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ABSTRACT
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For most workers, access to suitable employment is severely restricted by the fact that they look for jobs in the regional labour market rather than the global one. In this paper we analyse how macro-level opportunities (regional labour market characteristics) and micro-level restrictions (the extent to which job searchers are restricted to the regional labour market) can help to explain the phenomenon of overeducation. For the purposes of this project we obtained special permission to link regional data supplied by the German Federal Office for Building and Regional Planning to data provided by the respondents in the German Socio-Economic Panel (GSOEP), based on their region of residence. The use of multilevel models made it possible to combine both individual and regional characteristics in the same models. In addition, we used the Heckman two-step procedure to control for selective access to employment. The results show that the size of the labour market is an important factor in avoiding overeducation: looking for a job on a large labour market increases the probability of finding a suitable job. Access to a car for personal use and a longer commuting time reduce the risk of working in a job for which one is overeducated.

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1 Introduction

Workers are deemed to be overeducated if their acquired skills exceed the skills required to perform their current job (for an overview of overeducation, see e.g. Tsang and Levin, 1985). The underlying reason for workers' overeducation is a shortage of appropriate jobs.

In traditional labour market research, it is assumed that workers look for jobs on the global labour market. However, employment opportunities are mainly determined at the regional level: due to limited spatial flexibility, most people only look for work on the local (regional) labour market (see Van Ham et al., 2001a; 2001b for an overview of this theory). Spatial flexibility refers to the amount of time that workers are willing to spend on commuting (commuting tolerance) and their willingness to migrate for a job (migration tolerance).

A job seeker who is confronted with a regional labour market where no suitable jobs are available has three 'options' (Simpson, 1992). The first is non-participation, i.e., unemployment. The second is accepting a local job below his or her level of qualification, resulting in overeducation. The third is accepting a suitable job further away, beyond the current regional labour market (see Van Ham et al., 2001b, on workplace mobility). This can be achieved either by commuting over a longer distance or by migration.

There now exists an extensive body of literature on overeducation (see Groot & Maassen van den Brink, 2000, for a recent overview). Surprisingly, little attention has yet been paid to the spatial aspects of overeducation, the only exception being studies that focus on the job-seeking behaviour of married women (see section 2). This lack of research is remarkable, since a lack of job opportunities in combination with limited spatial flexibility of the workforce is a well-established explanation of unemployment (for literature on the spatial mismatch hypothesis, see, for example, Preston and McLafferty, 1999).

The aim of this article is to provide a framework that links the occurrence of overeducation at the individual level to the availability of employment opportunities, and to test it for the West German labour market. The central question is to what extent macro-level

opportunities (regional labour market characteristics) and micro-level restrictions (commuting and migration tolerance) can help to explain the phenomenon of overeducation.

2 Spatial determinants of overeducation

The only theoretical work that takes account of the spatial determinants of overeducation is the theory of differential overqualification developed by Frank (1978). Frank theorises that in dual-earner households, the husband chooses a job in the global labour market. The wife's job seeking is then restricted to the regional labour market chosen by her husband. Because this regional labour market is much smaller than the global one, the wife can be expected to run a higher risk of overeducation than her partner. Several authors have tested Frank's theory; the results are mixed. The findings of McGoldrick and Robst (1996) and Battu et al. (2000) led them to reject the theory. Büchel (2000), on the other hand, showed for Germany that married women indeed run a higher risk of working in jobs for which they are overeducated, especially when they live in a small regional labour market.

The higher risk of overeducation caused by geographic restrictions is a central aspect of Frank's theory. Frank, however, focuses exclusively on married women. In this paper we postulate that a more general theoretical framework is needed, because geographic restrictions affect the labour market outcomes of all workers.

We start with Simpson (1992), who pictures the economy as a group of 'local labour market islands', between which moves are costly. The costs of information flows and mobility between islands restrict workers' attempts to secure jobs located on other islands. Within the framework offered by Simpson, job-seeking behaviour is spatially systematic in two ways. First, workers will seek jobs located as closely as possible to their place of residence in order to economise on search and mobility costs. Second, workers will seek jobs that require the skills they have acquired. If no suitable jobs are available on their own 'island', and mobility

costs to 'escape' are too high, workers might 'bump down' and accept a job below their level of qualification.

The availability of suitable employment opportunities is central to the above theoretical considerations. For an individual job seeker, the availability of jobs is determined by two factors (Van Ham et al., 2001a). The first determining factor is the location of the residence in relation to the spatial configuration of employment opportunities. Jobs are not evenly spread over space in either quality and quantity. The second factor is the size of the labour market that can be searched from the residence. This size depends on the spatial flexibility of the job seeker – his or her migration and commuting tolerance.

Migration tolerance is limited because a residential move may engender considerable costs, for example, the loss of location-specific capital (Hey & McKenna, 1979). Especially for dual-earner households, where one residential location has to be combined with two work locations, migration tolerance is limited (Mulder and Hooimeijer, 1999; Jarvis, 1999).

Commuting tolerance refers to the maximum time a worker is willing to commute for a job. For most workers in modern western societies, 45 minutes of commuting is the absolute maximum (Van Ommeren, 1996). Because they have shorter commuting times, women are thought to have a lower commuting tolerance than men (Blumen, 1994). 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). Especially when children are present in the household, women are restricted in their spatial mobility (Baccaïni, 1997; Rouwendal, 1999).

The rationale of the above theoretical framework is that individual spatial flexibility in combination with the spatial distribution of suitable job opportunities, relative to the place of residence, largely determines the risk of overeducation. We expect the risk of overeducation to be highest for those workers restricted to a small regional labour market. As a consequence, spatial mobility can be seen as a means of avoiding overeducation (Van Ham et al., 2001b).

Based on these considerations we formulate three hypotheses. First, we expect those living far away from a large concentration of employment to run the highest risk of overeducation. Second, a high regional level of unemployment is expected to increase the probability of overeducation. Third, workers who are spatially more flexible – in the present analysis measured in terms of a long commuting time and access to a car for personal use – are expected to have a lower risk of overeducation.

3 Data and methodology

The data used in this paper were derived from the 1998 wave of the German Socio-Economic Panel (GSOEP). This database is administered by the German Institute for Economic Research (DIW) in Berlin (see Wagner et al., 1993, for details). The analyses were restricted to respondents aged between 16 and 65 years with a German vocational qualification or university degree (i.e., those who are at risk of overeducation). We excluded students, trainees and people in the armed forces. Following this selection procedure, the data set comprised 5152 respondents, 3375 of whom were employed. The 1998 regional data for the 75 West German spatial planning regions (*Raumordnungsregionen*) were obtained from the German Federal Office for Building and Regional Planning (Bundesamt für Bauwesen und Raumordnung, 1999). Using the *Raumordnungsregion* number for the GSOEP respondents' place of residence as a key variable, we were able to match individual data to regional data.

Theoretical considerations have two important implications for the methodology we used. First, the relationship between the availability of employment opportunities and overeducation is not straightforward. Those in employment are a selective group, and it can be assumed that the selection process is related to our dependent variable (overeducation). If no suitable employment is available, unemployment can be chosen as a strategy to avoid overeducation (Van Ham et al., 2001c). Analysing overeducation while restricting the sample to the employed only could therefore lead to biased results. We used the two-step Heckman

procedure to correct for selection effects (Heckman, 1979). In the first step, we analysed the probability of being employed. In the second step, we analysed the probability of those in employment being overeducated, including Heckman's lambda as an additional covariate. In both analyses, the dependent variable is dichotomous; we therefore used logistic regression models.

The second implication of the theoretical framework is that we have to use a multilevel model. The data includes both individual level and regional characteristics, and there is more than one respondent per region in our sample. Ignoring this nested nature of the data would violate the standard assumption of independence of observations that underlies traditional regression models. Using a multilevel model solves this problem (Goldstein, 1995). Our model thus has two levels: the individual level and the regional level.

The overeducation variable was constructed following the procedure developed by Büchel and Weißhuhn (for details, see Büchel 2001). Whether or not a worker is overeducated was determined by means of the so-called 'subjective' approach: asking workers about the level of education usually required to perform their current job. If the actual level of qualification was substantially higher than the job requirements, the worker was defined as being overeducated; if not, he or she was classified as being correctly allocated. This outcome variable was validated by information about the occupational status of the respondents. After weighting, 14.1 percent of the employed men and 18.2 percent of the employed women in our data set were identified as being overeducated (average 15.8 percent).

4 Results

Table 1 gives the results of the first step of the Heckman procedure. In the model we estimated the probability of whether respondents were employed (1) or not (0). The results of

this analysis are not discussed separately here. The resulting correction factor lambda is used as an independent variable in the analysis of overeducation.

---- please insert Table 1 about here ----

Table 2 shows two models in which we estimated the probability of whether the respondents were overeducated (1) or not (0). The two models present the results with and without correction for sample selection bias.

As expected, in the model without correction for sample selection bias (model 1 in Table 2), women living with a partner and children emerged to run a higher risk of overeducation than single women or men. In the model correcting for sample selection bias (model 2 in Table 2), however, this effect disappears. This is most likely caused by the fact that for women, the employment selection mechanism is partly determined by the presence of a partner and children (see Table 1). Age only has an effect on overeducation after correcting for selection effects; with increasing age the probability of overeducation increases. As expected, with increasing years of education, the probability of overeducation decreases. The probability of overeducation also decreases with longer firm tenure. Both results are in line with the human capital based assumption that that "overeducation may be a compensation for a lack of (…) relevant productive skills necessary for the job" (Groot and Maassen van den Brink, 2000:157; see Büchel and Pollmann-Schult, 2001, for more specific evidence of this relationship). In line with previous findings, foreigners and disabled workers run a higher risk of overeducation. The parameter of the correction variable lambda is positive and has a significant effect on the probability of overeducation, indicating that workers with a low probability of employment run a high risk of overeducation when they find a job. In other words, for some people, not working is a strategy chosen to avoid overeducation (for the

substitutional character of unemployment and overeducation see Büchel, 2001, and Van Ham, 2001c).

---- please insert Table 2 about here ----

Spatial flexibility reduces the risk of overeducation. Those with a car for personal use have a lower probability of overeducation than those without. Of course, this effect should be interpreted with some caution, because the direction of the causal effect is unclear: those with a high-level job might earn higher incomes, and thus be in a better position to afford a car. With increasing commuting time, the probability of overeducation decreases. This finding confirms the expected result that long commutes are a useful strategy to avoid overeducation.

The longer the travelling time to a large agglomeration, the higher the probability of overeducation. This means that access to a large concentration of employment opportunities reduces the probability of overeducation. Contrary to our expectations, however, the regional unemployment level does not impact on overeducation. In the light of this result, it is interesting to take a look at the analysis of employment in Table 1. The results show that with an increasing rate of unemployment, the probability of employment decreases. Access to a large agglomeration has no significant effect on employment. The results of these two analyses are important in helping us to understand the mechanisms behind overeducation. In order to avoid unemployment, it is important to have access to a regional labour market with a low level of unemployment: it is not the size of the labour market that is relevant, but the level of competition. On the other hand, in order to avoid overeducation, the size of the labour market is relevant: job seeking on a large labour market increases the probability of finding a suitable job, regardless of the structure of supply and demand.

5 Discussion

In this paper we have offered a framework that links the occurrence of overeducation at the individual level to the availability of employment opportunities. Our framework extends the existing literature by offering a broader framework than that used in the married-women approach; we postulate that geographic restrictions affect the labour market outcomes of *all* workers. Further, our research design for the analysis of overeducation is innovative in two ways. First, the use of multilevel models made it possible to combine individual and regional characteristics in the same models. Second, we drew a distinction between having no job and working in a job for which one is overeducated, and used the Heckman two-step procedure to control for selective access to employment.

Testing our framework for the West German labour market confirmed the hypothesis that both individual spatial flexibility and the spatial distribution of job opportunities play a major role in explaining the phenomenon of overeducation. The results show that workers with poor access to employment run a higher risk of overeducation. Furthermore, spatial flexibility helps workers to overcome a poor local labour market: a long commuting time and access to a car for personal use help to avoid overeducation.

By using rather rough proxies of job availability, we demonstrated the importance of including the spatial context in the explanation of overeducation. Our results might prompt research on the role of spatial flexibility as a means of reducing overeducation.

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Table 1 Determinants of employment (first step of the Heckman procedure)

	Parameter	Std error	
Individual level variables			
Female	0.733	0.155	***
Female * additional hh income[a]	-0.341	0.026	***
Female * child(ren) up to 16 years	-0.585	0.108	***
Partner	0.428	0.117	***
Female * partner	-0.328	0.167	**
Age	0.197	0.023	***
Age square	-0.003	0.000	***
Education in years	0.068	0.016	***
Foreigner	-1.674	0.084	***
Disabled[b]	-0.885	0.105	***
Work important in life	0.346	0.073	***
Regional level variables			
Time to agglomeration[c]	-0.120	0.126	
Unemployment rate[d]	-0.032	0.013	***
Constant	-2.288	0.541	***
Variance of random effect	0.047	0.022	**

N= 5152

a   Additional household income is defined as the net household income minus the net earnings of the female.

b   Workers are labelled as being disabled if they state that their health situation "strongly" impedes their performance of daily activities.

c Average travel time to the nearest three agglomerations in hours by car for 1998.

d Percentage unemployed in total potential labour force (15-65 years old).

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

Table 2 Determinants of overeducation (second step of the Heckman procedure)

	Model 1			Model 2		
	Parameter	Std error		Parameter	Std error	
Individual level variables						
Female	-0.297	0.205		-0.223	0.207	
Female * child(ren) up to 16 yrs	0.322	0.143	**	0.103	0.165	
Partner	-0.244	0.157		-0.140	0.161	
Female * partner	0.407	0.205	**	0.231	0.237	
Age	0.039	0.036		0.092	0.040	**
Age square	0.000	0.000		-0.001	0.001	
Education in years	-0.140	0.023	***	-0.126	0.023	***
Foreigner	0.885	0.131	***	0.482	0.186	***
Tenure in years	-0.079	0.007	***	-0.078	0.007	***
Car for personal use	-0.527	0.111	***	-0.527	0.112	***
Commuting time	-0.019	0.003	***	-0.019	0.003	***
Regional level variables						
Travelling time to agglomeration	0.370	0.159	***	0.362	0.158	**
Unemployment rate	0.011	0.021		0.007	0.021	
Lambda				0.808	0.264	***
Constant	-0.637	0.791		-1.898	0.896	**
Variance of random effect	0.052	0.035		0.050	0.034	

N=3375

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

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