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This paper uses a unique possibility to link unemployed individuals' stated willingness to move with administrative data, giving us the possibility to analyse the effects of mobility on labour market outcome. Furthermore, we can do this not only for those who actually move, but also for non-movers. I find that those who extend their search area in job search geographically do have a higher probability of escaping unemployment. However, this positive effect is not only present for jobs outside the local labour market, as would be expected, but the greatest effect is found on the local labour market. This indicates positive selection; i.e. it is not so much the increased geographic scope per se that increases the likelihood of escaping unemployment, but mainly differences in unobservable characteristics between those who choose to use a larger search area and those who do not.

Key Words: unemployment, selection, geographic mobility, job search, search scope

JEL Classification: D83, J64, R23

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1 Introduction

Labour mobility has long been seen as an important factor for an efficient job market, and has consequently been extensively studied by economists. A recognized problem in these studies is the problem of selection. If mobile individuals are different from the less mobile, then post-migration outcomes differ for reasons other than actual mobility. As long as these differences are observable to the researcher they can be controlled for, reducing the problem, but some differences in characteristics are not observable. Estimated effects of mobility will then be biased, and the direction of the bias will depend on the nature of these differences.

A related but different problem is that observed migration can reasonably be considered a consequence of perceived employment opportunities in the new location. If that is the case, then the effects of migration are biased upwards, and a range of methods have been tried to reduce this bias. Furthermore, the advent of the Internet as a channel for information has decreased the need for actual "migration as spatial job-search" (Herzog et al., 1993), and it is likely that individuals now instead migrate *following* a job offer or a successful application. A consequence of this is that the effects of observed migration on employment could be more and more biased the more recent the data used in a study, as Internet job searching has increased over time. A person's *willingness* to move, on the other hand, is likely to be determined before any offers arrive and should hence be less sensitive to such bias. This study therefore analyses the effects of stated *willingness* to move.

In previous studies, the main problem has been the absence of a counterfactual case; i.e. what would have happened to movers had they not moved? In this study we will look at the effects of a stated willingness to migrate, not only for actual movers, but also for those who were willing to move but for some reason did not, which is as close to an actual counter-factual of movers as we can get.

There is no reason why being willing to move per se should give you any labour market benefits in the *current* location. Therefore, any effects found on employment probability in the local market will indicate that there is selection into mobility. Thus, this paper will help shed some light on the age-old question of whether migrants are better off due to unobserved characteristics or to the actual move.

To my knowledge this is the first paper to study the labour market effects of a stated willingness to move, rather than observed migration. I utilise data from the Swedish Employment Agency on all individuals who entered unemployment during 2000-2004. The

information of particular interest is whether an individual is willing to move, which is identified by the answer to a question asked to all unemployed when registering for unemployment benefits; i.e. whether they are willing to look for jobs outside their local labour market. Such jobs are defined as being so distant that they would require moving or weekend commuting. A yes classifies them as being willing to move. This information is then merged with a richer dataset containing detailed information on individual, family and regional characteristics.

I analyse whether this willingness to move has any effect on the probability of escaping unemployment. More specifically, I look at the effect of the stated willingness to move on the probability of escaping unemployment to employment, not just generally escaping unemployment,[1] and find that individuals stating that they are willing to move do have better chances of finding work. However, the effect is not only present in the distant labour markets, as should be the case if there were no selection into mobility. Rather, the effect is also present, and is actually greater, in the *local* labour market.

This could have two different explanations: There may be differences in characteristics, i.e. that individuals who are more willing to move also tend to be more able or dedicated to finding a job and therefore, or for other reasons, are more willing to make sacrifices to find work.[2] A second reason could be that the willingness to move is a signal to the employment agency that the individual is more dedicated to finding work and is willing to make sacrifices (i.e. moving costs, both monetary and social/emotional). However, potential *employers* do not observe this exact variable, but will of course be aware of the origins of their job applicants. Consequently, local employers will not observe the willingness to move, while distant employers will. Our results consequently lend firm support to previous indications of positive selection into mobility.

The paper is structured in the following way: Section 2 briefly summarises the previous literature. Section 3 describes the data sources, variable definitions and descriptive statistics. In Section 4 the models to be estimated are presented, whereas Section 5 presents the results and Section 6 concludes.

[1] This distinction is important, as shown in Edin (1989)
[2] For instance Jaeger et al. (2007) find that individuals who are more mobile are also more willing to take risks in general.

2 Related literature

There is a large literature on what affects a person's willingness to move (see for instance Ahn and de la Rica (1999), Drinkwater (2003), or Zaiceva and Zimmermann (2008) or Greenwood (1997) for a survey) such as unemployment, earnings differences and so on, but hardly any empirical research has been done on the effects of the willingness to move. This is largely due to the gap in data availability; willingness to move is typically found in survey responses, where data on future employment will typically be missing.

In early studies of migration, explanations to the negative effect of distance on the willingness to move ranged from lack of information on the new locality to greater psychic costs from longer moves (Schwartz, 1976). Today, with the use of the Internet being a common and important part of most job searches, it is likely that focus should be placed more on the latter of these two explanations.[3] As a matter of fact, previous research has shown that moving to *search* for a job was a rather unsuccessful strategy in Sweden during the 1990s, as only about 25% of those who were unemployed prior to migration actually got a job after migration. The most common form of migration is "from work to work migration", and migration to work accounts for about 36-59% of all in-migration to a region (Johansson & Persson, 2000).

When looking for a new job an individual sets a reservation wage correlated to his or her human capital. Naturally, the higher the reservation wage, the fewer the jobs that are likely to be available to the individual. However, it is not certain that this reservation wage is constant over time; it may well be affected by developments in competition in the labour market, by the number of jobs offered or by loss of unemployment benefits (Shumway, 1993). Schwartz (1976) argues that search time can be shortened by increasing the search radius, if the unemployed individual accepts the first offer that meets his reservation wage, as the number of potential jobs increases with search radius. Search radius, in turn, depends on the individual's age and education.[4] At first, it may seem obvious that a person extending his or her search area would expect a higher probability of finding a job that matches or exceeds the reservation wage. However, it may also be that the individual will require a higher wage to offset migration costs, effectively raising the reservation wage as distance increases

[3] Lack of information may still be relevant for international migration, but hardly when it comes to internal migration. Information on vacancies is equally accessible from any part of the country, benefit rules are the same throughout the country, and so on.

[4] However, in that study migration is used as a proxy for search radius, which may not be entirely true. It may just mean that one area of search is replaced by another, rather than that the total search area is expanded. Again, there is a problem in using observed migration, as it may depend on offers received.

(Shumway, 1993). Therefore, it is not obvious that an extended search area will have a positive effect.[5] Seater (1979) finds that increasing the geographic scope of job search increases the search duration more than it does the probability of finding a job.

The reservation wage also depends on current income, and as unemployment reduces income (compared to employment) we would expect personal unemployment to increase the likelihood of migration.[6] This has also been found, first by Saben (1964), using tabular data. Goss and Schoening (1984) show that the *duration* of unemployment has a negative effect on the probability of migration; i.e. while there is a push effect of unemployment, it is reduced over time spent unemployed.

A lot of research has studied the effects of actual migration on earnings or employment (see for instance Pekkala and Tervo (2002), Lehmer and Ludsteck (2008). However, it is likely that these estimations will be biased if people only move if they think they will benefit from it. Hence, there could be problems with selection into mobility. Moving to a new area in order to start looking for work there may have been an option twenty years ago, but it is less common today as information about job openings are as available in the home municipality as anywhere else, thanks to the development of Internet based job search.[7]

There can be both positive and negative selection into migration, but in general it has been argued that it is positive.[8] That is, individuals who choose to migrate have characteristics, observable and/or unobservable, that will give them a better labour market outcome than stayers. This better outcome is consequently not a result of the migration per se, but rather of these characteristics. The empirical evidence is ambivalent; Rooth and Saarela (2007) study cross-border migrants from Finland to Sweden (as well as return migrants) and find that migrants are negatively selected on observables but much less so on unobservables. Zaiceva (2006) studies East-West migration in Germany and finds no self-selection on unobservables for migrants. In terms of internal migration within Sweden, Axelsson and

[5] Shumway (1993) argues that this could even increase search time, as a consequence of an increase in reservation wages due to migration costs. However, I find it more likely that the unemployed individual sets different reservation wages for job offers that do and do not require migration. However, it is still possible that the higher reservation wage for distant jobs affects the reservation wage for local jobs upwards, thereby increasing search time, although to a lesser extent than argued by Shumway (1993).

[6] For a survey, see Herzog et al. (1993).

[7] This is less true in the case of international migration, where job search migration is still a viable option. However, there are large problems of selection and many studies have tried to find ways to avoid it. However, this has proven difficult. See for instance McKenzie et al. (2006) who used lottery based migration to avoid selection. However, as even lottery winners were required to show evidence of a job offer to be allowed to immigrate, migration would turn out to be selective in spite of this.

[8] See for instance Gabriel and Schmitz (1995), Borjas et al. (1992) or Borjas (1987), or Chiswick (1999) for a good survey on this.

Westerlund (1998) find no evidence of self-selection among couples who migrated between 1980 and 1990. Dostie and Léger (2006) find support for self-selection on unobservable productivity into the choice of destination. That is, more productive individuals tend to move to regions where the returns to productivity are higher, whereas less productive individuals tend to move to regions where such returns are lower. However, all these studies use actual migration, or instruments for it, rather than willingness to move.

The argument for positive selection is strongest when we discuss mobility of employed individuals. In the case of the unemployed, things become more complicated as there is the possibility that migration is used as an "option of last resort"; i.e. when failing to find a job locally, the individual is forced to find work somewhere else. This would lead to negative selection into migration if the most skilled individuals can more easily find jobs locally, for which evidence has been found by Huttunen et al. (2007).

3 Data

In order to identify the effects of mobility we typically need information on the labour market development over time, which will be found in registry data. On the other hand, willingness to move cannot be observed in such data. Thus, it is usually not possible to observe both the left- and right-hand side variables in the same dataset.

I merge three different datasets, Händel, ASTAT and Linda, for individuals who registered as unemployed in 2000 – 2004.[9] Händel, from the national Labour Market Board, records all spells of unemployment registered at an unemployment office, and includes many characteristics related to unemployment. It therefore gives us a very detailed picture of the development of an individual's unemployment spell. It also includes the variable of particular interest "extended search area", indicating whether the individual is searching for jobs outside his or her local area (see below for a definition of local area). The dataset therefore has the benefit of a survey in that it captures the *willingness* to migrate without requiring the individual to actually move. Furthermore, it is based on individuals who are actually unemployed, removing the problem present in many survey studies: that job search questions asked are merely hypothetical.[10] ASTAT contains information on benefit receipts and pre-unemployment wages. The third dataset, Linda, contains information on 3% of all Swedish residents in each year, with detailed information on human capital, family, income, wealth

[9] Thus, those who were unemployed before 2000 are not included.

[10] For instance, in the Survey on Economic Expectations and Attitudes one question is 'In case you would not have a job but you would have a possibility to get a job and a flat in another, distant municipality, would you be ready to move?' (Fidrmuc and Huber, 2007). This question closely resembles the actual decision in our data.

variables and much more, giving us the benefits of registry data: a large dataset containing many detailed control variables. Since Linda contains only a sample of the Swedish population, some observations of unemployed individuals are lost when we merge the datasets. However, as the sample is representative for the Swedish population, this loss should have no general effect on results.

3.1 Sample selection

Individuals included in the data are those who registered as unemployed at the national unemployment agency during our time of observation.[11] Thus, those unemployed but not registered at the unemployment agency are not included. However, the number of individuals lost should be relatively low, considering that one has to register at the unemployment agency in order to receive any unemployment benefits. Survey responses have shown that about 90 percent of all unemployed do register at the unemployment office (Statistics Sweden, 1993). Furthermore, on-the-job job searches are not included in this study.

Some restrictions are imposed, the one affecting the largest number of spells being that I only include those who were registered by the unemployment agency as able to accept a job immediately.[12] I do this to ensure that all individuals were able to accept an offer instantly, and hence were more likely to be actively looking for work. Being enrolled in a labour market programme, or awaiting enrolment in such a programme, may reduce search intensity as a person may want to finish the programme before starting a new job. Such locking-in mechanisms have been found for some forms of unemployment programmes (see for instance Lindgren & Westerlund, 2003). In addition, I only include those who were full-time unemployed in order to avoid any 'voluntary' part-time unemployment.

I remove individuals younger than 25, as they are likely to move for reasons not related to the labour market. As the standard retirement age in Sweden is 65, I remove any individuals older than 65. Some spells (43) are registered as having begun before the previous one ended. As I in these situations cannot tell which of the two spells is wrong, I remove both. Individuals with missing information on education are also removed (87 observations).

[11] We have information on their unemployment history before this as well if they had been continually registered at the unemployment agency, but we cannot observe whether they had searched inter-locally or not.

[12] Note that this has nothing to do with the individual's willingness to start working, but only regards ability/possibility. There are several different classifications in the data. A person is registered as 'category 11' if the unemployment agency considered him or her able to start working without any additional courses or guidance. Category 12 indicates a need for guidance, 13 indicates that the individual was in need of some help and was awaiting the decided treatment, and so on. These classifications can also be used to identify participation in different labour market programmes.

These restrictions leave us with about 65 000 unemployment spells.

3.2 Variables

I include a standard set of variables that have previously been found to be significant to employment and mobility: age, gender, marital status, number of children, educational attainment, home ownership and measures of regional unemployment. In addition, I can also control for the number of previous unemployment spells. I aggregate the number of spells into four groups; zero, 1-5, 6-15, and more than 15 spells.[13] Immigrant status is defined by place of birth rather than by citizenship. Although having acquired Swedish citizenship may indicate some characteristics affecting the labour market outcome of immigrants, place of birth is a 'cleaner' indicator of immigrant status. Furthermore, due to the cultural similarities of Nordic immigrants and native Swedes, I distinguish between immigrants from Nordic and non-Nordic countries.

I also control for whether an individual had any sort of disability that may have impeded transition to employment. These range from poor hearing to mental or physical disabilities. Binary dummies for local labour markets are also included, controlling for where the unemployed person was living. This will help capture effects of living in different parts of Sweden, as well as more specific effects of living in a major city.

As a proxy for pre-unemployment work experience I include indicator dummies for which unemployment insurance fund the worker belonged to. These funds are specific for different industries, and will consequently indicate both industry-specific work experience and in what sector the worker was looking for work.

3.2.1 Extended search area

The distinction whether a search area can be considered to be extended or not was made by the local employment agency worker, based on the situation of each individual unemployed worker. The basic criterion for being classified as an extended search area is that it would not be feasible to commute to the potential job on an everyday basis.[14] It is therefore important to note that the area covered is generally quite large, requiring the unemployed to search not only outside the home city or municipality, but also outside the local labour market (IAF,

[13] We do not know the length of each spell prior to our period of observation, but the number of spells will at least give us some information about unemployment history.
[14] Rules stipulate that a job is defined as local if the worker does not have to spend more than 12 hours away from home each day. With an eight hour work day and one hour lunch break, this essentially leaves 90 minutes for travel in each direction (IAF, 2004)

2004). Thus, accepting a job outside the local area would typically involve weekend commuting or moving.

If the unemployed worker is truly interested in finding distant work, then his or her expected cost of extending search in terms of additional effort will be very low. On the other hand, rules on benefit entitlement stipulate that one has to accept a job offered if it is considered suitable with respect to job qualifications and requirements and the wage offered, all subject to the current vacancies in the local area. Consequently, if you are *not* willing to move, the expected *benefit* from external search will be zero, but you will still have to accept any offered jobs. Failure to accept an offer, or otherwise obstruct employment, that is considered suitable could result in a 25% reduction in benefits for 40 days, which is obviously a substantial penalty.[15] Furthermore, apart from the increased probability of finding work, no additional benefits are offered to individuals with an extended search area. Consequently, unless a person is willing to move he or she will have a negative total expected benefit from extending search, meaning that only those willing to move can be expected to search in the extended area.

A potential problem could be the fact that, during our period of observation, rules require that after an initial period of 100 'working days' of unemployment the individual would have to search in an extended area. However, this rule was rarely implemented and there is only a very small difference between searchers with unemployment durations shorter and longer than 100 days in this regard.[16] Unfortunately the data does not register *when* an individual chose to extend his or her search area. Consequently, I cannot tell whether those who are registered as having searched externally and having passed the 100 day limit decided to extend their search prior to or due to reaching the limit. While this could give us problems with identifying 'voluntarily extended search', a quick look at the data, as shown in Table 1, shows that there is a poor correlation between being unemployed for more than 100 days and searching in an extended area. This corresponds well to anecdotal evidence on poor compliance to this rule,[17] and has also been reported elsewhere. For instance, in 2002 the

[15] According to regulations, this applies the first time a suitable job offer is refused. If a second job offer is refused during the same unemployment spell benefits are reduced by 50%, and if it occurs a third time the unemployed is no longer entitled to unemployment benefits.

[16] A formal t-test shows that the mean does differ between those who have and have not passed the 100-day limit. However, this is also true for other, arbitrarily chosen, durations.

[17] During a discussion with an unemployment agency employee, he commented 'Making people extend their search? We have difficulties making people accept jobs on the other side of town!'

share of job searchers that used an extended search area only marginally increased as the 100 day limit was passed, from 7 to 7.5 percent (Statskontoret, 2004).

Table 1: Unemployment duration vs interlocal search

		Unemployment duration		
		<=100 days	>100 days	Total
Searching interlocally	no	28 351	30 201	58 552
	yes	2 577	3 595	6 172
	Total	30 928	33 796	64 724

One distinction may be worth noting. What I analyse here is the willingness to move; not the *intention* to move. Thus, 'willing' individuals are not explicitly planning to move, but nevertheless judge it as a possibility if a job offer from a more distant location would arise.[18] This also reflects a difference in how one could interpret mobility in terms of job markets. Had individuals been planning to move, they most likely would not have extended their geographic scope of search, but rather changed one labour market for another. In our case, individuals who are willing to move will add labour markets to their search but not exclude their current ones.

3.2.2 Escaping unemployment

The labour market outcome is defined by a binary dummy, which equals one if the unemployment spell ends in successful employment and zero otherwise. This definition is in turn defined based on the unemployment agency registers where the reason for ending the contact with the worker is recorded. These reasons range from simply losing contact to noting that the individual has successfully found work. Out of this range of categories I choose the three[19] that best represent successful escape from unemployment. However, in a large number of cases the unemployment agency simply lost contact with the worker. It is more than likely that in many of these cases the worker found employment but did not report it to the agency and simply stopped showing up for appointments. However, as we do not know the exact reason for losing contact these are not treated as successful cases. If anything we underestimate the number of successful cases.

[18] We could argue that if a person is intending to move, the probability of migration will be closer to 1 than to 0. If he or she is willing to move, the probability is only greater than zero. For more on intentions and their use when predicting behaviour, see Manski (1990)

[19] Category 1 'Found work', Category 2 'Found time-limited work' and Category 3 'Continued employment at previous employer'.

3.2.3 Migration

In our data, municipality of residence is recorded. However, a change of municipality may be due to reasons unrelated to the labour market,[20] and I therefore aggregate municipalities into local labour markets as defined by Statistics Sweden. Thus, the 290 municipalities are grouped into 87 local labour markets[21] and migration is defined as a change of local labour market. A perfect definition could have been made had I been able to see whether each individual had moved outside his or her personal search area as defined by the unemployment agency. Unfortunately, this information is not available.

3.3 Descriptive statistics

Table 2 separates descriptive statistics by search behaviour.[22] We can see that there are some interesting differences between the group of individuals who searched interlocally and those who did not, but also that the differences are as we would expect. Those who did not search in an extended area, are older, to a higher degree female and non-Nordic immigrants. They also have more children and are more often married. The differences in educational attainment are surprisingly small. Less surprising is that they to a higher degree own their own houses. Thus, those who are more mobile have characteristics that are generally considered positive on the labour market, which could indicate positive selection into extended search.

Turning to the differences between those who found job and those who did not, we look at Table 3. Here we can see that the differences are relatively small. While there are some differences in age and educational attainment, the largest differences are found in that successful job finders are to a much lesser extent non-Nordic immigrants, but to a greater extent own their houses. The other differences are quite small.

[20] Pekkala and Hervo (2002) argue that it is probable that most movers among the unemployed are those applying for jobs. However, in the case of the unemployed it is also very likely that a move is made to change to a different, probably smaller and cheaper, dwelling in order to adapt to the change in income due to the unemployment. Change of local labour market is therefore a preferable choice.

[21] For more information on how this aggregation is made, see for instance Statistics Sweden (1991)

[22] Descriptive statistics for all unemployed ready to accept work immediately, not divided by search behaviour, can be found in Appendix Table A1.

Table 2: Differences between those who search interlocally and those who do not

	Not searching interlocally				Searching interlocally			
	Mean	Std dev.	min	max	Mean	Std dev.	min	max
Age	38.243	9.67	25	65	36.175	9.74	25	65
Male	0.473	0.50	0	1	0.691	0.46	0	1
Children	0.590	0.49	0	1	0.461	0.50	0	1
Married	0.498	0.50	0	1	0.349	0.48	0	1
Unmarried	0.391	0.49	0	1	0.564	0.50	0	1
Divorced	0.105	0.31	0	1	0.082	0.27	0	1
Widowed	0.006	0.07	0	1	0.004	0.07	0	1
Education Compulsory schooling	0.145	0.35	0	1	0.093	0.29	0	1
Education High school	0.513	0.50	0	1	0.475	0.50	0	1
Education Undergraduate	0.301	0.46	0	1	0.397	0.49	0	1
Education Graduate	0.010	0.10	0	1	0.017	0.13	0	1
Nordic Immigrant	0.034	0.18	0	1	0.034	0.18	0	1
Non-Nordic Immigrant	0.206	0.40	0	1	0.144	0.35	0	1
Local unemployment rate	3.942	1.28	0	10.2	4.195	1.31	0	10.2
National unemployment rate	3.789	0.36	3.3	4.2	3.780	0.36	3.3	4.2
Home ownership: House	0.384	0.49	0	1	0.291	0.45	0	1
Home ownership: Apartment	0.003	0.06	0	1	0.003	0.06	0	1
Previous spells 0	0.119	0.32	0	1	0.099	0.30	0	1
Previous spells 1-5	0.559	0.50	0	1	0.554	0.50	0	1
Previous spells 6-15	0.313	0.46	0	1	0.333	0.47	0	1
Previous spells 16 or more	0.006	0.08	0	1	0.011	0.10	0	1
Unemployment duration (days)	248.033	306.32	0	1898	284.055	333.78	0	1886
# observations	58 552				6 172			

4 Model specification

The focus of this study is divided into two parts, first analysing what drives search in an extended area, and then looking at the effects of this extended search on the probability of finding employment.

4.1 Who extends the search area?

As a first step, the determinants of extending search area are investigated. As in the case of actual migration, it may well be that certain kinds of individuals choose to extend their search and that we consequently have selection problems. This was indicated in the descriptive statistics in Section 3.3, but it is also important to see how those results hold up to a more formal estimation. I will use logit regression, as the choice whether to search in the extended area or not is dichotomous,

$$\mathrm{P_i^S} = Prob(S = 1|x_i, \gamma_i) = \frac{e^{\beta x_i + \gamma z_i}}{1 + e^{\beta x_i + \gamma z_i}}$$

where x_i is a vector of individual characteristics and z_i is a vector of characteristics of the region in which the individual is living.

Table 3: Differences between those who find work and those who do not

	Found work				Did not find work			
	Mean	Std dev.	min	max	Mean	Std dev.	min	max
Age	38.386	9.207	25	65	37.945	10.025	25	65
Male	0.583	0.493	0	1	0.432	0.495	0	1
Children	0.550	0.498	0	1	0.603	0.489	0	1
Married	0.497	0.500	0	1	0.479	0.500	0	1
Unmarried	0.418	0.493	0	1	0.398	0.489	0	1
Divorced	0.082	0.274	0	1	0.117	0.322	0	1
Widowed	0.004	0.060	0	1	0.007	0.082	0	1
Education Compulsory schooling	0.139	0.346	0	1	0.142	0.349	0	1
Education High school	0.541	0.498	0	1	0.492	0.500	0	1
Education Undergraduate	0.294	0.456	0	1	0.314	0.464	0	1
Education Graduate	0.010	0.100	0	1	0.012	0.107	0	1
Nordic Immigrant	0.036	0.185	0	1	0.033	0.178	0	1
Non-Nordic Immigrant	0.138	0.344	0	1	0.244	0.430	0	1
Local unemployment rate	3.858	1.295	0	10.2	4.043	1.267	0	10.2
National unemployment rate	3.773	0.361	3.3	4.2	3.802	0.365	3.3	4.2
Home ownership: House	0.461	0.499	0	1	0.321	0.467	0	1
Home ownership: Apartment	0.004	0.063	0	1	0.003	0.053	0	1
Previous spells 0	0.115	0.319	0	1	0.119	0.324	0	1
Previous spells 1-5	0.557	0.497	0	1	0.559	0.497	0	1
Previous spells 6-15	0.316	0.465	0	1	0.315	0.465	0	1
Previous spells 16 or more	0.009	0.095	0	1	0.005	0.069	0	1
Unemployment duration (days)	172.210	194.598	0	1892	308.132	359.193	0	1898
# observations	25 690				37 940			

4.2 The effects of extended search

Having analysed what drives interlocal search, we will turn to the effect of interlocal search on the probability of finding employment:

$$\mathrm{P_i^E} = Prob(E = 1|x_i z_i, \delta_i) = \frac{e^{\beta x_i + \gamma z_\mathrm{i} + \delta s_\mathrm{i}}}{1 + e^{\beta x_i + \gamma z_\mathrm{i} + \delta s_\mathrm{i} x + \gamma z + \delta s}}$$

Where x_i is a vector of personal characteristics of individual *i*, and *z* is a vector of regional characteristics. Variable s_i indicates interlocal search of individual *i*, which equals one if the individual searched interlocally and zero otherwise.

A priori we can expect interlocal search to have a positive effect, for at least two reasons. Firstly, it indicates a greater scope in search, increasing the number of potential jobs. Secondly, if observable to the potential employer, it may signal a greater dedication to finding work. Variable *s* would typically be observable to *distant* employers, as they know whether the city of residence of the applicant differs from their own city, and could therefore be used by distant employers as some kind of sorting or selection criterion. However, it is

unobservable to *local* employers, who cannot tell whether the applicant is looking for jobs in distant markets as well. All they know is that the applicant resides in the same city as they operate in. A third effect, about the effect of which we have no a priori belief, is selection on unobservables, which could be either positive or negative.

If δ, the effect of interlocal search, is generally found to be negative it would indicate negative selection into willingness to move, which could be due to interlocal search being an option of last resort. If δ on the other hand is found to be positive, we cannot, from just the logit results, give any clear-cut interpretation of whether it is due to selection or an actual effect of mobility. However, for the potential employer, interlocal search per se should not be important to the decision to employ or not employ an applicant. Only if it represents some characteristic(s) important for the employer should it matter.

However, our main interest lies in analysing how the effect of interlocal search differs between the probability of finding employment in the *local* labour market and in *distant* ones. Thus, if δ is found to be significant for local employers, it must represent something that they can observe and we as researchers cannot.

Defining δ_l as the effect of interlocal search (s) on local employment and
δ_d as the effect of interlocal search (s) on distant employment,
we can make the following table of potential interpretations:

Table 4: Potential interpretations

	$\delta_l = 0$	$\delta_l < 0$	$\delta_l > 0$
$\delta_d = 0$	No effect for either local or distant employers. Variable s_i is uninformative.	Interlocal search is an "option of last resort".	Positive selection, but the job-seeker demands too high a wage premium for moving.
$\delta_d > 0$	No selection, but the greater geographic scope increases likelihood of finding employment.	The increased geographic scope (more than) compensates for the negative effect of using mobility as an "option of last resort".	Positive selection for both local and distant jobs.

Interpretations of $\delta_d < 0$ are not shown, as this outcome should logically not occur.

As we now have multiple nomial outcomes, which cannot be ordered, I use a pooled multinomial logit with three different outcomes (j=0,1,2) representing staying in employment, finding local employment and finding distant employment, respectively. Multinomial logit is

the most commonly used regression model for nomial outcomes (Long and Freese, 2006),[23] and is here defined as

$$P_E = Prob(E = j) = \frac{\beta_j x_i + \gamma z_i + \delta_j s_i}{\sum_{k=0}^{2} \beta_k x_i + \gamma z_i + \delta_k s_i}, \; j = 0, 1, 2.$$

As some of the individuals have several distinct unemployment spells and consequently occur more than once in the data, robust standard errors will be reported.

A concern when using multinomial logit is the assumption of independence of irrelevant alternatives (IIA). Very briefly, this assumption means that the odds of any two different alternatives should not be affected by what other alternatives are available. Long and Freese (2006) discuss the available tests and conclude that no test is reliable but that it is better to specify the model such that the alternative outcomes are distinct. As discussed earlier, distant jobs are jobs that would require moving or weekend commuting and can therefore be considered distinctly different from a local job. However, tests for the validity of the IIA assumption will be performed, see below.

5 Results

The descriptive statistics in Section 3.3 show that there are indications of selection into extended search area. There is also a difference, in terms of extended search, between those who found work and those who did not. We will now see how this is affected by including a rich set of control variables.

5.1 Who extends his search?

The estimation reports largely expected results (see Table 5): Younger individuals are more willing to search interlocally, as are men and unmarried individuals. Education also has a positive effect on mobility. Being an immigrant has different effects depending on whether the person is an immigrant from another Nordic country. Nordic immigrants are not statistically significantly different from native Swedes, whereas non-Nordic immigrants are less willing to search for distant jobs. This is somewhat surprising, as immigrants are generally considered more mobile than natives.

We would expect a high local unemployment rate to have a push effect, as it should encourage inhabitants to try to find work elsewhere. Correspondingly, we would expect a high

[23] See also Boehm, Herzog and Schlottman (1991), Linneman and Graves (1983) and Hacker (2000).

national unemployment rate to have a deterring effect on mobility, as there would be less work to be found. Local unemployment has the expected effect, although the effect is only weakly significant, whereas national unemployment has no statistically significant effect. The lack of statistical significance of national unemployment rates can probably be due to a lack of variation in the data, i.e. too few years of observation.

Owning a house has a negative effect on willingness to move, whereas owning a flat has no significant effect. This corresponds to the findings in Fidrmuc and Huber (2007), using Czech data. The difference between house and flat ownership could indicate that it is not the *monetary* transition cost of selling a house that reduces the willingness to move, as these costs are similar when selling a flat. It is more likely that house ownership is an indicator of some other characteristics corresponding to a higher degree of attachment to the area.

There could be two separate effects of the duration of unemployment on search behaviour. Firstly, there is the formal rule that forces the unemployed to extend their search area after 100 days of unemployment. Secondly, there is the effect of the individual realising that his entitlement period is coming to an end.[24] Both these effects should increase the probability of an individual searching in an extended area.

The first effect can be expected to be more binary in nature; immediately when the unemployment duration exceeds 100 days, there should be a change in search behaviour. The second effect can be expected to be smoother; as days pass, the individual becomes more and more anxious to find work and therefore extends his or her search area.

Passing the 100-day limit does have a positive effect on searching interlocally.[25] However, this is true for other, arbitrarily chosen, durations as well. It is therefore more likely that what we capture is part of the effect of approaching the end of the unemployment benefit entitlement period. The linear effect of unemployment spell duration is found to be positive and significant, although small.

The number of previous unemployment spells does not seem to have any effects, the exception being among those with a large number of spells.

[24] For more on this, see Lindenboom and Theeuwes (1993).
[25] Estimations run separately for men and women indicate that the effect is slightly stronger for women. Results are available upon request.

Table 5: Marginal effects on probability of searching interlocally

	Marginal effect	Std error	P-value
Aged 25 to 34	0.020	0.002	0.000
Aged 35 to 44	ref.		
Aged 45 to 65	0.007	0.003	0.032
Male	0.056	0.002	0.000
Children	-0.015	0.002	0.000
Married	ref.		
Unmarried	0.024	0.002	0.000
Divorced	0.009	0.004	0.028
Widowed	0.015	0.017	0.391
Education Compulsory schooling	ref.		
Education High school	0.022	0.003	0.000
Education Undergraduate	0.055	0.004	0.000
Education Graduate	0.103	0.017	0.000
Nordic Immigrant	0.002	0.006	0.744
Non-Nordic Immigrant	-0.011	0.003	0.000
Local unemployment rate	0.002	0.001	0.215
National unemployment rate	0.000	0.003	0.950
Home ownership: House	-0.030	0.002	0.000
Home ownership: Apartment	-0.005	0.016	0.738
Previous spells 0	ref.		
Previous spells 1-5	0.009	0.003	0.004
Previous spells 6-15	0.005	0.004	0.171
Previous spells 16 or more	0.037	0.014	0.009
Unemployment duration	0.001	0.000	0.000
Unemployment dur. > 100 days	0.018	0.002	0.000

Additional control variables: Local labour market, union specific dummies, requested working time, disabilities.
Results are based on the multinomial logit results reported in Table A2 in the appendix.
Standard errors are robust and are also adjusted for the presence of multiple observations for the same individuals (multiple unemployment spells), allowing these to not be independent.

5.2 The effects on employment probability

Turning to the effects of interlocal search on employment probability, I find that willingness to move does indeed increase the probability of finding employment. A simple logit regression with interlocal search as the only explanatory variable shows that interlocal search has a positive marginal effect of about 0.09. Adding more explanatory variables reduces the effect of interlocal search slightly, to about 0.08. However, the truly interesting question is whether this effect is present only in distant labour markets or if it is also present in an individual's local labour market. I therefore run a multinomial logit with three possible outcomes: found no job, found job in the local labour market, or found job in a distant labour market. The results are shown in Table 6.

Table 6: Marginal effects on probabilities of different outcomes

	unemployment			local employment			distant employment		
	Marginal effect	Std error	P-value	Marginal effect	Std error	P-value	Marginal effect	Std error	P-value
Aged 25 to 34	0.049	0.01	0.000	-0.052	0.01	0.000	0.003	0.00	0.000
Aged 35 to 44	ref.			ref.			ref.		
Aged 45 to 65	0.028	0.01	0.000	-0.025	0.01	0.000	-0.003	0.00	0.000
Male	-0.115	0.01	0.000	0.114	0.01	0.001	0.002	0.00	0.001
Children	0.057	0.00	0.000	-0.051	0.00	0.000	-0.006	0.00	0.000
Married	ref.			ref.			ref.		
Unmarried	0.015	0.01	0.009	-0.013	0.01	0.006	-0.001	0.00	0.006
Divorced	0.061	0.01	0.000	-0.062	0.01	0.148	0.001	0.00	0.148
Widowed	0.122	0.03	0.000	-0.122	0.03	0.944	0.000	0.00	0.944
Education Compulsory schooling	ref.			ref.			ref.		
Education High school	-0.045	0.01	0.000	0.043	0.01	0.061	0.002	0.00	0.061
Education Undergraduate	0.000	0.01	0.961	-0.006	0.01	0.000	0.006	0.00	0.000
Education Graduate	0.007	0.02	0.746	-0.006	0.02	0.453	-0.001	0.00	0.453
Nordic Immigrant	-0.022	0.01	0.098	0.019	0.01	0.058	0.003	0.00	0.058
Non-Nordic Immigrant	0.082	0.01	0.000	-0.079	0.01	0.000	-0.003	0.00	0.000
Local unemployment rate	0.018	0.00	0.000	-0.018	0.00	0.255	0.000	0.00	0.255
National unemployment rate	0.099	0.01	0.000	-0.092	0.01	0.000	-0.006	0.00	0.000
Home ownership: House	-0.089	0.01	0.000	0.092	0.01	0.000	-0.003	0.00	0.000
Home ownership: Apartment	-0.072	0.04	0.069	0.069	0.04	0.606	0.002	0.00	0.606
Previous spells 0	ref.			ref.			ref.		
Previous spells 1-5	-0.033	0.01	0.000	0.033	0.01	0.343	-0.001	0.00	0.343
Previous spells 6-15	0.003	0.01	0.736	-0.001	0.01	0.006	-0.002	0.00	0.006
Previous spells 16 or more	-0.082	0.03	0.009	0.081	0.03	0.767	0.001	0.00	0.767
Unemployment duration	0.023	0.00	0.000	-0.023	0.00	0.220	0.000	0.00	0.220
Unemployment dur. Squared	0.001	0.00	0.000	-0.001	0.00	0.038	0.000	0.00	0.038
Interlocal search	-0.067	0.01	0.000	0.054	0.01	0.000	0.013	0.00	0.000

Additional control variables: Local labour market, union specific dummies, requested working time, disabilities.
Results are based on multinomial logit results reported in Table A3 in the appendix.
Standard errors are robust and are also adjusted for the presence of multiple observations for the same individuals (multiple unemployment spells), allowing these to not be independent.

In general, the results are as expected: Education increases the likelihood of employment, although postgraduate education decreases it. This may seem odd, but one must keep in mind that we are talking about the likelihood of becoming employed if unemployed to begin with. This likelihood should be very different from the likelihood of being employed in general, and those highly educated individuals who register at the unemployment office may be a selected sample of all highly educated. Being male increases the likelihood, as does being married. Having children or being older than 45 decreases the likelihood.

Having experienced a few unemployment spells previously has no effect on employment likelihood. However, having between 6-15 earlier spells significantly reduces the

likelihood of employment whereas having more than sixteen spells *increases* it.[26] Being an immigrant from outside the Nordic countries reduces the chances of escaping unemployment, while Nordic immigrants are not significantly different from native Swedes.

Finally, increasing one's search area is found to increase the likelihood of escaping unemployment, just as in the simple logit regression. However, the marginal effect of interlocal search is greater on the *local* market than on *distant* ones. This indicates that it is not the extended search area per se, and the consequently larger number of potential jobs to apply for, that increases the likelihood of escaping unemployment, but rather that it is an effect of the positive selection into mobility, related to some characteristics unobservable to us, that drives the positive effect of interlocal search.

5.2.1 Robustness checks

If we, despite the discussion in Section 3.2.1, believe that the 100-day rule was actually enforced, one could argue that workers who passed the 100-day limit were forced to search interlocally and that the perceived threat of having to accept a distant job made workers accept less attractive local jobs. Another problem could be the effect of approaching the end of the entitlement period; individuals approaching a point where they will no longer be entitled to unemployment benefits will arguably be more willing to accept a job offer, even at a lower wage. These two effects would give rise to results similar to those presented above. As a robustness check I therefore estimated the same specification only for workers with unemployment durations of less than 100 working days. These individuals, with unemployment durations of less than 100 working days, are different than others in two ways: They were not forced to extend their search area and they were relatively far from the end of the benefit entitlement period. They can therefore be considered unaffected by both effects. However, results were very similar.

Additional robustness checks were made using different samples: only those who started their unemployment spells after February 5, 2001 (when a change of rules was implemented), all unemployed (not only those classified as able to 'start working immediately'), as well as a subsample for which we have very detailed unemployment benefit replacement rates. Although the size of the estimated effect varies between these different samples, the signs, significance and relative ordering of effects were unchanged. In all

[26] Bear in mind that these effects say nothing about the likelihood of keeping employment once having obtained it. Thus, individuals with more than sixteen spells could have some unobservable (to us) characteristics that reduce the likelihood of maintaining employment, which could be the reason why they have so many unemployment spells.

samples the estimated effect on unemployment is negative, but positive on both employment outcomes with the largest positive effect on *local* employment. These results are found in Appendix, Table A4.[27]

5.2.2 Testing for IIA

Although available tests for the validity of the independence of irrelevant alternatives (IIA) are not fully reliable and often produce conflicting results (Long and Freese, 2006), two tests were performed. The Hausman test gives slightly different results depending on which choice category is excluded. Excluding distant employment results in an insignificant test statistic, indicating that the IIA assumption has not been violated. Excluding local employment, on the other hand, returns a *negative* test statistic, which is not uncommon and also indicates that the IIA assumption has not been violated. The Small-Hsiao test, on the other hand, indicates that the IIA assumption has been violated.

Additionally, simple logit estimations were made for two different binary choice sets, excluding either local or distant employment. The results from these separate estimations were quite similar to the multinomial logit results.

Thus, although formal tests provide conflicting results, the results appear fairly robust to the exclusion of one of the choice categories. Furthermore, as the choice of accepting a *distant* job can be seen as quite different from accepting a *local* job lends further support for the multinomial logit model, we can reasonably still feel relatively confident about using it.

6 Conclusions

I find that most expectations are fulfilled regarding the characteristics that influence willingness to move and the probability of escaping unemployment. It appears that there is positive selection into extended search. I find evidence for selection on both observables and unobservables, as indicated by the estimations of the probability of extending search and the fact that I find positive effects of extended search on the probability of finding employment *locally*. There is no reason why the probability of finding work in the local labour market should be affected by an individual's geographic search scope.

[27] Additionally, discrete time duration modelling was tried. This requires that we create a number of individual-period observations for each individual. The number of such period-individual observations required for each individual is equal to the number of days of the individual's unemployment duration. One then estimates a multinomial logit model including all these observations, where the dependent variable is zero for all but the last observations. For individuals with right-censored spells, the last observation is also zero. However, the results were robust.

One possible argument would be that individuals using extended search as an option of last resort may be less restrictive in what job offers they would be willing to accept in the local market, thereby increasing the probability of finding local work. However, robustness checks show that this is not the reason. Thus, I believe that the positive effect of interlocal search on the probability of finding work locally is primarily due to positive selection. Higher skill or ability, unobservable in the data, also makes individuals more mobile and willing to search interlocally. However, their better qualifications are observable to the potential employer, and therefore also make them more likely to find work locally. A further explanation could be that extending your search is a sign of greater dedication to finding work. Thus, we could expect these individuals to be more motivated in other aspects as well, increasing their chances of finding work in the local market as well as in distant ones.

The policy implication of these results is that we cannot be certain of any positive effect on employment probabilities in general from stricter rules for unemployment benefit eligibility, forcing unemployed individuals to search in an extended area. The positive effects on the local market found in this paper would most likely disappear as the most probable explanation for this effect, namely positive selection, is removed if everyone is forced to extend their search. It is more difficult to say what would happen to the effect on distant jobs. However, since the effects of extended search are very small even in our sample where such a search is essentially voluntary, we cannot expect any major positive effects of *forced* extended search. In fact, it is more probable that, due to reduced motivation and effort among those forced into extended search, the effects would even be smaller than the already small effect found here.

Tighter rules have already been imposed in Sweden, in the summer of 2007, stipulating a requirement to search in the whole country from the first day of unemployment, although some exceptions are made from this general rule. Data from this post-reform period will be very interesting and will add more information on these issues.

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Appendix

Table A1: Descriptive statistics of all "ready to take work immediately"

	Mean	Std dev.	min	max
Age	38.046	9.698	25	65
Male	0.494	0.500	0	1
Children	0.578	0.494	0	1
Married	0.484	0.500	0	1
Unmarried	0.408	0.491	0	1
Divorced	0.103	0.304	0	1
Widowed	0.005	0.073	0	1
Education Compulsory Schooling	0.170	0.376	0	1
Education High School	0.509	0.500	0	1
Education Undergraduate	0.310	0.462	0	1
Education Graduate	0.011	0.104	0	1
Nordic Immigrant	0.034	0.181	0	1
Non-Nordic Immigrant	0.200	0.400	0	1
Local unemployment rate	3.967	1.281	0	10.2
National unemployment rate	3.788	0.364	3.3	4.2
Home ownership: House	0.375	0.484	0	1
Home ownership: Appartment	0.003	0.057	0	1
Previous spells 0	0.118	0.322	0	1
Previous spells 1-5	0.559	0.497	0	1
Previous spells 6-15	0.315	0.464	0	1
Previous spells 16 or more	0.006	0.080	0	1
Interlocal search	0.095	0.294	0	1
Unemployment duration (days)	251.468	309.225	0	1898
# observations	64 724			

Table A2: Logit estimates. Dependent variable is interlocal search

	Coeff.	Std. Err.
Aged 25 to 34	0.309	0.036
Aged 35 to 44	ref.	
Aged 45 to 65	0.099	0.045
Male	0.853	0.034
Children	-0.233	0.031
Married	ref.	
Unmarried	0.362	0.036
Divorced	0.130	0.057
Widowed	0.209	0.224
Education Compulsory schooling	ref.	
Education High school	0.338	0.050
Education Undergraduate	0.743	0.053
Education Graduate	1.032	0.123
Nordic Immigrant	0.028	0.084
Non-Nordic Immigrant	-0.178	0.047
Local unemployment rate	0.024	0.019
National unemployment rate	0.003	0.044
Home ownership: House	-0.488	0.036
Home ownership: Apartment	-0.084	0.259
Previous spells 0	ref.	
Previous spells 1-5	0.142	0.049
Previous spells 6-15	0.076	0.055
Previous spells 16 or more	0.473	0.151
Unemployment duration	0.020	0.005
Unemployment dur. > 100 days	0.280	0.035
Constant	-3.971	0.174
No. Of observations	64 693	

Additional control variables: Local labour market, union specific dummies, requested working time, disabilities.

Standard errors are robust and are also adjusted for the presence of multiple observations for the same individuals (multiple unemployment spells), allowing these to not be independent.

Table A3: Multinomial logit estimates. Omitted category: unemployment.

	Local employment		Distant employment	
	Coef.	Std. Err.	Coef.	Std. Err.
Aged 25 to 34	-0.212	0.023	0.374	0.083
Aged 35 to 44	ref.		ref.	
Aged 45 to 65	-0.111	0.027	-0.519	0.122
Male	0.477	0.022	0.436	0.073
Children	-0.223	0.020	-0.921	0.069
Married	ref.		ref.	
Unmarried	-0.058	0.023	-0.237	0.080
Divorced	-0.262	0.034	0.092	0.124
Widowed	-0.544	0.137	-0.152	0.535
Education Compulsory schooling	ref.		ref.	
Education High school	0.183	0.028	0.309	0.125
Education Undergraduate	-0.013	0.032	0.766	0.125
Education Graduate	-0.026	0.092	-0.252	0.364
Nordic Immigrant	0.082	0.054	0.413	0.169
Non-Nordic Immigrant	-0.341	0.029	-0.574	0.105
Local unemployment rate	-0.074	0.012	-0.078	0.042
National unemployment rate	-0.395	0.028	-1.131	0.093
Home ownership: House	0.374	0.023	-0.316	0.086
Home ownership: Apartment	0.287	0.159	0.433	0.516
Previous spells 0	ref.		ref.	
Previous spells 1-5	0.137	0.029	-0.041	0.103
Previous spells 6-15	-0.007	0.033	-0.304	0.117
Previous spells 16 or more	0.331	0.126	0.300	0.481
Unemployment duration	-0.095	0.011	-0.098	0.048
Unemployment dur. squared	-0.004	0.001	-0.015	0.006
Interlocal search	0.247	0.032	1.251	0.080
Constant	1.305	0.106	0.904	0.359
No. of observations	61 685		61 685	

Additional control variables: Local labour market dummies, union specific dummies, requested working time, disabilities.
Standard errors are robust and are also adjusted for the presence of multiple observations for the same individuals (multiple unemployment spells), allowing these to not be independent.

Table A4: Partial marginal effects of interlocal search for different samples*

		Unemployment		Local employment		Distant employment	
	Sample	Marginal effect	Std error	Marginal effect	Std error	Marginal effect	Std error
1)	Ready to start work immediately	-0.067	0,008	0.054	0,008	0.013	0,001
2)	All unemployed	-0.053	0,005	0.035	0,005	0.018	0,001
3)	Men	-0.046	0,007	0.031	0,007	0.015	0,001
4)	Women	-0.053	0,008	0.043	0,008	0.010	0,001
5)	Spells starting in or after 2001	-0.052	0,006	0.034	0,006	0.018	0,001
6)	Spell duration < 100 days	-0.105	0,011	0.086	0,011	0.019	0,002
7)	Both 5 & 6	-0.093	0,012	0.074	0,012	0.020	0,002
8)	Smaller sample, including replacement rates	-0.059	0,021	0.059	0,021	3.45E-08	0,000
9)	Same sample as in 8) but without replacement rates	-0.066	0,021	0.066	0,021	4.19E-07	0,000

* Full estimation results and marginal effects available upon request.