a positive influence on occupational achievement measured in a static way: workers who live on locations with good job access reach higher job levels. Workers with higher level jobs change jobs less often to make career advancement. Furthermore, people with really poor job access participate less in the labour market and are less engaged in job search; this poorer access also leads to reduced job mobility (see Van Ham *et al.*, 2001b). The job access related selective nature of job mobility might explain why we did not find any extra effect of job access on career advancement in addition to the known effect of job access on occupational achievement.

The central hypothesis is that workplace mobility is instrumental in career advancement. Workplace mobility enables workers to take advantage of job opportunities elsewhere and provides the opportunity to compete for more jobs. As expected, workplace mobility has a positive effect on career advancement for men. Men who accepted a job over a longer distance make more career advancement than those who accept jobs closer to their residence. We did not find an effect of workplace mobility for women.

We hypothesised a gendered effect of workplace mobility for workers with a partner. We expected workplace mobility to have a smaller effect on career advancement for women with a partner than for single women: women with a partner are often tied movers. No significant differences were expected for men. We estimated two more models to investigate whether there was an interaction effect between workplace mobility and having a partner. We included a variable in the form of three dummies to measure whether a job was accepted over long distance, with or without a partner. The reference category is those workers with a partner who did not accept a job over a longer distance. These workers were expected to make the least career advancement when changing jobs. The results in Table 2 confirm that, for men, workplace mobility has a positive effect on career advancement. Men with a partner who accept a job over a longer distance have the highest probability of making career advancement. For women, the picture is quite different. For them, workplace mobility is only instrumental in career advancement when they are single; that is to say, when they accept a job over a longer distance for the sake of their own careers. The absence of an effect of workplace mobility for women with a partner suggests the existence of a tied mover-effect.

5. Discussion

The goal in this contribution has been to extend our understanding of the relationship between spatial flexibility and occupational achievement. The analyses contribute to the existing literature in two ways. The first is in the use of the concept of *workplace mobility*: accepting a job over a longer distance. This ap-

proach is more comprehensive than the traditional one, because we include both long-distance migration and long-distance commuting as an instrument in career advancement. Long-distance commuting is becoming increasingly important, because the migration tolerance of households has decreased through the dramatic increase in the number of two-earner and two-career households in recent years. Both forms of accepting a job over a long distance may be regarded as an investment in human capital.

Our second contribution is that we have measured career advancement directly by comparing the level of the accepted job with the level of the former job. A feature of these data is that they include the complete labour market histories of the respondents. Using this longitudinal data makes it possible to take job change as the unit of analysis.

The starting point of our conceptualization is that career advancement through job mobility is only possible if suitable employment is available and accessible. We expected workers with access to a large set of suitable employment opportunities to make more career advancement than other workers. We further expected workplace mobility to be instrumental in career advancement, because it gives workers the opportunity to compete for more jobs. A critical note regarding the influence of workplace mobility on career advancement might be useful here. It is likely that people who are motivated do better in their careers, and also accept jobs over a longer distance. If this is the case, one could discuss to what extent a positive association between workplace mobility and occupational achievement can be interpreted as being the effect of the former on the latter. However, as indicated in the theoretical part of this paper, conceptually, workplace mobility is a cost which is instrumental in career advancement. Workplace mobility is therefore not the cause of career advancement, but an instrument that leads to career advancement. Obviously, more motivated workers will more often use this instrument, but this does not change the instrumental nature of workplace mobility, and one may still state that workplace mobility helped to advance the careers of these motivated workers.

Contrary to what was expected, we did not find an effect of job access on career advancement. A possible explanation is the selectivity of those who change jobs. Van Ham and Mulder (1999) showed that job access has a positive effect on the job level workers reach, measured in a static way. Workers with higher-level jobs change jobs less often to make career advancement. This selective nature of job mobility might explain why we did not find an extra effect of job access on career advancement in addition to the effect on the level of the job in general. Another explanation might be that the inclusion of the context variable *job access* may not have been optimal. Other variables, for example the number of suitable vacancies that can be reached, might measure the local set of job opportunities in a better way. Data on vacancies might also offer better ways to measure 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 job access in career advancement. Unfortunately, data on vacancies is seldom available and usually of questionable reliability.

The analyses confirmed our expectations regarding the instrumental nature of workplace mobility in career advancement. Workers who accept a job over a longer distance make more career advancement than workers who accept jobs closer to their residence. However, the analyses also confirmed that women with a partner form an exception to the rule. For them, workplace mobility has no effect on career advancement. A probable explanation is a tied-mover effect. Some women with a partner accept a job over a longer distance for the sake of the career of the male spouse, because the household as a whole migrates. The conclusion is that, for women, workplace mobility is only instrumental in career advancement when jobs are accepted over a long distance for their own careers.

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Notes

1. The survey was commissioned by the *Stichting Sociaal-culturele Wetenschappen* (SSCW), *Nederlandse Organisatie voor Wetenschappelijk onderzoek* (NWO). The data-set is available under the title 'Aspects of life-event history of the Dutch population. Part 1: Changes in socio-demographic data, social mobility, relationships history, educational career, and work mobility' at the Niwi Steinmetz archives (under number P1107).
2. The LISA datasets were obtained from the RIVM (Bilthoven, The Netherlands) for the *Ruimtescanner* project.

Appendix

The multilevel model is specified as follows. Let y_{ij} be the level of the accepted job for the i th job change for the j th worker. Then the model is written as:

$$y_{ij} = \beta_{0ij} + \beta_1 x_{1ij} + \dots$$

where

$$\beta_{0ij} = \beta_0 + u_j + e_{ij}$$

This model is a so-called random-effects model, in which the intercept is assumed to vary randomly across workers and jobs, but where the relationship

between the dependent and the independent variables is assumed to be the same for all job changes within workers. Both u_j and e_{ij} are random quantities, whose means are equal to zero; they form the random part of the model. We assume that, being at different levels, these variables are uncorrelated, and we further make the standard assumption that they follow a normal distribution so that it is sufficient to estimate their variances, σ_u^2 and σ_e^2 respectively (Rasbash *et al.*, 2000). The quantities β_0 and β_1 , the mean intercept and slope, are known as fixed parameters. The estimation was done using MLwiN.

References

- Becker, G. (1962) Human capital: a theoretical and empirical analysis. *Journal of Political Economy* 70, 9-46.
- Bielby, W.T. and Bielby, D.D. (1992). I will follow him: family ties, gender-role beliefs, and reluctance to relocate for a better job. *American Journal of Sociology* 97, 1241-1267.
- Blau, P.M. and Duncan, O.D. (1967) *The American Occupational Structure*. New York: John Wiley & Sons.
- Bonney, N. and Love, J. (1991) Gender and migration: geographical mobility and the wife's sacrifice. *Sociological Review* 39, 335-348.
- Burdett, K. (1978) A theory of employee job search and quit rates. *American Economic Review* 68, 212-220.
- Büchel, F. (1998) *Zuviel gelernt? Ausbildungsinadäquate Erwerbstätigkeit in Deutschland [Learned too much? Overeducation in Germany]*. Bielefeld: W. Bertelsman Verlag.
- CBS [Statistics Netherlands] (1997) *Enquête beroepsbevolking 1996 [Netherlands labour force survey 1996]*. Voorburg/Heerlen : Centraal Bureau voor de Statistiek.
- CBS [Statistics Netherlands] (1999) *Statline*. Voorburg/Heerlen: Centraal Bureau voor de Statistiek.
- Conen, G.J.M. and Huijgen, F. (1980) De kwalitatieve structuur van de werkgelegenheid in 1960 en 1971. Deel I [The qualitative structure of the labour market in 1960 and 1971. Part I]. *Economisch-Statistische Berichten* April, 480-487.
- DaVanzo, J. (1981) Microeconomic approaches to studying migration decisions. In: De Jong, G.F. and Gardner, R.W. (Eds) *Migration Decision Making. Multidisciplinary Approaches to Microlevel Studies in Developed and Developing Countries*, pp. 90-129. New York: Pergamon Press.
- De Jong, T. and Floor, H. (1993) Flowmap: een programma voor het weergeven en analyseren van interactiegegevens [Flowmap: a software package for displaying and analysing interaction data]. *Planning, methodiek en toepassing* 44, 16-31.

- Droogleever Fortuijn, J.C. (1993) *Een druk bestaan: tijdbesteding en ruimtegebruik van tweeverdieners met kinderen [A busy life: the use of time and space in dual-earner families]*. PhD thesis. Amsterdam: Amsterdam University Press.
- Frank, R.H. (1978) Why women earn less: the theory and estimation of differential overqualification. *American Economic Review* 68, 360-373.
- Gordon, P., Kumar, A. and Richardson, H.W. (1989) Gender differences in metropolitan travel behaviour. *Regional Studies* 23, 499-510.
- Greenwood, M.J. (1975) Research on internal migration in the United States: a survey. *Journal of Economic Literature* 13, 397-433.
- Hanson, S. and Pratt, G. (1988) Spatial dimensions of the gender division of labour in a local labour market. *Urban Geography* 9, 180-202.
- Hanson, S. and Pratt, G. (1990) Geographic perspectives on the occupational segregation of woman. *National Geographic Research* 6, 376-399.
- Hanson, S. and Pratt, G. (1991) Job search and the occupational segregation of women. *Annals of the Association of American Geographers* 81, 229-253.
- Hanson, S., Kominiak, T. and Carlin, S. (1997) Assessing the impact of location on women's labor market outcomes: a methodological explanation. *Geographical Analysis* 29, 281-297.
- Huijgen, F., Riesewijk, B.J.P. and Conen, G.J.M. (1983) *De kwalitatieve structuur van de werkgelegenheid in Nederland. Bevolking in loondienst en functieniveau-structuur in de periode 1960-1977 [The qualitative structure of the labour market in the Netherlands. Employees and job level structure in the period 1960-1977]*. Den Haag: Staatsuitgeverij.
- Jarvis, H. (1999) Identifying the relative mobility prospects of a variety of household employment structures, 1981-1991. *Environment and Planning A* 31, 1031-1046.
- Johnson, D.R. (1988) Panel analysis in family studies. *Journal of Marriage and the Family* 50, 949-955.
- Johnson, W.R. (1978) A theory of job shopping. *Quarterly Journal of Economics* 92, 261-277.
- Johnston-Anumonwo, I. (1992) The influence of household type on gender differences in work trip distance. *Professional Geographer* 44, 161-169.
- Jones, K. and Bullen, N. (1994) Contextual models of urban house prices: a comparison of fixed- and random-coefficient models developed by expansion. *Economic Geography* 70, 252-272.
- Jovanovic, B. (1979) Job matching and the theory of turnover. *Journal of Political Economy* 87, 972-990.
- Kain, J. (1968) Housing segregation, Negro employment, and metropolitan decentralization. *Quarterly Journal of Economics* 82, 175-197.
- Lichter, D.T. (1983) Socioeconomic returns to migration among married women. *Social Forces* 62, 487-503.

- Madden, J.F. (1981) Why women work closer to home. *Urban Studies* 18, 181-194.
- Markham, W.T. and Pleck, J.H. (1986) Sex and willingness to move for occupational advancement: some national sample results. *Social Science Quarterly* 27, 121-143.
- Markus, G.B. (1979) Analyzing Panel Data. Sage University Paper series/ Number 07-018, Sullivan JL (ed.). Beverly Hills/London: Sage Publications.
- Mincer, J. (1962) On the job training: costs, returns, and some implications. *Journal of Political Economy* 70, 50-79.
- Mincer, J. (1978) Family migration decisions. *Journal of Political Economy* 86, 749-773.
- Mulder, C.H. (1993) *Migration Dynamics: A Life Course Approach*. PhD thesis. Amsterdam: Thesis Publishers.
- Mulder, C.H. and Hooimeijer, P. (1999) Residential relocations in the life course. In: Wissen, L.J.G. and Dykstra, P.A. (Eds.) *Population Issues. An Interdisciplinary Focus*, pp. 159-186. New York: Kluwer Academic/Plenum Publishers.
- Ong, P. and Blumenberg, E. (1998) Job access, commute, and travel burden among welfare recipients. *Urban Studies* 31, 77-93.
- Parsons, D.O. (1973) Quit rates over time: a search and information approach. *American Economic Review* 63, 390-401.
- Polachek, S.W. and Hovarth, F.W. (1977) A life cycle approach to migration: analysis of the perspicacious peregrinator. In: Ehrenberg, R.G. (Ed.) *Research in labor economics: an annual compilation of research (Vol. 1)*, pp. 103-150. Greenwich, CT: JAI Press.
- Preston, V. and McLafferty, S. (1999) Spatial mismatch research in the 1990s: progress and potential. *Papers in Regional Science* 78, 387-402.
- Rasbash, J., Browne, W., Goldstein, H., Yang, M., Plewis, I., Healy, M., Woodhouse, G., Draper, D., Langford, I. and Lewis, T. (2000) *A User's Guide to MlwiN, Version 2.1*. Multilevel Models Project, Institute of Education, University of London.
- Rouwendal, J. and Rietveld, P. (1994) Changes in commuting distances of Dutch households. *Urban Studies* 31, 1545-1557.
- Shihadeh, E.S. (1991) The prevalence of husband-centered migration: employment consequences for married mothers. *Journal of Marriage and the Family* 53, 432-444.
- Simpson, W. (1992) *Urban Structure and the Labour Market: Worker Mobility, Commuting and Underemployment in Cities*. Oxford: Clarendon Press.
- Sjaastad, L.A. (1962) The costs and returns of human migration. *Journal of Political Economy* 70, 80-93.
- Smits, J. (1999) Family migration and the labour-force participation of married women in the Netherlands, 1977-1996. *International Journal of Population Geography* 5, 133-150.

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- Turner, T. and Niemeier, D.A. (1997) Travel to work and household responsibility: new evidence. *Transportation* 24, 397-419.
- Van Ham, M. and Mulder, C.H. (1999) De regionale component in de afstemming tussen opleiding en functieniveau [The regional component of the match between educational and job levels]. *Mens en Maatschappij* 74, 392-406.
- Van Ham, M., Hooimeijer, P. and Mulder, C.H. (2001a) Urban form and job access: disparate realities in the Randstad. *Tijdschrift voor Economische en Sociale Geografie* 92, 231-246.
- Van Ham, M., Mulder, C.H. and Hooimeijer, P. (2001b) Local underemployment and the discouraged worker effect. *Urban Studies* 38, 1733-1751.
- Van Ham, M., Mulder, C.H. and Hooimeijer, P. (2001c) Spatial flexibility in job mobility: macrolevel opportunities and microlevel restrictions. *Environment and Planning A* 33, 921-940.
- Van Ommeren, J. (1996) *Commuting and Relocation of Jobs and Residences: a Search Perspective*. PhD thesis. Amsterdam: Vrije Universiteit Amsterdam.
- Van Ommeren, J., Rietveld, P. and Nijkamp, P. (1999) Impacts of employed spouses on job-moving behaviour. *International Regional Science Review* 22, 54-68.
- Wachs, M. and Taylor, B.D. (1993) The changing commute: a case study of the jobs-housing relationship over time. *Urban Studies* 30, 1711-1730.

Job access at labour market entry and occupational achievement in the life course, Van Ham M., submitted.

Chapter 7

Job access at labour market entry and occupational achievement in the life course

Abstract. This paper addresses the question of the extent to which job access at labour market entry influences socio-economic status later in life. Multivariate models of workers' socio-economic status at the ages of 30, 40, and 50 were estimated using longitudinal data. The results show that job access at labour market entry is indeed instrumental in career advancement over the life course. The importance of job access at labour market entry increases significantly with age. Good job access at the beginning of the labour career evidently gives workers an advantage over others who start in less favourable labour markets.

1. Introduction

Career advancement is only possible when the spatial opportunity structure offers sufficient opportunities to find a better job. If insufficient suitable jobs are available, workplace mobility — the acceptance of a job at a long distance from the place of residence — can help overcome poor local job access (Sjaastad, 1962; Simpson, 1992). Previously, we have shown that workplace mobility is indeed instrumental in obtaining a better job (Van Ham, 2001). Workers accepting jobs over a longer distance obtained better jobs than workers accepting jobs closer to their residence. Our previous analyses did not reveal any effect on career advancement at a job change from job access — the number of jobs matching one's level of education and accessible from the residence.

It would be unlikely for job access to have no effect at all on occupational achievement: if career advancement is to be achieved through a job change, a better job must be available and within reach. There are several indications in the

literature that the occupational structure indeed influences occupational achievement. In the 1960s, Blau and Duncan (1967) showed that the chances for upward social mobility were highest in the urban growth centres of the USA. Although their classic work on social mobility was a source of inspiration for later research on occupational achievement (the status attainment tradition), the importance of the opportunity structure as a prerequisite for career advancement has been overlooked by many researchers (some exceptions are Wagner, 1989; Fielding, 1992; Lelievre and Bonvalet, 1994).

A possible explanation for failing to find any effect in our previous work (Van Ham, 2001) might be that good access to employment does not pay dividends immediately, but only after a number of job changes, and after a certain period of time. Conceptually, job access at labour market entry is particularly important. Most job changes occur in the first ten years of a labour career (Topel and Ward, 1992; Booth *et al.*, 1999). In this period, it is probably particularly important to live in a location favourable to the spatial distribution of employment opportunities. Such a location gives workers the opportunity of fast human capital accumulation while at the same time avoiding high spatial mobility costs (commuting or migration). If some workers indeed gain an advantage (in the form of more accumulated human capital) over others in less favourable labour markets from good job access at labour market entry, this should pay them dividends in the form of better jobs later in their careers. Should these better jobs indeed only be achieved at a later stage, the effect of job access on occupational achievement would not be measurable in job-to-job mobility (cross sectional), but only in a life course perspective; labour careers must therefore be analysed over a longer period of time.

This paper describes a longitudinal approach to the relationship between access to employment opportunities and occupational achievement. The paper addresses the question whether good job access at the beginning of a labour career is instrumental for occupational achievement over the life course: to what extent does job access at labour market entry influence socio-economic status later in life? Furthermore, we have tested whether the instrumental nature of workplace mobility in career advancement — as found for job-to-job mobility in previous work (Van Ham, 2001) — also holds over a longer period of time: to what extent does a history of workplace mobility influence socio-economic status later in life? To answer these questions, we have used longitudinal data from a retrospective survey of aspects of life histories of the Netherlands population conducted in 1993. A special feature of the data is that it included information on the complete labour market histories of the respondents so it was possible to measure job access at labour market entry and history of workplace mobility. Multivariate models explaining the socio-economic status of workers at the ages of 30, 40, and 50 were used.

2. Theory

The theoretical framework commences with the relationship between human capital accumulation and occupational achievement over the life course. We describe occupational achievement as an individual process under the influence of individual (and household) resources and restrictions. Next, we link the theoretical framework of occupational achievement to the spatial context. We elaborate both job access and workplace mobility — the two spatial context aspects influencing occupational achievement identified in the introduction.

2.1 Human capital and occupational achievement over the life course

According to the human capital theory (Becker, 1962) workers invest in productivity-enhancing skills over their labour careers and strive to maximize the returns on this accumulated human capital. Most workers start their labour careers after having acquired some level of general human capital through the educational system. This general human capital enhances productivity equally in all sectors. Next, workers acquire more specific human capital through working experience: sector-specific human capital (Simpson, 1992) which only enhances productivity in a particular sector of the economy; and enterprise-specific human capital, which is acquired with tenure (on-the-job training) and is not transferable across employers. Employers may put less value on the accumulated human capital of workers who have not been employed for a substantial period of time than on that of workers with a continuous labour career. Sector-specific human capital in particular may lose its value after a period of non-employment. Investments in human capital are useful, because employers use the level of human capital as a simple way of determining a worker's productivity (Arrow, 1973). The best positions in the labour market are given to those workers with the highest levels of human capital. On the basis of human capital theory, we expected workers with the highest levels of general human capital to have the jobs with the highest socio-economic status through the whole labour career. Furthermore, we expected a period of non-employment to have a negative influence on occupational achievement over the labour career.

Whether from choice or impediment, many women still stop working for at least some period of time after they have had a child, so that women still working at a certain age are a selective category. Women who (want to) work are restricted in their job search by household and childcare responsibilities (see Van Ham *et al.*, 2001c). A restricted search might lead to less optimal search outcomes, yielding less human capital accumulation when changing jobs and so to less career advancement over the life course. It is also possible that some women with children place a low priority on pursuing a career. This attitude might lead to lower socio-economic status, but also to non-employment. Previous research (Van Ham, 2001) showed that in job-to-job mobility, women with children

make less career advancement than women without children. Dykstra and Fokkema (2000) showed that women who remain childless achieve greater occupational success than mothers. The above led us to expect that household history also influences occupational achievement over the life course. We expected women who had ever had a child would reach a lower socio-economic status at different moments in their labour careers than men, or women without children.

It was thought that cohort effects might influence socio-economic status reached at certain ages, because people born in different periods enter the labour market at different moments in time. When good labour market conditions provide more opportunities for job-to-job mobility, human capital might be accumulated more rapidly in times of economic prosperity. Different cohorts may have had more, or fewer, opportunities for human capital accumulation and career advancement, according to the labour market situation at the time of labour market entry.

2.2 Job access at labour market entry and occupational achievement

There are several indications in the literature that access to employment opportunities influences occupational achievement. In the 1960s, Blau and Duncan (1967) showed that in USA workers living in or moving to larger cities had the highest chances for upward social mobility. Wagner (1989) found for Germany that workers experienced higher rates of upward mobility if they lived in highly urbanized areas. Fielding (1992) demonstrates that the southeast region of England acts as an 'upward social mobility escalator' within the British urban and regional system. Lelievre and Bonvalet (1994) show for France that the Paris region appears to be the ideal location for improving one's chances of social advancement.

Blau and Duncan (1967: 260, footnote) take the spatial distribution of occupational positions into account in the notion of opportunity structure: "(...) the opportunity structure is defined by the total distribution of occupations in a community (...)". They operationalize opportunity structure by city size. The English (Fielding, 1992) and French (Lelievre and Bonvalet, 1994) studies used a simple operationalization of opportunity structure. They investigated whether a stay in the capital led to more upward social mobility than did remaining outside the capital. To some extent this operationalization can be justified by the fact that both the English and French national urban contexts can be characterized as mononuclear urban systems with London and Paris as the largest concentrations of employment. For polynucleated urban regions like the Rhine-Ruhr metropolitan region in Germany, the Flemish Diamond in Belgium, and the Randstad in the Netherlands, a simple operationalization by city size would not be sufficient. In polynucleated urban regions there is no central city. Instead, several large concentrations of employment opportunities are located in close proximity to each other and are connected by intensive road and rail networks (Dieleman and Faludi, 1998). As a consequence, the locations in between the larger con-

centrations of employment opportunities, and not the largest cities themselves, show the highest job access (Van Ham *et al.*, 2001a).

Even more important than making the opportunity structure operational is a theoretical framework capable of explaining the link between opportunity structure and occupational achievement. For this purpose a spatial extension of the human capital framework was used, placing the role of job access in a life course perspective. A relevant aspect of the human capital theory is that human capital is accumulated over the life course. Human capital accumulation through job mobility mainly takes place in the beginning of the labour career. Topel and Ward (1992) have shown that young men make more than two-thirds of their lifetime job changes during their first 10 years of work experience. The process of human capital accumulation can be seen as the outcome of a series of searches for a better job and matches of varying success. The only way to find out whether a match is successful is by experience. When one particular job does not come up to expectations, a worker has to move to another. By trying out several jobs, workers ascertain their comparative advantages (Johnson, 1978); find higher quality job matches (Jovanovic, 1979); and achieve better pay (Parsons, 1973; Burdett, 1978). After a few job changes, workers will have gained enough experience to enable them to estimate accurately whether a match will be successful or not. As a result, the risk of a less successful match decreases during the labour career.

Workers searching from a location with good access to suitable employment are probably able to find a successful match more quickly, while at the same time avoiding high spatial mobility costs (commuting or migration). It is therefore to be expected that human capital accumulation is fastest when enough suitable jobs are available and accessible. Job access at labour market entry is expected to be particularly important. Workers who start their careers from a location with a good opportunity set accumulate human capital more quickly and get a head start over other workers in less favourable labour markets. When an employer can choose between two workers with the same level of human capital, the younger worker — who will have accumulated human capital more rapidly — will probably be preferred. Getting the job increases this worker's lead position. We may therefore expect that good job access at labour market entry has a lasting and increasing effect on occupational achievement over the labour career.

2.3 Workplace mobility and occupational achievement

A job searcher faced with a lack of suitable job opportunities on the local labour market has to be spatially flexible to make career advancement through a job change. Workers who are prepared to broaden their search area can take advantage of job opportunities elsewhere and compete for more jobs (Mincer, 1978; Lichter, 1983; Markham and Pleck, 1986). The classic conceptualization of the relationship between spatial flexibility and occupational achievement is human capital related migration. Since Sjaastad's (1962) article *The costs and returns of*

human migration, long-distance migration is often referred to as a form of investment in human capital that is expected to pay for itself in the form of career advancement: increased income; better employment prospects; higher occupational status (Sjaastad, 1962; Blau and Duncan, 1967; Greenwood, 1975; Smits, 1999). In Van Ham (2001) we extended the classic conceptualization of the relationship between spatial flexibility and occupational achievement by including not only long-distance migration, but also long-distance commuting as an instrument of career advancement. We used the concept of workplace mobility: accepting a job at a long distance from the residence (Van Ham *et al.*, 2001b). Being prepared to commute over a long distance increases the probability of finding a better job quite as much as being prepared to migrate (Simpson, 1992). For job-to-job mobility we showed that workplace mobility is indeed instrumental in obtaining a better job (Van Ham, 2001). Workers who accept jobs over a longer distance make more career advancement after a job change than workers who accept jobs closer to their residence.

Two conclusions can be drawn concerning the effect of job access and workplace mobility on occupational achievement. First, we theorized that good job access at labour market entry led to faster human capital accumulation, because workers were able to make career advancement through job mobility while avoiding high spatial mobility costs. We hypothesised that this head start in human capital accumulation led to a higher socio-economic status later in the labour career. Second, the theoretical considerations led us to expect that, besides good job access at labour market entry, workplace mobility later in a labour career also positively influences career advancement. When the local labour market does not provide enough suitable jobs, workplace mobility has been shown to be an instrument for getting a better job. We therefore expected workers with a history of workplace mobility to reach a higher occupational status compared with those who had never accepted a job at a comparatively long distance.

3. Data and methods

Making the opportunity structure operational is more complicated in a polynuclear urban region like the Randstad than in a mononuclear urban region: it necessitates a more detailed definition of the spatial level on which the opportunity structure has to be included. In Van Ham *et al.* (2001a) we postulated that, in order to understand how the opportunity structure plays a part in labour market outcomes, both the commuting tolerance of workers and the spatial distribution of employment opportunities have to be taken into account. We developed an instrument to measure the job access of residential locations using GIS (see also Hanson *et al.*, 1997; Ong and Blumenberg, 1998) and applied it to the Netherlands. Job access is measured as the number of jobs, by job level, which

can be reached over the transport network or by car within 30 minutes from the residence (see Van Ham *et al.*, 2001a, for a detailed description of the method used). It was shown that, in the Netherlands, there is an enormous differentiation in the total number of jobs that can be reached within 30 minutes from a residential location. As 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. However, it is the locations in between these cities, and not the four largest cities themselves, which show the highest job access. The four cities are located relatively close to each other, so that people living between them can reach more than one concentration of employment within 30 minutes. The measure of job access is calculated with the GIS extension Flowmap (De Jong and Floor, 1993). For this paper we allotted a measure of job access at labour market entry to all respondents on the basis of the municipality of residence and their level of formal education in the year they accepted their first job. The data on job opportunities were derived from the National Information System of Employment¹ (LISA 1991 and 1994) and the Netherlands labour force survey (EBB 1994, 1995, 1996) conducted by Statistics Netherlands (CBS, 1997).

The data on individual labour careers were taken from the Netherlands SSCW survey². This retrospective survey was conducted in 1993 with a sample of some 3,000 members from about 1,600 households. Respondents answered questions on a wide variety of topics in several rounds. This procedure led the response level to vary between the topics; some respondents left or entered the sample during the survey period. The set contains data about the respondents' residential, educational, household, and labour market histories. The sample of this retrospective study was designed to be representative of the Netherlands population aged 18 and over for the beginning of the 1990s (cross-sectional), including labour participation rates. However, with regard to lifetime labour participation, particularly of women, the sample does not seem to be completely representative. The women in the sample showed higher participation rates over their lifetimes in comparison with the total population.

Since our interests lie in accounting for occupational achievement through the labour career, we performed analyses at three different ages: 30, 40, and 50. Because we were using retrospective data, this choice had two important consequences. First, because at the moment of the interview the respondents were of different ages, they reached the ages of 30, 40, and 50 in different years. Second, the number of respondents per analysis varied. Fewer of our respondents had ever reached the age of 50 than had ever reached the age of 30. For age 30, the data set contained 1,840 respondents, 1,127 of whom were working. For age 40, the data set contained 1,188 respondents, 805 of whom were working. For age 50, the data set contained 634 respondents, 400 of whom were working.

The dependent variable is socio-economic status at the ages of 30, 40, or 50, measured according to Ganzeboom and colleagues' (1992) international socio-

economic index of occupational status (ISEI). The values of the socio-economic index ranged from 10 to 88 in our data set. For the analysis, OLS regression models were estimated. In addition to job access at labour market entry, six independent variables and an interaction effect were inserted into the models. Level of education was measured according to five categories: primary education; lower-level secondary education; upper-level secondary education; higher vocational education; university. Loss of human capital during the labour career was measured in years of non-employment since the end of formal education. A dummy for females was included. Household history was included as a dummy indicating whether a respondent had ever had a child before the ages of 30, 40, or 50. The respondents were classified according to the following five categories of birth cohorts: before 1925; 1925-1934; 1935-1944; 1945-1954; 1955-1963. A dummy was used to indicate a history of workplace mobility: whether or not the respondent had ever accepted a job over a long distance up to the ages of 30, 40 or 50. We defined long distance as 45 kilometres or more, which is equivalent to some 30-40 minutes of travel time (Van Ham *et al.*, 2001b). This is a realistic approximation of the maximum time people are willing to spend on commuting. For all job changes, we calculated the distance between the place of residence one year before the interview and the location of the accepted job: this is the distance over which workers accepted a job.

The theoretical considerations had an important implication for the methodology. The relationship between job access at labour market entry and socio-economic status at a certain age is not straightforward. Those working at a particular age are a selective category, and it was anticipated that the selection process would be related to our dependent variable (socio-economic status). People with an expected low socio-economic status might have higher rates of non-employment compared with those with an expected high socio-economic status. People who work, but in a job with a low socio-economic status, might be more likely to leave employment at some point in their careers than other workers. Furthermore, people with poor access to suitable employment might not be able to find suitable employment, resulting in their non-employment (see van Ham *et al.*, 2001c). It was anticipated that the determinants of non-employment and socio-economic status would overlap. Employed females with children were expected to be a selective category. When children are present in the household, women — especially those with a low socio-economic status — might decide to stop working (voluntarily or because of restrictions).

Overall, it was anticipated that people with good chances on the labour market would more often be employed and would reach higher occupational status when employed. Analysing the socio-economic status of a sample restricted to the employed could therefore lead to biased results. We used the two-step Heckman procedure to correct for possible selection effects (Heckman, 1979). In addition to the main analysis of socio-economic status for those in employment,

we also analysed the probability of being employed. This analysis of employment resulted in Heckman's correction factor Lambda, which has been added as an additional covariate in the analysis of socio-economic status. In its transformed form, Lambda represents the inverse of the predicted probabilities of accepting a job. The main analysis and the selection analysis need to have different sets of independent variables so as to avoid multi-collinearity between Lambda and the subset of independent variables in the main model. In the selection analysis the dependent variable measures whether (1) or not (0) a respondent was employed at the ages of 30, 40, or 50. Since the dependent variable is dichotomous, we have used logistic regression models. Five independent variables and two interaction effects were inserted into the models. Education, female, having ever had a child, and cohort were measured in the same way as in the main model. An extra household history variable was included in the form of a dummy indicating whether the respondent had ever married or cohabited up to the ages of 30, 40, or 50.

4. Results

First, the models of socio-economic status at ages 30, 40, and 50 without correction for selection effects as shown in Table 1 are discussed. As expected, level of education is positively related to socio-economic status. Workers with the highest levels of general human capital obtain the best jobs. Also as expected, as the number of years without employment since the end of formal education increases, the socio-economic status reached later in life decreases. Non-employment leads to loss of human capital.

As expected, the interaction effect of female and child has a negative effect on socio-economic status: women who have ever had a child reach a lower socio-economic status than women who remain childless. For men, the presence of a child has a positive effect on socio-economic status. Overall, women who remained childless reached the highest socio-economic status.

The cohort effects show that cohorts born after 1935 reached lower occupational status than cohorts born before 1935. This could be because workers of later birth cohorts entered the labour market at moments in time which were less favourable to the fast accumulation of human capital.

According to the main hypothesis of this paper, starting a labour career from a location with good job access has a positive and lasting effect on occupational achievement. Workers who start their labour careers from a location with good access to employment can accumulate human capital more rapidly than workers in less favourable labour markets. This faster accumulation of human capital is expected to pay dividends later in the form of better jobs with a higher socio-economic status. As expected, job access at labour market entry has a positive influence on socio-economic status. The results also provide evidence that the

Table 1. Parameters of OLS regression models explaining the socio-economic status of working respondents at different ages.

	Age 30			Age 40			Age 50		
	B	s.e.	Beta	B	s.e.	Beta	B	s.e.	Beta
Education (primary = 0)									
Lower secondary	1.461	1.256	0.048	1.837	1.394	0.059	1.347	1.974	0.042
Upper secondary	5.415***	1.561	0.148	6.347***	1.875	0.154	2.496	2.868	0.057
Higher vocational	15.959***	1.466	0.395	15.886***	1.637	0.394	15.901***	2.514	0.351
University	27.154***	1.959	0.429	23.862***	2.052	0.419	23.473***	3.179	0.368
Years non-employed since end education	-0.387*	0.200	-0.054	-0.385***	0.133	-0.112	-0.316**	0.149	-0.129
Female (male = 0)	6.108***	1.306	0.183	6.300***	2.288	0.186	9.694**	3.871	0.269
Ever had child (no child = 0)	2.874***	0.992	0.094	3.079**	1.547	0.077	7.200***	2.631	0.154
Interaction female*child	-5.920***	1.799	-0.138	-5.143*	2.681	-0.139	-9.337**	4.536	-0.239
Cohort (before 1925 = 0)									
1925-1934	-0.826	1.920	-0.018	0.171	1.843	0.004	0.509	1.927	0.016
1935-1944	-3.273*	1.828	-0.082	-3.721**	1.776	-0.110	-4.041**	1.974	-0.125
1945-1954	-2.365	1.719	-0.073	-1.910	1.705	-0.062			
1955-1963	-2.531	1.740	-0.078						
Job access at labour market entry (*100,000)	1.160**	0.468	0.077	1.211**	0.584	0.076	3.047***	0.893	0.187
Ever workplace mobility	1.705*	0.889	0.051	3.584***	1.003	0.113	3.271**	1.463	0.101
Constant	39.858***	2.074		41.137***	2.356		36.167***	3.425	
Adjusted R ²	0.272			0.293			0.294		
N respondents	1127			805			400		

*= $p < 0.10$; **= $p < 0.05$; ***= $p < 0.01$

effect of job access increases with age: in the analysis for age 50, the effect is stronger than in the analysis for age 30. This finding confirms the idea that good access to employment at the beginning of their careers gives workers a head start over other workers, and that this head start enables them to continue to accumulate human capital more quickly than other workers.

The effect of workplace mobility is as expected. Respondents who have a history of workplace mobility reach a higher occupational status later in life. Workplace mobility is instrumental in occupational achievement over the life course. The effect of workplace mobility also increases with age.

The fact that the effects of job access at labour market entry and a history of workplace mobility both increase with age could be a cohort effect not completely controlled for by including cohort as a variable. In the analysis at ages 40 and 50, only older cohorts could be included. This could explain the age effect when, for example, these older cohorts were less spatially mobile. To eliminate these possible cohort effects, we also performed the analyses for ages 30 and 40 just for the respondents included in the analysis for age 50 (not shown). In this way all three analyses applied to the same cohorts. These extra analyses also show that the effects of job access and workplace mobility increases with age.

The results of the selection analysis (analysis whether or not respondents are employed) can be found in Table 2 in the Appendix. The selection model resulted in a correction factor Lambda which is included in the models of socio-economic status as shown in Table 3 in the appendix. We expected the parameters of Lambda to be negative. Had they been, this would have indicated that those with poor chances on the labour market reach a lower socio-economic status when they are employed. Surprisingly, including Lambda does not have the expected effect; Lambda has no significant effect on socio-economic status at any age. Only in the analysis at age 30 does the parameter of Lambda have the expected sign. In this analysis, the inclusion of Lambda leads the interaction effect between female and the presence of children to disappear, indicating that, after correction, women with children do no worse than childless women. This suggests that, at least at age 30, the lower socio-economic status of women with children (as found in the model without correction in Table 1) can be explained because these women had a low likelihood of being employed. It is noteworthy, however, that the standard errors of the interaction effect are rather large in the analysis for age 30. In the analyses at ages 40 and 50, the interaction effect remains present; here too the standard errors are large, possibly partly because of the small numbers of cases. Furthermore, in these analyses the parameter of Lambda is positive, which was unexpected. These results led us to suspect that, in the models of socio-economic status in Table 3, both Lambda and the interaction effect of being female and the presence of children capture part of the same selection effects. To consolidate our grasp on the results, we also ran the models including Lambda, but without the interaction effect. Table 4 in the appendix

shows that in these models the parameters of Lambda all have the expected negative sign and that the effect is significant at ages 30 and 50: workers with poor chances of being employed reach a lower socio-economic status when they are employed. Because both Lambda and the interaction effect seem to capture part of the same selection effects, models including either one or the other are to be preferred.

More importantly, the inclusion of Lambda does not influence the effects of the central independent variables — job access at labour market entry and workplace mobility — on socio-economic status. In conclusion, the results show that both job access and workplace mobility are important in explaining occupational achievement over the life course.

5. Conclusion

This contribution describes the further extension of our understanding of the relationship between spatial context and occupational achievement. We placed the relationship between the availability of employment and occupational achievement in a life course perspective. On the basis of a spatial extension of the human capital theory, we hypothesised that the availability of suitable employment at the beginning of their labour careers gives workers a head start over other workers, because they can accumulate human capital more rapidly through job mobility. This faster accumulation of human capital was expected to pay dividends later in the career in the form of jobs with a higher socio-economic status. Longitudinal data gave us the opportunity to test this hypothesis.

As expected, we found that job access at labour market entry is instrumental in occupational achievement. Workers who start their careers from a location with good job access reach a higher socio-economic status than workers who start their careers in a less favourable labour market. We found the effect of job access at labour market entry increased with age. This result suggests that good job access at labour market entry gives workers a head start over other workers and that this head start enables them to keep increasing their lead over their labour careers. Furthermore, the analysis showed that a history of workplace mobility is instrumental in career advancement over the life course. Workers who accept a job over a comparatively long distance at some point in their careers reach a higher socio-economic status than other workers. This indicates that over the life course workplace mobility serves as an instrument to accumulate human capital more rapidly.

The results of the analyses of socio-economic status were expected to be biased because of selectivity in the research population: only working respondents were included. Working women with children in particular were expected to be a selective category. Including a correction factor showed some evidence that, at age 30, the lower socio-economic status of women with children could be

explained because these women had a low likelihood of being employed. Although theoretical considerations led us to expect more serious selection effects at higher ages, the results showed no direct evidence of selection bias. A possible cause might be that the data did not allow for a better correction of selection effects. In addition, the fact that the data was not completely representative of the Netherlands population regarding the lifetime labour participation of especially women might have masked the presence of selection effects. More important, however, is the fact that the inclusion of a correction factor did not influence the effects of job access at labour market entry and workplace mobility on socio-economic status.

Our findings have important implications for our understanding of the relationship between the spatial context and individual labour careers. Our earlier research has shown that access to suitable employment has a positive influence on job-to-job mobility. We have further shown that good job access decreases the necessity of accepting a job over a longer distance (Van Ham, 2001b). These findings led us to expect that job access helped to accumulate human capital more rapidly and that workplace mobility served as an instrument in career advancement. In Van Ham (2001) we have shown that for job-to-job mobility, workplace mobility is indeed instrumental in career advancement. We have not found evidence that job access contributes to obtaining a better job in the short term. By placing the relationship between the spatial context and occupational achievement in a life course perspective it has been shown in this paper that, measured over the life course, access to employment positively influences career outcomes. We can therefore conclude that access to suitable employment not only helps avoid high spatial mobility costs, but also helps in career advancement.

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Notes

1. The LISA datasets were obtained from the National Institute of Public Health and the Environment (RIVM, Bilthoven, The Netherlands) for the *Ruimtescanner* project.
2. The survey was commissioned by the *Stichting Sociaal-culturele Wetenschappen* (SSCW), *Nederlandse Organisatie voor Wetenschappelijk onderzoek* (NWO). The data set is available under the title 'Aspects of life-event history of the Dutch population: part 1: changes in socio-demographic data, social mobility, relationships history, educational career, and work mobility' at the Niwi Steinmetz archives (under number P1107).

Appendix

Table 2 shows the results of the selection analysis. The probability of being employed increases with the level of education. Women who have ever had a child, or have ever had a partner have the lowest probability of being employed. For men, the presence of partner and child seems to have a positive effect on employment chances. Younger cohorts have a higher probability of being employed than older cohorts. The theoretical background for this analysis can be found in Van Ham *et al.* (2001c).

Table 2. Parameters of logistic regression models explaining whether or not respondents are working at different ages.

	Age 30			Age 40			Age 50		
	B	s.e	Exp(B)	B	s.e	Exp(B)	B	s.e	Exp(B)
Education (primary = 0)									
Lower secondary	0.349**	0.162	1.418	0.363**	0.181	1.438	0.500**	0.237	1.649
Upper secondary	0.312	0.194	1.367	0.855***	0.259	2.350	0.568*	0.330	1.765
Higher vocational	0.469**	0.212	1.600	1.471***	0.296	4.352	1.143***	0.393	3.135
University	-0.690***	0.249	0.502	1.157***	0.400	3.180	1.014*	0.561	2.756
Female (male = 0)	0.741**	0.337	2.098	0.350	0.785	1.419	-0.029	1.014	0.972
Ever had child (no child = 0)	0.435**	0.207	1.545	0.576	0.361	1.779	-0.187	0.581	0.830
Ever had partner (no = 0)	0.563**	0.245	1.757	-0.078	0.645	0.925	0.998	0.975	2.712
Interaction female*child	-2.333***	0.284	0.097	-1.193**	0.468	0.303	-0.218	0.723	0.804
Interaction female*partner	-1.463***	0.403	0.232	-1.856**	0.872	0.156	-2.231*	1.166	0.107
Cohort (before 1925 = 0)									
1925-1934	-0.039	0.267	0.962	0.457	0.282	1.579	0.175	0.274	1.192
1935-1944	0.193	0.258	1.213	0.782***	0.272	2.186	0.351	0.279	1.421
1945-1954	0.455*	0.244	1.577	0.844***	0.264	2.325			
1955-1963	0.635**	0.248	1.887						
Constant	0.347	0.292		0.604	0.590		0.331	0.881	
Initial-2 log likelihood	2 454			1 490			833		
Model-2 log likelihood	1 815			1 084			630		
Improvement	639, df=13, p=0.00			406, df=12, p=0.00			203, df=11, p=0.00		
N respondents	1840			1188			634		

*=p<0.10; **=p<0.05; ***=p<0.01

Table 3. Parameters of OLS regression models explaining the socio-economic status of working respondents at different ages incl. Lambda.

	Age 30		Age 40		Age 50	
	B	s.e.	Beta	B	Beta	B
Education (primary = 0)						
Lower secondary	0.665	1.397	0.022	2.517*	0.081	1.907
Upper secondary	4.662***	1.665	0.128	7.687***	0.186	3.092
Higher vocational	14.992***	1.670	0.370	17.908***	0.444	16.967***
University	28.677***	2.284	0.453	25.598***	0.449	24.542***
Years non-employed since end education	-0.382*	0.200	-0.053	-0.405***	-0.118	-0.333**
Female (male = 0)	6.534***	1.347	0.196	5.050**	0.150	8.181
Ever had child (no child = 0)	1.816	1.284	0.059	3.664**	0.091	7.240***
Interaction female*child	1.628	6.091	0.038	-8.645**	-0.234	-11.093**
Cohort (before 1925 = 0)						
1925-1934	-0.654	1.923	-0.014	0.723	0.019	0.717
1935-1944	-3.544*	1.839	-0.089	-2.803	-0.083	-3.670*
1945-1954	-3.096*	1.808	-0.096	-0.925	-0.030	
1955-1963	-3.582*	1.919	-0.111			
Job access at labour market entry (*100,000)	1.153**	0.468	0.076	1.261**	0.079	3.071***
Ever workplace mobility	1.733*	0.889	0.052	3.552***	0.112	3.317**
Lambda	-7.958	6.137	-0.182	6.626	0.146	4.291
Constant	43.973***	3.790		37.550***		34.222***
Adjusted R ²	0.273			0.294		0.292
N respondents	1127			805		400

*= $p < 0.10$; **= $p < 0.05$; ***= $p < 0.01$

Table 4. Parameters of OLS regression models explaining the socio-economic status of working respondents at different ages including Lambda, excluding the interaction effect.

	Age 30		Age 40		Age 50	
	B	s.e.	B	s.e.	B	s.e.
Education (primary = 0)						
Lower secondary	0.824	1.263	1.814	1.451	0.422	2.227
Upper secondary	4.812***	1.567	6.204***	2.020	0.150	3.082
Higher vocational	15.130***	1.478	15.661***	1.983	0.389	3.147
University	28.378***	1.988	23.731***	2.278	0.417	3.801
Years non-employed since end education	-0.381*	0.200	-0.445***	0.133	-0.129	0.154
Female (male = 0)	6.524***	1.345	3.271	2.346	0.097	5.250
Ever had child (no child = 0)	2.067**	0.874	1.456	1.300	0.036	2.348
Interaction female*child		not included		not included		not included
Cohort (before 1925 = 0)						
1925-1934	-0.682	1.920	0.024	1.867	0.001	1.950
1935-1944	-3.485*	1.825	-4.117**	1.816	-0.122	2.015
1945-1954	-2.940*	1.711	-2.324	1.754	-0.075	
1955-1963	-3.359*	1.727	-0.104			
Job access at labour market entry (*100,000)	1.155**	0.467	1.187**	0.586	0.075	0.895
Ever workplace mobility	1.726*	0.888	3.594***	1.005	0.113	1.467
Lambda	-6.391***	1.811	-3.113	1.954	-0.068	4.249
Constant	43.122***	2.051	43.207***	2.554	41.911***	3.795
Adjusted R ²	0.273		0.290		0.288	
N respondents	1127		805		400	

*= $p < 0.10$; **= $p < 0.05$; ***= $p < 0.01$

References

- Arrow, K. (1973) Higher education as a filter. *Journal of Public Economics* 2, 193-216.
- Becker, G. (1962) Human capital: a theoretical and empirical analysis. *Journal of Political Economy* 70, 9-46.
- Blau, P.M. and Duncan, O.D. (1967) *The American Occupational Structure*. New York: John Wiley and Sons.
- Booth, A.L., Francesconi, M. and Garcia-Serrano, C. (1999) Job tenure and job mobility in Britain. *Industrial and Labor Relations Review* 53, 43-70.
- Burdett, K. (1978) A theory of employee job search and quit rates. *American Economic Review* 68, 212-220.
- De Jong, T. and Floor, H. (1993) Flowmap: een programma voor het weergeven en analyseren van interactiegegevens interactiegegevens [Flowmap: a software package for displaying and analysing interaction data]. *Planning, Methodiek en Toepassing* 44, 16-31.
- Dieleman, F.M. and Faludi, A. (1998) Polynucleated metropolitan regions in Northwest Europe: theme of the special issue. *European Planning Studies* 6, 365-377.
- Dykstra, P.A. and Fokkema, T. (2000) Partner en kinderen: belemmerend of bevorderend voor beroepssucces? [Partner and children: a burden, or an asset for occupational attainment?]. *Mens en Maatschappij* 75, 110-128.
- Fielding, A.J. (1992) Migration and social mobility: South East England as an escalator region. *Regional Studies* 26, 1-15.
- Ganzeboom, H.B.G., De Graaf, P.M. and Treiman, D.J. (1992) A Standard International Socio-Economic Index of Occupational Status. *Social Science Research* 21, 1-56.
- Greenwood, M.J. (1975) Research on internal migration in the United States: a survey. *Journal of Economic Literature* 13, 397-433.
- Hanson, S., Kominiak, T. and Carlin, S. (1997) Assessing the impact of location on women's labor market outcomes: a methodological explanation. *Geographical Analysis* 29, 281-297.
- Heckman, J. (1979) Sample selection bias as a specification error. *Econometrica* 47, 153-161.
- Johnson, W.R. (1978) A theory of job shopping. *Quarterly Journal of Economics* 92, 261-277.
- Jovanovic, B. (1979) Job matching and the theory of turnover. *Journal of Political Economy* 87, 972-990.
- Lelievre, E. and Bonvalet, C. (1994) A compared cohort history of residential mobility, social change and home-ownership in Paris and the rest of France. *Urban Studies* 31, 1647-1466.
- Lichter, D.T. (1983) Socio-economic returns to migration among married women. *Social Forces* 62, 487-503.

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- Markham, W.T. and Pleck, J.H. (1986) Sex and willingness to move for occupational advancement: some national sample results. *Social Science Quarterly* 27, 121-143.
- Mincer, J. (1978) Family migration decisions. *Journal of Political Economy* 86, 749-773.
- Ong, P. and Blumenberg, E. (1998) Job access, commute, and travel burden among welfare recipients. *Urban Studies* 31, 77-93.
- Parsons, D.O. (1973) Quit rates over time: a search and information approach. *American Economic Review* 63, 390-401.
- Simpson, W. (1992) *Urban Structure and the Labour Market: Worker Mobility, Commuting and Underemployment in Cities*. Oxford: Clarendon Press.
- Sjaastad, L.A. (1962) The costs and returns of human migration. *Journal of Political Economy* 70, 80-93.
- Smits, J. (1999) Family migration and the labour-force participation of married women in the Netherlands, 1977-1996. *International Journal of Population Geography* 5, 133-150.
- Topel, R.H. and Ward, M.P. (1992) Job mobility and the careers of young men. *Quarterly Journal of Economics* 107, 439-479.
- Van Ham, M., Hooimeijer, P. and Mulder, C.H. (2001a) Urban form and job access: disparate realities in the Randstad. *Tijdschrift voor Economische en Sociale Geografie* 92, 231-246.
- Van Ham, M., Mulder, C.H. and Hooimeijer, P. (2001b) Spatial flexibility in job mobility: macrolevel opportunities and microlevel restrictions. *Environment and Planning A* 33, 921-940.
- Van Ham, M., Mulder, C.H. and Hooimeijer, P. (2001c) Local underemployment and the discouraged worker effect. *Urban Studies* 38, 1733-1751.
- Van Ham, M. (2001) Workplace mobility and occupational achievement. *International Journal of Population Geography* 7, 1-12.
- Wagner, M. (1989) Spatial determinants of social mobility: an analysis with life history data for three West German cohorts. In: Van Dijk, J., Folmer, H., Herzog, H. W. and Schlottmann, A. M. (Eds.) *Migration and Labour Market Adjustment*, pp. 241-264. Dordrecht: Kluwer.

Chapter 8

Discussion

8.1 Introduction

The spatial mismatch between where workers live and where jobs are located is one of the causes of underemployment. Even in the case of a perfect balance between supply and demand of labour at the national level, underemployment will still persist, because of regional discrepancies in the match of supply and demand. These regional differences in underemployment may be resolved by the spatial mobility of the labour force. However, the labour force is relatively immobile. Individual restrictions on meeting the costs of spatial mobility — both commuting and migration — might severely hamper the clearing of the labour market at the national level. In chapter 1, it was asserted that it was important to know how geographical barriers influenced individual (spatial) labour market behaviour if the spatial disequilibrium at the macrolevel were to be understood. What was needed was a theoretical framework within which the effect of the opportunity structure on occupational achievement could be understood, including geographical barriers to employment and spatial mobility as an instrument to overcome these barriers.

Simpson offers such a theoretical framework in his book *Urban Structure and the Labour Market* (Simpson, 1992). He proposes a spatial extension of the human capital framework which places the choice of work location in the perspective of an individual's labour career. He postulates that job search is crucial in the understanding of the link between urban structure and individual labour market outcomes. The spatial extent of job search determines access to employment opportunities and therefore the opportunities for occupational achievement. When job access on the local labour market is poor, workers have to extend their

search area; workplace mobility can serve as an instrument for occupational achievement. The aim of this book was to test part of the theoretical framework developed by Simpson in order to gain more insight into the relationship between the spatial context and individual (spatial) labour market behaviour. To accomplish this aim the following three research questions were addressed:

1. *To what extent do spatial differences in job access explain underemployment?*
2. *Under what (spatial) circumstances do workers use workplace mobility as an instrument in career advancement?*
3. *To what extent do workplace mobility and job access actually help workers advance their careers?*

Each of the preceding 6 chapters consists of an independent paper which answers part of the above three research questions. In this last chapter, the results are integrated. First, the empirical results are summarized. Next follows a reflection on data and measurement issues, with special attention paid to the measurement of job access at the macrolevel and how measures of job access can be linked to individual respondents in the microdata used. Following a discussion of the main findings of the book, attention is paid to two valuable spin-offs from the research: improved insight into gender differences in labour market outcomes; selection mechanisms on the labour market. The discussion concludes with some final general remarks.

8.2 Summary of the results

Chapters 2 to 4 are devoted to the first research question: To what extent do spatial differences in job access explain underemployment? The paper in chapter 2, entitled *Urban form and job access: disparate realities in the Randstad*, addressed the question of how to measure job access and described both the theoretical background and the instrument to measure job access. Following Simpson (1992), the basic idea was that job search starts from the residence and that the number of suitable jobs within reach depends on both the geographical distribution of job opportunities and on the individual spatial flexibility of workers in reaching these opportunities. Therefore, the conclusion drawn was that access to jobs on various occupational levels should be measured from residential locations while taking into account workers' commuting tolerance. Although data for existing administrative regions is readily available, this data was not suitable for representing job access from residential locations. Existing regions are either too large (so that not all jobs in the region are within commuting distance) or too small (so that jobs in neighbouring regions are also within reach). The solution was to start from a low spatial level (four-digit postal codes) and determine which jobs in neighbouring regions (postal code areas) could be reached within varying levels of commuting

tolerance. To handle this geographical detail, Flowmap was used; it is a network-oriented GIS extension developed at the Faculty of Geographical Sciences, Utrecht University (De Jong and Floor, 1993). The calculations resulted in several measures of job access within 15, 30, and 45 minutes by car over the road network from the postal code areas.

As expected, the results showed that urban form has a tremendous impact on job access. In traditional mononuclear urban systems, as can be found in the Northeast of the Netherlands, job access is highest in the central city, regardless of the commuting tolerance of the population. However, for the polynuclear urban system of the Randstad in the West of the Netherlands, a different picture emerged. For a commuting tolerance of 15 minutes, which is realistic for a large part of the population, the cities still show the highest job access. But with workers' increasing commuting tolerance, locations in between the cities and not the cities themselves show the highest job access. More than one concentration of employment can be reached from these locations. Only for the small proportion of the working population which is willing to commute for 45 minutes or more for a single work trip can the Randstad be seen as a single daily urban system. For those with a high commuting tolerance, residential locations in the centre of the Randstad are particularly interesting, because they offer the opportunity of changing jobs without having to change residence. For workers with a lower commuting tolerance, the residential locations in or near the cities offer the maximum job access.

The research reported in Chapter 2 resulted in several measures of job access. The measure of job access within 30 minutes was used as an independent variable to explain (spatial) labour market behaviour in the other chapters. Job access was measured on five different job levels, corresponding with the five educational levels in which respondents in the datasets used were classified. Every respondent in these datasets was allotted a value of job access depending on the location of residence and educational level.

The paper in chapter 3, entitled *The regional component of the match between educational and job levels*, described a method of measuring underemployment and the investigation of the extent to which region of residence and job access explain underemployment. The existing ways of measuring underemployment were improved in two ways: by empirically examining what job level can be attained with a given educational level; by paying attention not only to the job level attained by those in work, but also to whether people were employed or not. The regional differences in the incidence of underemployment were mapped for the Netherlands using the Netherlands Labour Force Surveys of 1995 and 1996 of Statistics Netherlands. The map revealed a strong centre-periphery image with the lowest incidence of underemployment in the west of the Netherlands and the highest in the Northeast and the Southeast. Next, by using a cumulative logit model, the extent to which region of residence influences

whether a person has a job of at least a certain level was investigated. The results showed that, after controlling for individual characteristics, the strong centre-periphery picture still persisted. This indicates that region of residence indeed plays a part in explaining underemployment. Next, the hypothesis that spatial differences in job access account for these regional differences in underemployment was tested. The results showed that, as expected, the greater the number of suitable jobs that are accessible, the easier it is to obtain a minimal certain job level: good access to employment has a negative influence on underemployment. However, the inclusion of the job access variable in the model did not lead to the disappearance of the regional effect.

The paper in chapter 4, entitled *Local underemployment and the discouraged worker effect*, reported the investigation of the mechanisms underlying underemployment in more detail by looking at job search. Job search is a prerequisite for the labour market participation of the unemployed and for the career advancement of those already in a job (Simpson, 1992). The idea was that having poor chances on the labour market discouraged people in their job search and this led to underemployment. Two sources of discouragement were identified: a lack of individual qualifications, or ascribed characteristics that make a worker less competitive in the labour market; poor local labour market conditions. It was hypothesised that discouragement could enter the job search process at two stages. The first is the decision to participate in the labour force: the stage in which people decide whether or not they are willing to work. The second stage is the decision to become actively engaged in a job search when already active in the labour market. The hypothesis was tested using data from the Netherlands Labour Force Surveys 1994-97 from Statistics Netherlands. The data contained direct measures of job search and participation, making it possible to split the category of people not in employment into those who do not participate (and are unwilling to work) and the unemployed (although willing to work). Poor local labour market conditions were made operational by the local level of underemployment.

Logistic regression analysis indicated a *discouraged worker* effect in the stage of deciding whether to participate in the labour force. Personal characteristics that indicate poor chances on the labour market were negatively related to the decision to participate. This effect was much stronger for women than for men. As expected, a high local level of underemployment negatively influenced the participation decision, but only for women. This finding indicates that, at least for women, poor local labour market characteristics lead to discouragement and, therefore, to underemployment in the form of non-participation. The results further indicate that there is a category of people with poor chances on the labour market who have used the decision not to participate as a means of avoiding unemployment: they have also been discouraged. The results of discouragement among those in the active labour force were slightly less convincing. For the unemployed, local labour market conditions had no effect on job search.

However, personal characteristics indicating poor chances resulted in less search activity by both men and women, indicating discouragement. Among the employed, the effect on search of poor local labour market conditions was negative for men. For employed women, there was only an effect of personal characteristics on search. The overall conclusion is that individual qualifications and ascribed characteristics turn out to be more decisive than the local level of underemployment.

The results reported in chapters 2 to 4 have contributed to our understanding of the relationship between spatial differences in job access and underemployment. As expected, spatial differences in job access explain part of the spatial variation in underemployment. However, the results show that job access does not explain all the regional variation. This absence raises the question, what further regional characteristics can lead to regional differences in underemployment? Another question raised is, to what extent does the job access variable used represent local labour market conditions? To obtain a better picture of the mechanisms underlying underemployment, the extent to which the spatial context influences the participation and job search decision was investigated. The results show that the spatial context plays a part in the participation decision, but that personal characteristics play a much larger part. Furthermore, the spatial context hardly influences the search decision. So, although spatial differences in job access indeed seem to play a part in explaining underemployment, how the mechanisms work is not entirely clear. To gain a better insight into these mechanisms, it is necessary to investigate the spatial nature of job search in more detail. Such an investigation would require data on the commuting tolerance of workers and information on where people search. Unfortunately, no such information is available.

Chapter 5 dealt with the second research question: Under what (spatial) circumstances do workers use workplace mobility as an instrument in career advancement? This chapter consists of a paper entitled *Spatial flexibility in job mobility: macrolevel opportunities and microlevel restrictions*. Workplace mobility was identified as a special case of general job mobility, which involves accepting a job over a greater distance and resulting in either long-distance commuting, or migration. General job mobility allows individuals to take advantage of alternative job opportunities, thus serving as a mechanism for occupational achievement. However, when insufficient suitable local job opportunities are available, workers have to extend their search area and be spatially flexible if they are to get a better job. Being spatially flexible leads to career advancement, but also to higher costs in the form of commuting or migration. Individual restrictions in meeting these costs might lead to spatial inflexibility. Using data from the Netherlands Labour Force Surveys 1994-97, the hypothesis was tested that poor job access obliges workers to extend their search area and leads to workplace mobility. The data made possible the use of a direct measure of workplace mobility: the distance at which people are prepared to accept a job. The results show that good job access indeed stimulates general job mobility and reduces

workplace mobility. These findings support Simpson's (1992) idea that good job access decreases the necessity of accepting a job over a longer distance.

Chapters 6 and 7 dealt with the third research question: To what extent do workplace mobility and job access actually help workers advance their careers? The paper in chapter 6, entitled *Workplace mobility and occupational achievement* reported the cross-sectional study of the problem, considering job-to-job mobility. According to the theoretical framework, career advancement is only possible when the spatial opportunity structure offers sufficient opportunities for a better job to be found. The hypothesis that workers with good job access are able to get better jobs than workers with poor job access was derived from this statement. In chapter 5, it was shown that poor job access indeed stimulated workplace mobility. However, the question remained whether workplace mobility actually led to more career advancement, as predicted by Simpson's (1992) spatial extension of the human capital theory. Therefore, the second hypothesis tested was that workers who invest in workplace mobility get better jobs than those who accept a job near home. Longitudinal data from the retrospective SSCW survey made it possible to measure career advancement directly by comparing the level of the accepted job with the level of the former job. The data also facilitated the measurement of the distance over which the job was accepted. The results of the multivariate analysis show that in the case of job-to-job mobility, workplace mobility is indeed instrumental in career advancement. Workers accepting jobs over a longer distance obtain better jobs than workers accepting jobs closer to their residence. However, no evidence was found that job access contributes to obtaining a better job in the short term.

The relevant literature suggests that such a relationship ought to exist, so the idea developed that good job access might not pay off immediately, but only after a number of job changes, and after a certain period of time. The paper in chapter 7, entitled *Job access at labour market entry and occupational achievement in the life course*, describes a longitudinal approach to the relationship between job access and occupational achievement. Most job mobility takes place at the beginning of a labour career, so it was hypothesised that job access at labour market entry in particular should have a positive influence on occupational achievement. Again, longitudinal data from the retrospective SSCW survey was used. Multivariate models of workers' socio-economic status at the ages of 30, 40, and 50 show that job access at labour market entry is indeed instrumental in career advancement over the life course. The importance of job access at labour market entry increases significantly with age. The results further show that workers with a history of workplace mobility make more career advancement than workers who have never accepted a job over a greater distance. This finding is in line with the findings for job-to-job mobility from chapter 6.

Conclusion

Bearing in mind the results from chapters 2 through 7, it can be concluded that important empirical evidence has been offered which supports the spatial extension of the human capital theory as put forward by Simpson (1992). By defining spatial mobility as an instrument for occupational achievement, and defining this behaviour as the outcome of a spatially systematic job search, Simpson provided a powerful model for the study of the relationship between job access and occupational achievement. Including job access as an independent variable to explain (spatial) labour market behaviour led to great advancement in linking macrolevel opportunities with microlevel labour market behaviour. Both job access and workplace mobility were shown to be instrumental in occupational achievement. Further, it was shown that access to suitable employment helps not only career advancement, but also the avoidance of high spatial mobility costs.

The outcomes of this research are an important contribution to the spatial mismatch literature. In chapter 1 it was stated that the spatial mismatch hypothesis did not in itself provide a theoretical foundation capable of explaining the link between the spatial distribution of job opportunities and underemployment. The spatial mismatch hypothesis focuses too much on commuting costs and pays hardly any attention to migration. By concentrating on workplace choice, this research avoided an *a priori* assumption of either workplace dominance or residence dominance. The mechanisms were described by which the spatial distribution of job opportunities influences the opportunity set of workers and how this opportunity set influences (spatial) labour market behaviour, especially workplace mobility. It was shown that poor job access and the spatial inflexibility of workers led to non-participation (discouragement) and a low level of general job mobility and thereby hindered occupational achievement.

8.3 Reflection on data and measurement issues

Data was needed on two levels to answer the research questions: first, data on the macrolevel to measure the job access of residential locations; second, data on the (spatial) labour market behaviour of individual workers. Perhaps of even greater importance than the availability of this data was the ability to link the macrolevel data to individual respondents. Data on the spatial distribution of job opportunities was available at the level of work-site address in the 1997 National Information System of Employment (LISA). In theory, it would have been possible to measure the job access of residential locations on the level of individual addresses. However, it was decided to measure job access from four-digit postal code areas, because this was the lowest spatial level on which measures of job access could be linked to the residential locations of individual respondents in the micro datasets used. In chapter 2, the network-oriented GIS extension Flowmap was used to

measure job access: the absolute number of jobs, by job level, which could be reached from various postal codes within 30 minutes by car over the road network. The use of a network-oriented GIS extension facilitated not only the treatment of the spatial detail of postal code areas, but also the measurement of job access over the transportation network within a certain travel time rather than distance.

The measurement of job access

The key question is, to what extent does the job access variable actually reflect the local opportunity set of workers? This question was also raised by some of the anonymous referees of the papers in chapters 2 through 7. Besides the spatial detail of the measure of job access, several other decisions had to be made, some of which are worthy of further brief discussion. One anonymous referee made the point that the measure of job access used did not include the loss of travel time resulting from congestion. Unfortunately, with the time and data available, inclusion of congestion in the calculations was not possible. In urban areas, and in the Randstad as a whole, this omission could lead to a serious overestimation of job access. However, the extent to which this has influenced the outcomes of the analyses is debatable. The overestimation would be roughly the same for the whole of the Randstad, so it might not have had much impact within this area. And in comparison with the rest of the country, job access within the Randstad is still much higher even when congestion is accounted for.

Another improvement suggested was to calculate job access for more modes of transport. At this time, job access has only been calculated for car users; since more than 55% of workers in the Netherlands commute by car, this choice was justified. It entails an overestimation of the job access of workers who travel by bicycle, on foot, or by public transport. Although data on travel times by public transport is now available (in travel planners, for example) it was not accessible for this research. However, had the data been available, there would still have been a problem of how to take delays into account, as was the case with car use and congestion.

Furthermore, it was suggested that measuring job access as the total number of jobs within reach did not reflect the opportunity structure very well, because the competition on the labour market was not taken into account. A worker living in a big city in the Randstad has better access to jobs than a worker outside the Randstad, in a smaller city. However, there the competition would be much less. It was decided to use absolute measures of job access, because the size of the opportunity set was thought to be a better reflection of the probability of a suitable job becoming available. Particularly when considering occupational achievement over the life course, it is important to bear in mind that the probability of a job becoming available is much greater in a large labour market than in a small one, regardless of the level of competition. A possible solution might

be a measure of job access which incorporated both the size of the labour market and competition. Such measures are currently under development at the National Institute of Public Health and the Environment (RIVM) in cooperation with the Urban Research centre Utrecht at the Faculty of Geographical Sciences, Utrecht University (Geurs and Ritsema van Eck, 2001).

In addition to the possible technical improvements of the measurement of job access described above, several improvements are also possible concerning the content of the measurement: what is measured. For example, data on vacancies might measure the local opportunity set in a better way than the number of jobs by job level. For a job searcher, jobs are only interesting when they are suitable and vacant. Since they provide information on the skill requirements for a job, data on vacancies might offer better opportunities of measuring the suitability of jobs for individual workers. Unfortunately, data on vacancies are difficult to obtain and of questionable reliability.

To account for the heterogeneity of both workers and jobs, it was decided to measure job access on five job levels. The variable *job level* was developed by Statistics Netherlands and defined by the amount of theoretical or practical schooling needed to perform the task adequately and the work experience (or training time) needed. Whether or not a job within reach was suitable for a worker was determined solely on the basis of the level of the job and the level of formal education of the respondents. This method of measuring job access is too rough and ready and is capable of improvement in several ways. One is to measure job access not only by the level of the job, but also by industry. For some jobs the industry does not matter much, as for example in secretarial or administrative work (although specialized knowledge about the industry may be required in some cases). For other jobs, however, it is a different story. A car mechanic might have the same job level as a confectioner, but that does not mean that someone who has trained to be a car mechanic can then apply for a job in the confectionery trade. Another way of improving the job access variable is to include information on the type of skills, years of work experience, and on-the-job training needed.

The enormous advances in the developments of GIS systems and GIS extensions such as Flowmap make it possible to improve measures of job access in several ways. The only limitation seems to be the data which is needed. These developments offer very promising possibilities for future research, not only for measuring access to employment, but also for measuring the quality of residential locations in terms of access to shopping facilities, schools and leisure centres, for example. Such accessibility measures can be used to gain more insight into the residential behaviour of households. However, measuring accessibility in a much more detailed way only makes sense when it is possible to link these measures to respondents at the same level of detail. For access to employment, this link should be based on the location of the residence, the commuting tolerance, and the

respondent's type and level of skills. Data on the exact location of respondents' residences is not always available in microdata, because of the limitations imposed by the protection of privacy legislation, and making the link might be problematic.

Another problem is the estimation of workers' commuting tolerance. For the measure of job access used, it was decided to calculate job access within 30 minutes' commuting. The reasoning behind this 30-minute threshold was that, for 80% of the working population in the Netherlands, travelling to work takes less than 30 minutes per single journey. The threshold of 30 minutes was therefore thought to be a reasonable measure of local labour market access. However, according to the literature, commuting tolerance differs significantly between socio-economic groups (Kwan, 1999). It would therefore be necessary to use different measures of job access based on the commuting tolerance of workers instead of one measure for all workers. Unfortunately, information on the commuting tolerance of respondents is not readily available in most secondary datasets. Often, the only information available is actual commuting time, which is not a very good proxy for commuting tolerance and is only available for those with a job. Actual commuting times reflect the opportunity structure within people's search area rather than what they would be willing to do, so that actual commuting times necessarily underestimate workers' commuting tolerance. The problem with using commuting times is that most people are unconcerned about commuting up to a certain threshold. The attachment of such scant importance suggests that commuting times below this threshold are more or less at random. Above the threshold, resistance to commuting increases sharply (Van Ommeren, 1996). This phenomenon might explain why models of commuting time perform so poorly: below the threshold, there is little to explain. It cannot be assumed that a worker who can get a suitable job at 5 minutes' walking distance from home would have been unwilling to travel 20 minutes by car for the same job. In a life course perspective, having a job near at hand does not mean that a worker would be unwilling to commute longer for a better job in the future.

To gain more insight into commuting tolerance, more information is needed on how people value travel time. Such information could be gathered with a questionnaire designed to reveal stated preferences. For example, respondents could be asked to choose between different alternative combinations of commuting time, type of job, and pay. Such knowledge on commuting tolerance could be used to estimate the commuting tolerance of respondents in existing datasets based on known individual and household characteristics. This estimation could be used to link more tailored measures of job access to respondents. Furthermore, more information is also needed on the transport mode available; given a certain commuting tolerance, the size of the search area depends on travel speed.

Another type of information needed to link respondents to more tailored measures of job access is the type and level of skills. Not only should the formal

educational level be known, but also the on-the-job training, work experience, and preferences. This data is also hard to obtain, because the present job will not necessarily reflect the preferred job. For example, a recently graduated historian might start off working in a clerical capacity and search on-the-job for a more suitable position. More information is therefore needed on the types of jobs people are looking for.

Microdata

Data on the (spatial) labour market behaviour of individual workers came from two secondary datasets: the Netherlands Labour Force Surveys 1994-97 conducted by Statistics Netherlands; the SSCW survey conducted in 1993. Although not specifically designed for the purposes of this research, the datasets proved to be invaluable. Special features of the Netherlands Labour Surveys are the very large sample size and the spatial detail. The Labour Force Surveys are designed to be representative of the Netherlands population aged 15 and above and not living in an institution. Every year, more than 100,000 respondents are asked to provide detailed information on individual and household characteristics. The dataset contains the postcode of the residence and the municipality of the work address. Furthermore, the dataset includes retrospective information on where the respondent worked and lived one year before the interview. Neither the spatial nor the retrospective information have previously been used very much; because of the protection of privacy legislation, special permission had to be obtained from Statistics Netherlands to work with the data in a secure environment on-site at a Statistics Netherlands branch. Unfortunately, the retrospective part of the Labour Force Survey does not contain any information on the level of the former job. In order to perform the life course analyses, alternative data had to be used: the SSCW survey. This dataset contains less spatial detail and has fewer respondents than the Labour Force Surveys, but it does have the great advantage that the whole labour career of respondents can be reconstructed up to the moment of the interview. The sample of this retrospective study was designed to be representative of the Netherlands population aged 18 and over for the beginning of the 1990s. Some 3000 members from about 1600 households answered questions on a wide variety of topics, including residential, educational, household, and labour market histories.

The decision was taken to use the above two secondary data sources, because the collection of the same spatial detail for a similar number of cases through primary data would have been impossible, given the time and money available. However, the fact that secondary data was used should not be seen as a second choice. The opportunities offered by secondary data are generally underestimated, partly because not all the data is made public. In the case of the Labour Force Surveys, only very limited datasets are available for research at Universities. However, at the on-site facilities of Statistics Netherlands the complete datasets

are accessible, which offers great opportunities for research on a large variety of topics. Further, recent developments might make the use of secondary data even more attractive in the future. Statistics Netherlands is investigating the possibility of enriching microdata from surveys with information from existing registrations, such as information from tax registrations, for example. The first steps in this direction have already been taken. In future, using information from registrations might even make it possible to construct what has been referred to as a virtual census. There has been no census in the Netherlands since 1971, because of the lack of support from the population. However, by matching existing registrations a virtual census could be constructed without even having to interview people. It would also be possible to construct panel data.

8.4 Two spin-offs from the research

The empirical analyses in this book have yielded more than an improved understanding of the relationship between the spatial context and individual (spatial) labour market behaviour. Two important spin-offs deserve particular attention: an improved understanding of gender differences in labour market outcomes; an improved understanding of the selection mechanisms on the labour market which lead to underemployment.

Gender differences

Throughout the book, the outcomes of the analyses of (spatial) labour market behaviour have appeared to differ for men and women. The influence of individual restrictions in particular appears to be gendered. Since gaining more insight into these gender differences was not a specific aim of the study, the results were reported in the separate chapters, but they were paid no special attention. Nevertheless, the results reported might be of interest to a much wider audience, for example, to those concerned with gender studies and labour market sociology. However, to be of interest to such a wider audience, a more social and gender-oriented approach in the literature review would have been necessary. In the book as it now stands, the human capital theory dominates the theoretical framework. The main assumptions underlying this theory are that all people are rational beings and all strive to maximize utility on their human capital. Throughout the book the assumption of rational behaviour has been qualified by taking (spatial) restrictions into account. An anonymous referee, who admitted to having little sympathy for human capital and rational choice theory, proposed an alternative theoretical framework which gives a more central role to the restrictions. Such an approach might have led to a fairly similar set of hypotheses, but also to a completely different book. Here, as an afterthought, the basic ideas for

such an alternative 'gender, work, and space' book are discussed and the gender related outcomes from chapter 2 to 7 are summarized and integrated.

The framework suggested by the anonymous referee resembles closely the work of Hanson and Pratt (1995; Pratt and Hanson, 1991). According to them, the human capital theory highlights the wrong set of variables if women's position in the paid labour force is to be capable of explanation. They argue that gender differences in labour market outcomes result "not from a rational choice calculus of training investments/payoffs over the lifetime, but from the immediate space-time constraints that women face at certain points in the life-cycle, paired with the existing structure of labour market segmentation" (Pratt and Hanson, 1991: 156). Many households are still traditional in the sense that women undertake most of the household and childcare responsibilities. This uneven division of responsibilities has an enormous effect on women's labour force participation, because the time women have available for job search, commuting and work is restricted. These restrictions particularly restrain women with children and lead to limited job access. In an alternative, more gender oriented book, there would have been more emphasis on the fact that there is no single threshold limit in commuting tolerance. According to the alternative view, individuals negotiate their limits within particular household structures and biographies.

The suggested alternative theoretical framework leads to a series of additional hypotheses regarding gender, restrictions, and labour market outcomes; these have already been addressed implicitly in chapters 2 through 7. These hypotheses can be summarized in two statements. The first is that women with children have a higher probability of being underemployed than women without children or men; they run a higher risk of becoming discouraged, resulting in non-participation, unemployment and over-education. The second statement is that part of this higher risk of underemployment is caused by the fact that women are less spatially flexible than men.

Chapter 3 showed that women were more often underemployed than men. According to the analyses, after controlling for educational level and age, women have a smaller chance of attaining a job at a certain level than men. In chapter 4 the mechanisms behind these gender differences were considered in more detail by looking at the participation decision and job search. It was shown that discouragement at the stage of the participation decision was gender-related. For women there is a strong negative effect of the presence of young children and partner on labour force participation. Furthermore, the results reveal that women are put off from participation in places with a high level of local underemployment. Regarding job search, women appeared to be less often engaged in job search than men. This is especially true for women with a partner and children.

In chapter 5, general job mobility and workplace mobility were addressed. The results show that, for women, having a partner and children negatively influences job mobility. For both men and women, access to employment had a

positive influence on job mobility, but the effect was stronger for women, indicating that women were less spatially flexible and therefore more dependent on local jobs. Similarly for workplace mobility, the results showed gender differences in the impact of the presence of a partner and children. For men, this presence does not limit their spatial flexibility; for women, it does. The overall conclusion is that spatial inflexibility contributes to the underemployment of women spouses and mothers, but not of women in general.

In chapter 6 it was shown that workplace mobility is instrumental in career advancement, but that women with a partner form an exception. A tied mover effect was given as a probable explanation: some women accept a job over a longer distance for the sake of the career of the male spouse and because the household as a whole migrates. So for women, workplace mobility is only instrumental in career advancement when a job is accepted over a long distance for their own career. Furthermore it was shown that, for working women, having young children led to less career advancement when changing jobs than for women without children. In chapter 7, the influence of children was analysed in a life course perspective. The analyses show that women who have ever had a child make less career advancement over their life course than childless women.

The results from chapters 2 through 7 show a strong impact of the presence of a partner and children on labour market outcomes for women. The rationalization is that women spouses and mothers face considerable space-time constraints which bring about spatial inflexibility, resulting in a higher probability of underemployment. This idea is supported by several of the findings: women in areas with poor local labour market conditions participate less; women with children accept jobs over a longer distance less often; workplace mobility is only instrumental for women when they are single.

Unfortunately, the results in this book do not permit statements to be made on the extent to which rational choices, restrictions, or career orientation plays a part in labour market outcomes for women. In the Netherlands, many households are still very traditional in the division of household and employment responsibilities. Although female labour participation in the Netherlands has increased over the last few decades, it still lags behind other western economies. In most households, the male spouses have full-time jobs and the females combine out-of-home work activities with household and childcare responsibilities (SCP, 1999). As a result, most working women have a part-time job and dual career households with two full time workers are less common than in neighbouring countries (SZW/CBS, 1999). It is evident that part of the gender differences in labour market outcomes is caused by gender differences in career orientation. A large category of women still prefers to work part-time, or not to participate in the labour market at all and look after the children instead (Keuzenkamp, 1995). One should, however, be cautious about putting too much emphasis on career orientation as an explanation of gendered labour market out-

comes. The results from chapter 4 show that local labour market conditions influence the participation decision of women, indicating a role of spatial barriers in career orientation. To gain a better insight into the role of restrictions in labour market outcomes of women, more research is needed with a different set of explanatory variables, including if possible detailed measures of preferences regarding career orientation. Possibly, more tailored measures of job access are also needed to take into account gender differences in commuting tolerance and occupational segregation.

Selection mechanisms

It has been acknowledged throughout the book that selectivity of the research population might lead to biased results. The two-step Heckman procedure (Heckman, 1979) was used several times as a technical solution to correct for selection effects. In the first step of the procedure, the probability of being in the research population is estimated; this results in a correction factor which is inserted as an independent variable in the main analysis. Applying this method has proved to be more than just a technical solution. The second spin-off from the research is that a substantive interpretation of both the selection model and the parameter of the correction factor in the main analysis has led to an improved understanding of the selection mechanisms on the labour market which lead to underemployment.

The paper in chapter 4 was concerned with the question of the extent to which local labour market conditions influence whether or not people engage in a job search. The idea was that poor local labour market conditions would discourage people in their job search. It was recognized that simply analysing whether or not people search might lead to biased results, because not all people are at risk of search; those at risk of job search are a selective category. Conceptually, those not in employment can be divided into two sub-groups: those who are willing to work and will therefore search assiduously; those who have decided not to work and will not search at all. Those who decide not to work select themselves out of the population at risk of search. Identifying this selection mechanism led to the idea that poor local labour market conditions might discourage not only the people searching for jobs, but also those deciding whether to participate on the labour market. If this is the case, the mechanism by which people are selected into the active labour force is influenced by local labour market conditions. To account for possible selection effects, the analysis of job search was preceded by an analysis of the participation decision. The analysis of participation led to the conclusion that poor local labour market conditions did indeed negatively influence the participation decision for women, which might indicate discouragement. Furthermore, the results show that there is a category of people with poor chances on the labour market (mainly because of personal characteristics) who become discouraged and select themselves out of the active

labour force in order to avoid unemployment. The identification of the selection mechanisms indicate that the main stage of discouragement is not the search decision, but the participation decision.

In the analysis of workplace mobility in chapter 5, it was also shown that selection effects have to be taken into account if a better understanding of the problem under study is to be achieved. The central hypothesis tested was that, of all the workers who accept a(nother) job, those with poor access to employment do so more often over a longer distance. This idea was confirmed by the results. However, it was recognized that those accepting another job are a selective category and that the selection mechanism might again be influenced by access to employment opportunities or, in more general terms, by spatial restrictions that limit the search area. To correct for selection bias in the results, the analysis of workplace mobility was preceded by the analysis of general job mobility. The results show that ignoring the category that has not found a job leads to biased results in the analysis of workplace mobility. For example, it was found that the fact that the unemployed accept jobs over a longer distance less often was frequently brought about by the fact that they lacked 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.

Some critical notes regarding the possibility of correcting for selection mechanisms might be worthy of mention. The technical solutions applied to correct for selection effects have proved to be useful, but that is not to say that all possible selection mechanisms capable of influencing the results or their interpretation were accounted for. For example, in chapter 4, a statistical relationship was found between poor local labour market conditions and the participation decision of women. The negative relationship was interpreted as discouragement: women living on locations with poor labour market conditions more often decide not to work. This interpretation was based on the relevant literature indicating that women are more spatially constrained and therefore more sensitive to local labour market conditions than men, and on literature indicating that women are often tied movers, resulting in a residential location which has a negative influence on their labour careers. However, it is possible that a part of the effect is caused by a spatial selection mechanism by which women who attach little value to their labour career decide (or consent to the decision) to live on a location with poor access to employment. For these women, the negative relationship does not reflect discouragement so much as their career orientation.

A critical note is also worthwhile regarding the positive relationship between job access and occupational achievement. For example, it is possible that more motivated people move more often to the larger cities to follow higher education, enter the labour market on these locations, and attain better jobs over their labour careers. If this is the case, controlling for level of education does not com-

pletely rule out selection effects, because the positive relationship might partly be caused by the motivation of workers. A similar problem of causality was also raised by an anonymous referee of the paper in chapter 6. According to the referee, it is likely that people who are more highly motivated and ambitious do better in their careers and also more often accept jobs over a longer distance. If this is the case, it might not be possible to interpret the positive association between workplace mobility and occupational achievement as the effect of the former on the latter. However, as indicated in the theoretical part of chapter 6, conceptually workplace mobility is a cost which is instrumental in career advancement. Workplace mobility should not therefore be perceived as the cause of career advancement, but as an instrument that leads to career advancement. Obviously, more motivated workers will use this instrument more often, but that does not affect the instrumental nature of workplace mobility; to state that workplace mobility helps advance the careers of these motivated workers is justified.

8.5 Final remarks

The main findings of this book are that good access to jobs leads to occupational achievement and that workplace mobility can serve as a mechanism to overcome poor access to suitable jobs. These findings imply that the residential location is important in avoiding costly workplace mobility over the labour career. 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. Seen over the life course, such locations offer maximum opportunities for occupational achievement paired with a minimum of spatial mobility costs. The results show that, within the polynuclear structure of the Randstad, locations with the best access to employment opportunities can be found in between the major concentrations of employment and at the edges of the larger cities.

A strategic residential location is particularly important for dual-earner households. Most of them have to combine two work locations with one place of residence. The increase in female labour participation has led to a decrease in the migration tolerance of households. Increasingly, both partners are tied stayers, because a residential move for the benefit of the career of one spouse will disrupt the career of the other. Increasingly, the choice of residence depends less on one job in a fixed location than on the number of jobs (including those currently held) within reach of the residence. Most dual-earner households in the Netherlands consist of a full-time male worker and a part-time female worker. Working women partners and mothers are more spatially constrained than men and are therefore more dependent on local job opportunities. For households consisting of one worker with a high and the other worker with a low commut-

ing tolerance, residential locations along the ring roads of the major cities are most advantageous, because they combine good access to jobs within a limited commuting time with access to other concentrations of employment for those with a high commuting tolerance.

Further substantial advances remain to be achieved in enhancing insight into the relationship between the residential location and the labour career. Knowledge of the processes of spatial labour market adjustment within households is still very limited. In this respect, the relationship between life-time residential mobility and daily mobility is particularly important. While the importance of migration for the spatial labour market adjustment of households is decreasing, the value of a strategic residential location and commuting is increasing. The question at issue is how households decide on a residential location, taking into account not only present jobs, but also future jobs. To address this question, more insight is needed into the commuting tolerance of workers. Further advances can be made in gaining insight into the relationship between the macro context and the behaviour at the microlevel of individuals and households. In this book, an important step in understanding the macro-to-micro link has been made with regard to the relationship between job access and spatial labour market behaviour. It has been shown that the labour career cannot be seen apart from the residential career. A better understanding of this relationship also requires more insight into the relationship between the macro context and housing market behaviour. With respect to residential choices, not only is the locational quality important in terms of access to employment, but also the quality of housing and the attractiveness of the residential surroundings in terms of access to shopping facilities, schools, leisure centres, recreational nature areas, and so forth.

Inevitably, the labour and housing market behaviour of workers also influences the macro context. In this book, two important mechanisms at the microlevel have been identified which help us understand the link between the labour and the housing markets at the macrolevel. The first mechanism is that people who change jobs over a longer distance are most likely to do so in the direction of those locations with good access to employment. The second mechanism is that the need to move residence in order to get a better job is low for households already living on such a location: they only have to adjust their behaviour with respect to commuting. These mechanisms can contribute to our understanding of how the spatial labour market adjustment of individuals and households leads to pressure on the housing market on those locations from where more concentrations of employment opportunities can be reached. The identification of these two mechanisms is an important contribution to geography. The mechanisms imply not only that the urban structure influences the labour market outcomes of individuals, but also that the urban structure itself is influenced by the spatial behaviour of workers.

References

- De Jong, T. and Floor, H. (1993) Flowmap: een programma voor het weergeven en analyseren van interactiegegevens [Flowmap: a software package for displaying and analysing interaction data]. *Planning, Methodiek en Toepassing* 44, 31-16.
- Geurs, K.T. and Ritsema van Eck, J.R. (2001) *Accessibility Measures. Review and applications*, RIVM report 408505006. Bilthoven: RIVM.
- Hanson, S. and Pratt, G. (1995) *Gender, Work and Space*. London: Routledge.
- Heckman, J. (1979) Sample selection bias as a specification error. *Econometrica* 47, 153-161.
- Keuzenkamp, S. (1995) *Emancipatiebeleid en de levensloop van vrouwen. Een toekomstanalyse [Emancipation policy and the life course of women. A look into the future]*. PhD thesis. Amsterdam: Babylon-De Geus.
- Kwan, M. (1999) Gender and individual access to urban opportunities: a study using space-time measures. *Professional Geographer* 51, 210-227.
- Pratt, G. and Hanson, S. (1991) Time, space, and the occupational segregation of women: a critique of human capital theory. *Geoforum* 22, 149-157.
- SCP [Social and Cultural Planning Office of the Netherlands] (1999) *Naar andere tijden? Tijdsbesteding en tijdsordening in Nederland, 1975-1995 [To other times? Time use and time structuring in the Netherlands, 1975-1995]*. Den Haag: Elsevier Bedrijfsinformatie.
- Simpson, W. (1992) *Urban Structure and the Labour Market: Worker Mobility, Commuting and Underemployment in Cities*. Oxford: Clarendon Press.
- SZW/CBS [Ministry of Social Affairs and Employment/Statistics Netherlands] (1999) *Jaarboek Emancipatie 1999; Wie zorgt in de 21ste eeuw? [Yearbook Emancipation 1999; Who provides care in the 21st century?]*. Den Haag: Elsevier Bedrijfsinformatie.
- Van Ommeren, J. (1996) *Commuting and Relocation of Jobs and Residences: A Search Perspective*. PhD thesis. Amsterdam: Vrije Universiteit Amsterdam.

Summary in Dutch

Toegang tot banen, werkplaatsveranderingen en de voortgang in de arbeidscarrière

Inleiding

Ruimtelijke verschillen in waar mensen wonen en waar banen zijn gelokaliseerd vormen een van de bronnen van *underemployment*. Underemployment staat voor het niet volledig benutten van gedane investeringen in menselijk kapitaal zoals non-participatie, werkloosheid en overscholing. Zelfs als er op de nationale arbeidsmarkt sprake is van een perfect evenwicht tussen vraag en aanbod van arbeid kan underemployment blijven bestaan door verschillen in vraag en aanbod tussen en binnen regio's. Deze regionale verschillen kunnen worden opgeheven door ruimtelijke mobiliteit van de beroepsbevolking. Echter, de beroepsbevolking is relatief immobiel. Individuele restricties in het accepteren van een baan over een langere afstand (werkplaatsveranderingen) — in de vorm van pendel en migratie — kunnen het evenwicht op de nationale arbeidsmarkt ernstig verstoren. Om de ruimtelijke onevenwichtigheid in vraag en aanbod op het macroniveau te begrijpen is het belangrijk inzicht te hebben in hoe individueel (ruimtelijk) arbeidsmarktgedrag wordt beïnvloed door ruimtelijke barrières op de arbeidsmarkt. Hiervoor is een theoretisch kader nodig waarbinnen het effect van de beschikbaarheid van werkgelegenheid op de voortgang in de arbeidscarrière kan worden begrepen. Dit kader zal daarom ruimtelijke barrières op de arbeidsmarkt en werkplaatsveranderingen als een instrument om deze barrières te overkomen moeten bevatten.

Simpson biedt zo'n theoretisch kader in zijn boek *Urban Structure and the Labour Market* (Simpson, 1992). Dit kader is gebaseerd op een ruimtelijke uitwerking van de theorie van het menselijk kapitaal waarin de keuze van werklocatie wordt geplaatst in het perspectief van individuele arbeidscarrières. Simpson stelt dat het idee dat zoeken naar werk vooraf gaat aan het krijgen van een (nieuwe)

baan cruciaal is om de link tussen de ruimtelijke structuur van de arbeidsmarkt en individuele arbeidsmarkttuitkomsten te begrijpen. De omvang van iemands werkzoekgebied bepaalt de toegang tot banen en daarmee de mogelijkheden tot voortgang in de arbeidscarrière. Als toegang tot banen op de lokale arbeidsmarkt beperkt is moeten mensen hun zoekgebied uitbreiden; werkplaatsveranderingen kunnen dan dienen als een instrument voor voortgang in de arbeidscarrière. In dit boek wordt een deel van het theoretisch kader van Simpson getoetst om meer inzicht te krijgen in de relatie tussen de ruimtelijke structuur van de arbeidsmarkt en individueel (ruimtelijk) arbeidsmarktgedrag. Om dit doel te bereiken zijn drie onderzoeksvragen beantwoord:

1. *In hoeverre kunnen ruimtelijke verschillen in underemployment worden verklaard uit de ruimtelijke differentiatie in toegang tot banen?*
2. *Welke kenmerken van individuen en van hun ruimtelijke omgeving bepalen in hoeverre werknemers werkplaatsveranderingen gebruiken als instrument om verder te komen in de arbeidscarrière?*
3. *In hoeverre helpen werkplaatsveranderingen en toegang tot banen werknemers in de voortgang van hun arbeidscarrière?*

Naast de inleiding en de discussie bestaat dit boek uit 6 empirische hoofdstukken die ieder bestaan uit een afzonderlijk artikel. In hoofdstukken 2, 3 en 4 wordt de eerste onderzoeksvraag beantwoord. In hoofdstuk 5 wordt de tweede en in hoofdstukken 6 en 7 de derde onderzoeksvraag beantwoord.

Samenvatting van de resultaten

Het artikel in hoofdstuk 2 getiteld *Urban form and job access: disparate realities in the Randstad* gaat in op de vraag hoe toegang tot banen te meten. Het basisidee is dat werk zoeken begint vanuit de woonlocatie en dat het aantal banen binnen bereik afhangt van zowel de ruimtelijke spreiding van werkgelegenheid als van de individuele ruimtelijke flexibiliteit van werkzoekenden. Met behulp van de GIS extensie Flowmap (software ontwikkeld aan de Faculteit Ruimtelijke Wetenschappen, Universiteit Utrecht) en gegevens van het Landelijk Informatie Systeem Arbeidsvoorziening (LISA) zijn berekeningen uitgevoerd van het aantal banen binnen bereik voor een pendeltolerantie van 15, 30 en 45 minuten.

De resultaten laten zien dat voor een pendeltolerantie van 15 minuten, realistisch voor een groot deel van de beroepsbevolking, de meeste banen bereikt kunnen worden vanuit woonlocaties in de steden. Met toenemende pendeltolerantie zijn het niet de steden, maar de woonlocaties tussen de steden die de beste toegang bieden tot banen. Vanuit deze locaties kunnen meerdere concentraties van werkgelegenheid bereikt worden. De meting van toegang tot banen binnen 30 minuten is gebruikt als onafhankelijke variabele om (ruimtelijk) arbeidsmarktgedrag te verklaren in de andere hoofdstukken.

In het artikel in hoofdstuk 3, getiteld *The regional component of the match between educational and job levels*, wordt een methode beschreven om underemployment te

meten en wordt onderzocht in hoeverre de woonregio en toegang tot banen van invloed zijn op onderemployment. Voor de empirische toetsing is gebruik gemaakt van gegevens uit de Enquête Beroepsbevolking 1995 en 1996 van het Centraal Bureau voor de Statistiek. De resultaten van een cumulatief logitmodel laten zien dat na controle voor individuele kenmerken de woonregio van invloed is op het behaalde beroepsniveau. Vervolgens is de hypothese getoetst dat ruimtelijke verschillen in toegang tot banen deze regionale verschillen veroorzaken. Weliswaar blijkt dat hoe beter de toegang tot banen is, des te gemakkelijker het is om een baan op niveau te vinden, maar het opnemen van toegang tot banen deed het regio-effect niet verdwijnen.

In het artikel in hoofdstuk 4, getiteld *Local underemployment and the discouraged worker effect*, wordt dieper ingegaan op de mechanismen achter onderemployment door te kijken naar zoekgedrag. De gedachte is dat mensen ontmoedigd kunnen raken in hun zoekgedrag door een tekort aan individuele kwalificaties en slechte toegang tot banen en dat dit kan leiden tot onderemployment. De hypothese is dat ontmoediging het zoekproces op twee momenten kan beïnvloeden: de participatiebeslissing (al dan niet willen werken) en de zoekbeslissing (wel willen werken maar al dan niet zoeken). Logistische regressieanalyses op data van de Enquête Beroepsbevolking 1994-97 laten zien dat in de participatiebeslissing persoonlijke kenmerken de belangrijkste bron van ontmoediging zijn. Tevens blijkt een hoog percentage onderemployment op de lokale arbeidsmarkt een negatieve invloed te hebben op de participatiebeslissing van vrouwen. Het percentage onderemployment heeft geen invloed op het zoekgedrag van werklozen. Wel is er een sterke invloed van persoonlijke kenmerken op het zoekgedrag van werklozen. Onder werkenden hebben slechte lokale arbeidsmarktomstandigheden alleen een negatief effect op het zoekgedrag van mannen. De algemene conclusie is dat individuele kenmerken belangrijker zijn dan kenmerken van de lokale arbeidsmarkt.

In het artikel in hoofdstuk 5 getiteld *Spatial flexibility in job mobility: macrolevel opportunities and microlevel restrictions* wordt het accepteren van een baan over langere afstand beschouwd als een speciaal geval van arbeidsmobiliteit, aangeduid met de term werkplaatsverandering. Gebruik makend van de Enquête Beroepsbevolking 1994-97 is de hypothese getoetst dat slechte toegang tot banen werkzoekenden noodzaakt hun zoekgebied te vergroten en een baan over langere afstand te accepteren. De resultaten laten zien dat goede toegang tot banen een positieve invloed heeft op arbeidsmobiliteit en een negatieve invloed op de noodzaak een baan te accepteren over een langere afstand. De resultaten van hoofdstuk 5 ondersteunen hiermee de ideeën van Simpson (1992). Echter, de vraag of goede toegang tot banen en werkplaatsveranderingen ook leiden tot voortgang in de arbeidscarrière, zoals voorspeld door de theorie van het menselijk kapitaal met ruimtelijke uitbreiding, blijft onbeantwoord.

In het artikel in hoofdstuk 6, getiteld *Workplace mobility and occupational achievement* wordt gekeken naar voortgang in de arbeidscarrière bij baanwisselingen. De resultaten van multivariate analyses op data uit het retrospectieve SSCW-survey laten zien dat bij baanwisselingen het accepteren van een baan over langere afstand inderdaad instrumenteel is voor voortgang in de arbeidscarrière. Mensen die een baan over een langere afstand accepteren krijgen betere banen dan mensen die een baan dicht bij huis accepteren. Echter, een goede toegang tot banen blijkt niet bij te dragen aan het krijgen van een betere baan.

In het artikel in hoofdstuk 7, getiteld *Job access at labour market entry and occupational achievement in the life course*, wordt een longitudinale aanpak van de relatie tussen toegang tot banen en voortgang in de arbeidscarrière beschreven. De hypothese is dat goede toegang tot banen misschien niet direct resultaat heeft, maar pas na een aantal baanveranderingen. Met de longitudinale data van het retrospectieve SSCW-survey is de hypothese getoetst dat toegang tot banen aan het begin van de arbeidscarrière van invloed is op de voortgang van de verdere arbeidscarrière. Multivariate modellen met de sociaal-economische status van werknemers op de leeftijden 30, 40 en 50 als afhankelijke variabele laten zien dat toegang tot banen aan het begin van de arbeidscarrière inderdaad instrumenteel is voor de voortgang van de arbeidscarrière over de levensloop. Het belang van goede toegang tot banen aan het begin van de arbeidscarrière neemt toe met leeftijd. De resultaten laten verder zien dat werknemers met een geschiedenis van het accepteren van banen over een langere afstand meer voortgang maken in de arbeidscarrière dan mensen die nooit een baan hebben geaccepteerd over een langere afstand.

Twee belangrijke bijproducten

De empirische resultaten van dit boek hebben meer opgeleverd dan alleen een toegenomen begrip van de relatie tussen de ruimtelijke structuur van de arbeidsmarkt en individueel (ruimtelijk) arbeidsmarktgedrag. In hoofdstuk 8 wordt uitgebreid aandacht besteed aan twee belangrijke bijproducten van het onderzoek. Het eerste is een toegenomen begrip van sekseverschillen in arbeidsmarktgedrag. Het verkrijgen van inzicht in deze sekseverschillen is geen specifiek doel van het onderzoek, maar doordat de analyses van (ruimtelijk) arbeidsmarktgedrag door het gehele boek verschillende uitkomsten opleveren voor mannen en vrouwen verdient het onderwerp extra aandacht. Vooral de invloed van individuele restricties op arbeidsmarktgedrag blijkt te verschillen naar sekse.

De empirische resultaten laten een sterke invloed zien van de aanwezigheid van een partner en kinderen op het arbeidsmarktgedrag van vrouwen. Het idee is dat echtgenotes en moeders te maken hebben met aanzienlijke tijd-ruimte beperkingen die zorgen voor ruimtelijke inflexibiliteit en daardoor voor een hogere kans op onderemployment. Dit idee wordt bevestigd door diverse bevindingen: vrouwen in gebieden met beperkte toegang tot banen participeren minder;

vrouwen met kinderen accepteren minder vaak banen over een langere afstand; en veranderingen van werkplaats zijn alleen instrumenteel voor alleenstaande vrouwen. Helaas kunnen op basis van de resultaten geen uitspraken worden gedaan over de mate waarin rationele keuzes, restricties of carrièreoriëntatie een rol spelen in de arbeidsmarkttuitkomsten van vrouwen.

Een tweede bijproduct van het onderzoek is een toegenomen begrip van de relatie tussen selectie-effecten op de arbeidsmarkt en onderemployment. Selectiviteit in de onderzoekspopulatie kan leiden tot vertekening in de resultaten. Om te controleren en te corrigeren voor selectie-effecten is gebruik gemaakt van de *two-step Heckman procedure* (Heckman, 1979). Door een inhoudelijke interpretatie van de selectieanalyses en correctiefactoren blijkt het toepassen van deze methode meer te zijn dan alleen een technische oplossing. Een van de belangrijkste bevindingen (gerapporteerd in hoofdstuk 4) is dat slechte lokale arbeidsmarktomstandigheden een negatieve invloed hebben op de participatiebeslissing van vrouwen. Verder laten de resultaten zien dat er een categorie mensen bestaat met een kleine kans om werk te vinden (door voornamelijk persoonlijke kenmerken) die daardoor ontmoedigd raken in hun zoekgedrag en vervolgens het bewust niet werken verkiezen boven werkloosheid. De identificatie van deze selectiemechanismen laat zien dat het belangrijkste moment van ontmoediging niet de zoekbeslissing is maar de participatiebeslissing.

Enkele slotopmerkingen

Dit boek heeft belangrijke empirische resultaten geleverd ter ondersteuning van de ruimtelijke uitwerking van de theorie van het menselijk kapitaal, zoals voorgesteld door Simpson (1992). De belangrijkste bevinding van dit boek is dat goede toegang tot banen een positieve invloed heeft op de voortgang in de arbeidscarrière en dat werkplaatsveranderingen een oplossing kunnen zijn voor een tekort aan banen op de lokale arbeidsmarkt. Deze bevindingen geven aan dat de woonlocatie van groot belang is in het vermijden van kostbare ruimtelijke mobiliteit (pendel en migratie) gedurende de arbeidscarrière. Gezien over de levensloop bieden locaties met goede toegang tot banen maximale mogelijkheden tot voortgang in de arbeidscarrière terwijl tegelijkertijd de mobiliteitsbehoefte tot een minimum wordt beperkt. Binnen het polynucleaire verstedelijkingspatroon in de Randstad kunnen de locaties met de beste toegang tot banen gevonden worden in het gebied tussen de grote steden.

Een strategische woonlocatie is in het bijzonder van belang voor tweeverdieners. Binnen tweeverdienershuishoudens moeten twee werklocaties worden gecombineerd met één woonlocatie. De toename van de arbeidsmarktparticipatie van vrouwen heeft er toe geleid dat de migratietolerantie van huishoudens is afgenomen. In toenemende mate ondervinden beide partners beperkingen in hun ruimtelijke arbeidsmarktgedrag doordat een verhuizing voor de carrière van de ene partner kan leiden tot een breuk in de carrière van de andere partner. In

toenemende mate zal de keuze van de woonlocatie van huishoudens niet meer afhangen van één baan op een vaste locatie, maar van het aantal banen dat binnen acceptabele reistijd vanuit de woning kan worden bereikt. Werkende vrouwen en moeders ondervinden meer ruimtelijke beperkingen dan mannen en zijn daarom meer afhankelijk van lokale werkgelegenheid. Voor huishoudens die bestaan uit één werkende met een hoge pendeltolerantie en één met een lage zijn woonlocaties langs de ringwegen om de grote steden het meest aantrekkelijk. Deze locaties combineren goede toegang tot werkgelegenheid voor mensen met een beperkte pendeltolerantie met toegang tot verder weg gelegen concentraties van werkgelegenheid voor mensen met een hoge pendeltolerantie.

De aanwezige kennis van processen van ruimtelijke arbeidsmarktaanpassingen binnen huishoudens is nog steeds erg beperkt. In deze processen is de relatie tussen migratie over de levensloop en dagelijkse mobiliteit (pendel) van groot belang. Terwijl het belang van migratie voor de ruimtelijke aanpassing van huishoudens afneemt, neemt het belang van een strategische woonlocatie en pendel toe. Het is de vraag hoe huishoudens besluiten tot een woonlocatie met inachtneming van niet alleen de huidige banen, maar ook toekomstige banen. Om deze vraag te kunnen beantwoorden is het onder meer nodig meer inzicht te krijgen in de determinanten van pendeltolerantie. Verder kan voortgang geboekt worden in het verkrijgen van inzicht in de relatie tussen de macrocontext en het gedrag op het microniveau van individuen en huishoudens. In dit boek is een belangrijke stap gemaakt met betrekking tot (ruimtelijk) arbeidsmarktgedrag. De resultaten laten echter zien dat het niet mogelijk is de arbeidscarrière los te zien van de woningcarrière. Daarom is het noodzakelijk ook meer inzicht te krijgen in de relatie tussen de macrocontext en woningmarktgedrag. Niet alleen de locatiekwaliteit met betrekking tot toegang tot banen is dan van belang, maar ook de kwaliteit van woningen en de aantrekkelijkheid van de woonomgeving in termen van toegang tot bijvoorbeeld winkelvoorzieningen, scholen en natuur.

In dit boek zijn twee belangrijke mechanismen op het macroniveau geïdentificeerd die een bijdrage leveren aan het begrip van de link tussen arbeidsmarkt en woningmarkt op het macroniveau. Het eerste mechanisme is dat mensen die een baan accepteren over een langere afstand dat vaak doen in de richting van locaties met goede toegang tot banen. Het tweede mechanisme is dat de noodzaak om van woonlocatie te veranderen om een betere baan te krijgen klein is voor huishoudens die wonen op locaties met goede toegang tot banen. De identificatie van deze mechanismen draagt bij aan het begrip van de wijze waarop individuele ruimtelijke arbeidsmarktaanpassingen leiden tot druk op de woningmarkt op locaties van waaruit meerdere concentraties van werkgelegenheid bereikt kunnen worden. De identificatie van deze twee mechanismen is een belangrijke bijdrage aan de geografie. De mechanismen impliceren dat de ruimtelijke structuur van invloed is op het arbeidsmarktgedrag van individuen, en dat de ruimtelijke structuur zelf weer wordt beïnvloed door ruimtelijk gedrag.

Curriculum Vitae

Maarten van Ham was born in Utrecht on August 11, 1972. At the age of 4 he moved with his parents to Oudewater, where he spent the rest of his childhood. After he graduated from the Woerden *Atheneum* in 1991, he worked for a few months and then travelled through the United States and Israel. In 1992 he moved back to Utrecht to study Human Geography at the Faculty of Geographical Sciences, Utrecht University. On completing his first year, he decided it was time to see something of the world again. After two years of working and travelling in Australia he returned in 1995 to Utrecht University. Before starting his major in economic geography, he studied for 6 months at the University of Seville in Spain. His master's programme in Utrecht included a one-year practical research course at the Faculty of Geographical Sciences. During this practical year he worked on a research project, which resulted in his Master's degree dissertation entitled *Job search in a household context*. This dissertation dealt with the influence of individual, especially household, characteristics on the probability of being engaged in job search. In 1998 he graduated *Cum Laude*.

In October 1998 Maarten entered the PhD programme of the Netherlands Graduate School of Housing and Urban Research (NETHUR) at the Urban Research centre Utrecht (URU), Faculty of Geographical Sciences, Utrecht University. He worked on his PhD thesis, followed courses, gave lectures (with a 1/10 teaching appointment), and attended congresses. At the beginning of 2001 Maarten visited the Max Planck Institute for Human Development in Berlin for a two-month research stay. In January 2002, he completed the PhD thesis which resulted in this book.

