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ABSTRACT

Mobility Assistance Programmes for Unemployed Workers, Job Search Behaviour and Labour Market Outcomes*

The appealing idea of geographically relocating unemployed job seekers from depressed to prosperous regions and hence reducing unemployment leads to industrialised countries offering financial support to unemployed job seekers when searching for and/or accepting jobs in distant regions. In this paper, we investigate the impact of the existence of these mobility assistance programmes (MAPs) on the job search behaviour of unemployed workers and how this affects their labour market outcomes. While job search theory predicts a shift in individuals' search effort from local to distant labour markets, consequences for other dimensions of the search behaviour, e.g. reservation wages or the overall search effort, and job-finding probabilities remain theoretically ambiguous. We use survey data on German unemployed job seekers and apply an instrumental variable approach to empirically identify the causal impact of an increased search radius, due to the availability of MAPs, on job search strategies and subsequent labour market outcomes. The results show that the existence of MAPs shifts individuals' search effort from local to distant regions without affecting the total number of job applications. The increase in search radius causes a higher geographical mobility and hence higher employment probabilities and wages.

JEL Classification: J61, J68, D04, C21

Keywords: job search, active labour market policy, labour market mobility, instrumental variable approach

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1 Introduction

The existence and associated economic consequences of large and persistent regional disparities in terms of employment are well documented for industrialised countries (Moretti and Kline, 2013; OECD, 2005). To equalise these disparities, geographical mobility of labour is considered as one of the most efficient adjustment mechanisms relaxing labour market tightness in certain regions and improving job match quality (Blanchard et al., 1992; Taylor and Bradley, 1997; Giannetti, 2002; Borjas, 2006). Therefore, some industrialised countries spend financial resources on increasing job seekers' willingness to search for and accept jobs in geographically-distant regions within the country, i.e. increasing internal migration. For instance, the German active labour market policy (ALMP) offers a wide range of financial support for distant job search activities, such as subsidies for travel costs to distant job interviews, daily commuting costs or even the costs of a relocation. These programmes aim to enhance geographical mobility by removing existing financial constraints that prevent unemployed individuals from searching for jobs in distant labour markets.[1] Moreover, earlier studies have shown the effectiveness of such programmes to improve the labour market outcomes of actual participants (e.g. Caliendo et al., 2017).

In addition to actual participation, the mere existence of these MAPs, covering several types of subsidies, can already be expected to affect the job search behaviour of unemployed workers. If caseworkers inform their clients about the availability of MAPs, this can be assumed to reduce the job seekers' expected costs of searching for and accepting jobs in geographically-distant labour markets and therefore provides incentives to shift their search effort from local to distant vacancies. However, it remains theoretically unclear whether this leads to an increase of the overall effort level and whether this increases the job-finding rate, e.g. due to higher job-offer arrival rates or a better job match quality. We now empirically investigate these mechanisms and aim to answer the following questions: Does the existence of MAPs affect individuals' willingness to search for distant jobs and, if so, what is the impact on other dimensions of the search behaviour, such as local search effort and reservation wages? Moreover, we also examine the impact of the altered job search strategy on subsequent labour market outcomes, as well as the realised moving and commuting behaviour. Analysing the *existence* instead of the *participation* effect is particularly interesting as it allows us to provide first comprehensive evidence with respect to

[1] We find suggestive evidence of the existence of such constraints in our estimation sample. For instance, households receiving one of these subsidies are more likely to depend on welfare payments and are less likely able to pay off their debt compared with non-subsidised job seekers.

the underlying effect mechanisms induced by the presence of the programme. Moreover, it allows us also to analyse consequences for job-finding probabilities, which can not be specified based on participation data since receiving one of the subsidies already implies starting a new job. This also provides insights about the importance of deadweight effects related to the subsidy payout, since a strong behavioural adjustment due to the availability of the programme would suggest that only a small fraction of actual participants had moved even without the subsidy and vice versa.

In the empirical analysis, we use rich survey data on unemployed job seekers in Germany and apply an instrumental variable approach exploiting regional variation among German local employment agencies (LEA) with respect to their preferences towards MAPs. Therefore, we take advantage of the fact that each LEA has a high degree of autonomy when deciding on its own policy mix, i.e. which share of its budget to spend on which ALMP programme. This autonomy leads to regional differences in terms of the intensity with which MAPs are offered to job seekers (conditional on local labour market conditions). We use this regional variation as an instrumental variable that exogenously affects the individual probability to search for distant jobs. Therefore, job seekers living in a LEA district with a high intensity of MAPs also face a higher probability of receiving knowledge about the existence of the programmes (via the case-worker), which is expected to increase their willingness to search for distant jobs. This exogenous variation in the first stage subsequently allows us to estimate the causal effect of searching for distant jobs on other search characteristics and subsequent labour market outcomes. Based on this IV setting, which assumes that any behavioural adjustment is a consequence of the initial decision to consider a relocation, our results can be interpreted as the local average treatment effect (LATE, see Imbens and Angrist, 1994) on those job seekers who start searching for distant jobs due to the LEA's support of MAPs. We argue that this parameter holds strong interest for policy-makers as they have full control over the instrumental variable, i.e. the (regional) intensity of MAPs.

With our study, we contribute to the economic literature in particular with respect to three dimensions. First, existing studies have identified several determinants of geographical mobility. It has been shown that a generous welfare system (De Giorgi and Pellizzari, 2009), strong social ties (Rainer and Siedler, 2009; Belot and Ermisch, 2009), home-ownership (Battu et al., 2008; Caliendo et al., 2015b), risk-aversion (Jaeger et al., 2010; Bauernschuster et al., 2014) and external locus of control (Caliendo et al., 2015a) reduce internal migration, while educational mismatch (Borjas et al., 1992) and regional disparities in terms of prices (Giannetti, 2003),

income (Kennan and Walker, 2011) and labour demand (Wozniak, 2010) positively affect geographical mobility in the labour market. Moreover, studies on individual characteristics find that migrants are rather young and have higher levels of human capital (e.g. Pekkala and Tervo, 2002; Hunt, 2006; Dustmann and Preston, 2007). Another stream of literature shows individuals' preferences to avoid longer commuting distances by accepting lower wages (see Van den Berg and Gorter, 1997; Van Ommeren et al., 2000b), change jobs (see Zax, 1991; Zax and Kain, 1991) or relocate (see Zax, 1994).[2] In our study, we analyse the extent to which the existence of MAPs affects individuals' decisions to search for distant jobs and hence geographical mobility. Second, we contribute to the literature on the returns to geographical mobility, especially in the context of governmental subsidy programmes. Thus far, evidence only exists for the US (Briggs and Kuhn, 2008; Mueller, 1981), Germany (Caliendo et al., 2017) and Romania (Rodríguez-Planas and Benus, 2010), showing that specific MAPs, i.e. relocation assistance programmes, improve the labour market outcomes (employment and income) of participants. Third, in contrast to the existing literature, we now analyse whether the incentives provided by the mere existence of MAPs have an impact on job seekers' labour market outcomes through changes in job search behaviour. This allows us to provide comprehensive evidence with respect to the underlying effect mechanisms, which have not been analysed in the context of MAPs and have only received very limited attention for ALMP programmes in general. In particular, we can disentangle two potential behavioural adjustments: on the one hand, job seekers have incentives to increase their overall effort level due to the reduction of search costs; and on the other hand, the presence of MAPs would also encourage job seekers to shift their effort from local to distant job applications. While the first mechanism can be expected to increase job-finding rates in general, the effectiveness of the second depends on the labour market conditions in different regions. This is generally related to the literature on the ex-ante effects of labour market policies showing that job seekers who are at risk of being treated often adjust their search behaviour to prevent programme participation (see e.g. Black et al., 2003; Rosholm and Svarer, 2008; van den Berg et al., 2009).

The results show that regional variation in the availability of MAPs influences the individuals' willingness to search for distant jobs. In fact, job seekers living in LEA districts that offer MAPs more intensively, shift their search effort from local to distant job search, while the total effort

[2] A related body of literature analyses moving decisions in a general-equilibrium framework accounting for regional-specific factors like the supply of land, local amenities, housing costs (see the seminal studies by Rosen, 1979; Roback, 1982) as well as local public finances (see Gyourko and Tracy, 1991), idiosyncratic preferences for locations (see Moretti, 2011) and information frictions (see Lutgen and van der Linden, 2015).

level remains unchanged. The extended search radius leads to a higher probability of moving to a distant region, as well as higher job-finding probabilities and wages. Moreover, we conduct an extensive sensitivity analysis to rule out the notion that unobserved regional differences bias our estimation. In particular, we exploit an alternative instrument and account for region-specific preferences of the working population with respect to geographical mobility. The remainder of the paper is organised as follows. The next section explains the institutional settings in Germany, outlines the theoretical job search model and introduces the data. Section 3 explains the econometric identification strategy. Section 4 presents the estimation results and shows the robustness of these results, especially with respect to unobserved regional heterogeneity, before Section 5 concludes.

2 Institutional Settings, Economic Framework and Data

2.1 Mobility Assistance Programs in Germany

MAPs as part of ALMP were initially introduced in 1998 in Germany to encourage geographical mobility among unemployed job seekers and encompass overall six separate programmes ranging from reimbursement for distant job interviews to relocation assistance. While the use of such programmes was only modest immediately after their introduction in 1998, it increased remarkably with the implementation of a major labour market reform – the "Hartz Reform" – between 2003 and 2005 (see, e.g. Caliendo and Hogenacker, 2012, for details). Whereas only 84,000 job seekers received mobility assistance in 1999, the number increased to 375,000 participants in 2008.

In general, MAPs are directly linked to a transition to employment, i.e. to be eligible, the job seeker has to have a concrete job offer (respectively a job interview to receive travel cost assistance). It is further important to know that out of the six separate programmes summarised under the term MAP, only four programmes are actually directly linked to the geographical mobility of unemployed job seekers. The two "unrelated" subsidy programmes are called equipment and transition assistance. The equipment assistance financially supports the acquisition of work clothes and working tools up to an amount of €260, while the transition assistance offers an interest-free loan up to €1,000 to bridge the period until the first wage payment arrives. Both programmes aim to increase the job seekers' overall flexibility to overcome financial barriers to the new job, but not necessarily the geographical mobility. Nevertheless, they are categorised as MAPs due to administrative reasons.

By contrast, the other four programmes directly aim to address the geographical mobility. First, the travel cost assistance reimburses expenses for distant job interviews up to an amount of €300. Second, the commuting assistance financially supports the daily commuting to work with 20 Euro cent per kilometre for the first six months in the new job. Third, the separation assistance subsidises temporary accommodation costs of up to €260 per month for a period of maximal six months, e.g. for renting a second apartment at the new working location. Fourth, the relocation assistance provides full coverage of transportation costs (with a maximum of €4,500) associated with a permanent move to the new working location. In order to being eligible to both separation and relocation assistance, the daily commuting time to the new working location has to exceed 2.5 hours.

The application for all programme types has to be submitted to the LEA before the actual event that should be subsidised takes place. Moreover, job seekers are only eligible if the prospective employer does not cover the requested costs, and subsequent programme participation is allowed. The final decision about subsidy receipt is at the caseworker's discretion (no legal claim). The caseworker decides based on the individual labour market situation of the applicant and the available budget of the LEA for MAPs.

2.2 Theoretical Framework

As discussed above, MAPs are subsidies that reduce the job seeker's search and moving costs associated with vacancies in geographically-distant regions. Therefore, the existence of these programmes can be expected to provide incentives to increase job seekers' search radius, respectively to spend more effort on those activities that are associated with the receipt of a subsidy, e.g. applying to vacancies that require a residential relocation. However, the impact on other dimensions of job seekers' search strategy is less clear. In order to illustrate the underlying mechanisms and discuss the potential effects of the different subsidies, the following section presents a stylised job search model (see e.g. Mortensen, 1986) where job seekers are allowed to search simultaneously in local and distant labour markets. The theoretical framework builds on the vast literature analysing spatial job search models. However, in contrast to search models developed by urban economists who typically consider the choice of housing and job location as being mutually dependent (see e.g. Rouwendal, 1999; Van Ommeren et al., 1999, 2000a; Eliasson et al., 2003; Damm and Rosholm, 2010; Buchinsky et al., 2014), we assume that the acceptance of a distant job determines a residential relocation (see e.g. Sugden, 1980; Van Ophem, 1991; Van den Berg, 1992; Arntz, 2005). This assumption seems to be plausible given that the subsidy

under scrutiny targets unemployed job seekers (who focus on job search).

Model Setup: Each job seeker decides on how much effort he/she wants to devote to local and distant job search activities, denoted by e_l and e_d respectively. We define local as being within commuting distance, whereas distant jobs are those that would require a residential relocation. This decision on search effort as well as regional differences in terms of labour market conditions implies different job-offer arrival rates for local $\alpha_l(e_l)$ and distant jobs $\alpha_d(e_d)$. Both functions increase with respect to effort, i.e. $\frac{\partial \alpha_l}{\partial e_l} > 0$ and $\frac{\partial \alpha_d}{\partial e_d} > 0$. Furthermore, the two labour markets are characterised by different wage offer distributions $F_l(w_l)$ for local and $F_d(w_d)$ for distant jobs, which are assumed to be known by the job seeker. Accepting a distant job offer involves higher costs compared to a local offer. The additional costs, denoted by $\kappa > 0$, arise due to the relocation, including, e.g. transportation costs, job change of a partner, school change of children, social ties, etc. Finally, when not accepting a job offer the search process continues, where searching for a job causes costs $c(e_l, \lambda e_d)$ depending on both types of search effort. Search costs are assumed to increase with respect to effort, i.e., $\frac{\partial c}{\partial e_l} > 0$, $\frac{\partial c}{\partial e_d} > 0$, and $\lambda > 1$ denotes the additional search costs for distant compared to local job search, e.g. due to higher travel costs for job interviews or the higher effort needed to receive information about vacancies.

Optimal Search Strategy: Within this framework, the optimal search strategy is to accept any offer with a wage that exceeds the individual reservation wage, which is defined as the lowest net wage at which the job seeker is indifferent between accepting the offer and remaining unemployed. The job seeker rejects every job offer with a wage below the reservation wage. For a given discount rate r, the reservation wage ϕ can be derived by equalising the inter-temporal utility of accepting a given local or distant job offer and the utility of remaining unemployed (see for instance Rogerson et al., 2005, and the Supplementary Appendix A for details):

$$\phi = -c(e_l, \lambda e_d) + \alpha_l(e_l) E_{F_l} \max\left\{\frac{w_l - \phi}{r}, 0\right\} + \alpha_d(e_d) E_{F_d} \max\left\{\frac{w_d - (\kappa + \phi)}{r}, 0\right\} \qquad (1)$$

where the first term on the right-hand side depicts the search costs, and the second and third terms the return to local and distant job search, respectively. Given the job-offer arrival rates, the cost function and the wage distributions, the job seeker chooses the optimal level of effort on local and distant job search by maximising the inter-temporal utility, i.e. $\frac{\partial \phi}{\partial e_l} = \frac{\partial \phi}{\partial e_d}$ which yields:

$$G(e_l, e_d) = \lambda \frac{\partial c}{\partial e_d} - \frac{\partial c}{\partial e_l} + \frac{\partial \alpha_l}{\partial e_l} E_{F_l} \max\left\{\frac{w_l - \phi}{r}, 0\right\} - \frac{\partial \alpha_d}{\partial e_d} E_{F_d} \max\left\{\frac{w_d - (\kappa + \phi)}{r}, 0\right\} = 0 \qquad (2)$$

This first-order condition implies that the availability of MAPs (as discussed in Section 2.1) affects the equilibrium levels of search effort for local and distant jobs by changing the costs of accepting a distant job offer κ (through separation and relocation assistance), as well as the additional search costs for distant jobs λ (through the travel cost assistance). On the one hand, it can be expected that distant job search becomes generally more attractive compared to local search activities (due to lower costs and higher returns), which encourages job seekers to shift effort from local to distant search activities (substitution effect). However, on the other hand, reducing the costs of distant job search allows the job seeker to devote more effort overall to both types of job search (income effect). Therefore, the model clearly predicts that the presence of the MAPs leads to a higher level of distant search effort, while the impact on local search effort crucially depends on the functional form of G (because substitution and income effects act in different directions).[3] For instance, assuming that $\frac{\partial G}{\partial e_l} < 0$ and $\frac{\partial G}{\partial e_d} < 0$ ensures that equation 2 characterises a maximum. This implies that the marginal return with respect to both types of search effort, determined by the job offer arrival rates α_l and α_d, increases to a lesser degree than the marginal search costs imposed by the function c. Hence, the substitution effect will be larger than the income effect and the model predicts:

$$\frac{\partial e_d}{\partial \lambda} < 0, \quad \frac{\partial e_d}{\partial \kappa} < 0, \quad \frac{\partial e_l}{\partial \lambda} > 0 \quad \text{and} \quad \frac{\partial e_l}{\partial \kappa} > 0. \tag{3}$$

Consequently, we can expect an increased exit rate to distant jobs and a lower exit rate to local jobs. Moreover, the reduction of κ also directly reduces the reservation wage for distant jobs leading to a higher exit rate to employment (see equation 1). However, due to the lower search costs for distant jobs λ as well as the increased net wage for distant jobs (due to the reduced κ), remaining unemployed and continuing job search becomes more attractive making the expected effect on the reservation wage and the exit rate to employment ambiguous.

2.3 Data and Descriptive Statistics

For the empirical analysis, we use the *IZA Evaluation Dataset Survey* as provided by the International Data Service Center (IDSC) of the Institute of Labor Economics (IZA). The data comprises survey information on 17,396 individuals who entered unemployment between June 2007 and May 2008 in Germany (see Arni et al., 2014, for details). The survey comprises three interview waves. This first interview took place shortly after the entry into unemployment (on

[3] In general, the same is true for the overall effect on distant job search. However, since $\lambda > 1$, it is much more likely that $\frac{\partial G}{\partial e_d} < 0$ compared to $\frac{\partial G}{\partial e_l} < 0$. This can be seen from condition A.12 and A.13 in the Supplementary Appendix A.

average 10 weeks). After 12 and 36 months, the participants received a second and third interview. Due to panel attrition, only 8,915 and 5,786 individuals are observed in the second and third waves, respectively. Besides an extensive set of socio-demographic characteristics and labour market outcomes, the survey contains a large variety of non-standard questions about job search behaviour, social networks, psychological factors, cognitive and non-cognitive skills, subjective assessments on future outcomes and preferences.

We implement the following restrictions to define our estimation sample: We use the first and second wave only.[4] Although the third wave would increase the observation window to 36 months after entry into unemployment, it induces a low number of observations (due to panel attrition) which would significantly reduce the statistical power of the empirical model. We further consider only individuals who report in the first interview that they are actively searching for employment (including self-employment), as only those received the questions on job search behaviour which are crucial for our analysis. Active job search is defined as having sent out at least one application between entry into unemployment and the first interview. This restriction excludes individuals who have either already found a job or are inactive. In order to estimate the effect of MAPs on distant job search, we divide the sample into distant and local job seekers. The definition of *distant job seeker* is based on the survey question concerning whether the job seeker also applied for vacancies that would require a relocation: respondents who negated this question are defined as *local job-seekers*. This classifying question is measured at the first interview, for which the exact timing differs significantly across individuals (one to four months after entry into unemployment). Therefore, we do control for the timing of the first interview in the empirical model to take the correlation between search radius and unemployment duration into account.[5] The final estimation sample comprises 4,625 local and 1,799 distant job seekers.

[Insert Table 1 about here]

Table 1 shows selected descriptive statistics of individual, household and regional characteristics. First, it can be seen that distant job-seekers are very different compared to local job seekers in terms of observed characteristics. They tend to be younger, higher educated, have more employment experience and higher earnings in the past. Moreover, they are less likely to have family obligations and property. Second, with respect to personality, distant job seekers tend to be more open, less neurotic and have a more internal locus of control. Finally, distant

[4] Section 4.4 shows the robustness of our results with respect to panel attrition.

[5] For instance, individuals might extend their search radius with increasing unemployment duration if local job search fails. Not taking this into account would bias our results.

job seekers live in rather disadvantaged regions in terms of labour market conditions.

[Insert Table 2 and Figure 1 about here]

As outcome variables, we consider different characteristics with respect to (i) individuals' job search behaviour (measured in wave 1), (ii) labour market outcomes (measured in wave 2) and (iii) geographical mobility (also measured in wave 2). Table 2 shows unconditional differences between local and distant job seekers with respect to different outcome variables. In panels A and B, it can be seen that the selection of distant job seekers is reflected by the job search behaviour and more favourable labour market outcomes. With respect to job search, distant job seekers devote more effort to job search activities and have a higher reservation wage. Search effort is measured by the average weekly number of applications. In addition to Table 2, Figure 1 shows the exact distribution of the number of job applications and search radius. With respect to labour market outcomes, distant job seekers are about 4 percentage points more likely to be regularly employed in the second wave, they are slightly more commonly self-employed, earn on average €1.09 more per hour and work about 5 hours more per week compared to local job seekers, which also results in higher monthly earnings of about €400.

In order to shed light on the underlying mechanisms, Panel C of Table 2 shows additional outcome variables with respect to job seekers' realised geographical mobility related to the transition from unemployment to employment. In fact, we consider the share of those who (i) relocated during the two interview waves, (ii) received a mobility assistance and (iii) travel $>$ 50km to their work. Unsurprisingly, distant job seekers experience a higher labour market mobility with respect to all three measures compared to local job seekers. It can be seen that about 12% of those who apply for distant vacancies also relocate within one year. Moreover, 20% of the distant job seekers who are employed at the second wave report that their working location is more than 50km away from their place of residence, while 6% make use of a mobility assistance.

3 Empirical analysis

Our discussion has shown that it remains theoretically ambiguous how increasing the search radius by offering MAPs affects the overall job search strategy and what consequences it would imply for subsequent labour market outcomes. The main problem when estimating the effect of distant job search using non-experimental data is the simultaneous correlation of unobserved

characteristics, such as the motivation of a job seeker or social ties, with the job seeker's willingness to search for distant jobs and the outcome variables. We address the endogeneity problem by using an instrumental variable approach which is also applied by Caliendo et al. (2017). In fact, we exploit regional variation in terms of the LEAs' preferences for MAPs (instrument) to identify the effect of the availability of MAPs on the individual probability of searching for distant jobs (1st stage), as well as the causal impact of searching for distant jobs on both the overall search strategy and labour market outcomes (2nd stage). In the following, we explain the instrument and the estimation strategy in further detail.

3.1 The Local Treatment Intensity as Instrumental Variable

In an ideal setting, we would actually like to have access to experimental data on (at least) two regions, with the only difference that one region offers MAPs and the other does not. As long as job seekers are randomly assigned to either of the two regions, an unconditional comparison would yield a causal interpretation. Unfortunately, such an experiment does not exist in reality, whereby we have to find a similar "quasi" experimental situation to causally identify the aforementioned mechanism. In fact, we exploit a special feature of the administration of the German employment agency with respect to the allocation of ALMP programmes. While the Federal Employment Agency determines the budget for each LEA and the set of ALMP programmes, the single LEAs have autonomy in allocating the assigned budget to the pre-determined ALMP programmes (see Blien et al., 2009; Fertig et al., 2006). This autonomy generates regional variation in terms of the intensity with which job seekers are treated with MAPs, i.e. certain regions assign higher budgets to MAPs than others, while unemployed workers are assigned to LEAs based on their place of residence. The allocation decision by the LEA is based on two dimensions: (i) local labour market conditions and (ii) preferences of the administrative boards of the LEAs, capturing beliefs and experiences about the effectiveness of certain ALMP programmes. Caliendo et al. (2017), who firstly used this instrument to estimate the effect of relocation assistance, one of the six MAPs, on participants' labour market outcomes, argue that the empirical challenge is to isolate the part of the preferences that is exogenous with respect to the job seekers' search behaviour and labour market outcomes. We follow their empirical strategy and include several control variables for local labour market conditions, time characteristics and different types of regional fixed effects to account for unobserved regional heterogeneity. We show that the remaining variation in the instrument can be considered exogenous. In addition, we run an extensive sensitivity analysis, including the implementation of an alternative instrument, to underline the

validity of our approach (see Section 4.4).

We define our instrument, the local treatment intensity of MAPs, as follows:[6]

$$Z_{jt-1} = \log\left[\frac{N_{jt-1}^{\text{MAP}}}{N_{jt-1}^{\text{UE}}} \times 100\right], \tag{4}$$

where N_{jt-1}^{MAP} denotes the number of recipients of MAPs and N_j^{UE} the average stock of unemployed job seekers in each LEA district $j = 1, ..., 178$ both measured in $t-1$, i.e. the year before the job seekers entered unemployment to avoid our estimation sample contributing to the construction of the instrument. The instrument reflects the intensity with which each LEA offers/uses MAPs. The distribution of the instrument within our estimation sample can be seen in Figure 2.

[Insert Figure 2]

3.2 Estimation Strategy

Assuming that the treatment intensity is a valid instrument (see discussion below), we can estimate the treatment effect δ using the two-stage least squares estimator (2-SLS, e.g. Angrist and Imbens, 1995):

$$D_i = \alpha_1 + \gamma Z_{jt-1} + \beta_1 X_i + \pi_1 R_{jt} + T_t + U_i \tag{5}$$

$$Y_i = \alpha_2 + \delta \hat{D}_i + \beta_2 X_i + \pi_2 R_{jt} + T_t + V_i, \tag{6}$$

where i denotes the individual, j the LEA district in which the individual is located and t the year in which the individual entered unemployment. Y_i denotes the outcome variable of interest as defined in Section 2.3. D_i is a dummy variable indicating distant job search and Z_{jt-1} is the instrumental variable as defined before. X_i contains control variables at the individual and R_{jt} at the regional level, while T_t contains time characteristics to capture common time trends affecting both the instrument and the outcome variables. It is important to note that the outcome variables Y, the observable characteristics X and the treatment indicator D only vary at the individual level, while the instrument Z and the regional characteristics R are region-/time-specific. This is because we observe each individual i only once, i.e., for each individual the timing t and the district j of entry into unemployment are fixed. See Figure 4 for the design of the empirical study and the full list of control variables.

[Insert Figure 4 about here]

[6] We use the treatment intensity as the LEAs do not provide information on the initially planned expenditures for MAPs.

Given the empirical model, our focus is on estimating the coefficient on being a distant job seeker δ on the allocation of search effort and subsequent labour market outcomes. According to the seminal work of Imbens and Angrist (1994), our instrumental variable approach allows us to identify the LATE, which characterises the treatment effect on the subgroup of compliers, namely those individuals who react to a change of the instrument (see also Heckman and Vytlacil, 1999; Imbens, 2001, who discuss the LATE including covariates). In our setting, when using the local treatment intensity as an instrument which is assumed to proxy the LEAs preferences for MAPs, the LATE concept is highly useful as we identify the effect on those job seekers who actually change their search behaviour due to differences with respect to the regional-specific policy style.

3.3 Discussion of Instrumental Variable Conditions

In order to identify causal local average treatment effects (LATE, see e.g. Imbens and Angrist, 1994), the instrument has to fulfil four conditions: it has to be relevant, independent, fulfil the exclusion restriction and affect the probability of searching for distant jobs in a monotonic way.

Relevance The main idea behind the instrument is that the preferences of the LEA for MAPs influence the probability that a job seeker receives knowledge about the availability of the subsidies and hence, her/his job search strategy. In Germany, every job seeker will be assigned to a caseworker when registering as unemployed. The caseworker and the job seeker meet regularly to discuss the job search strategy including possible participation in ALMP. During the meetings, caseworkers in regions with high treatment intensities, and therefore a strong preference for MAPs, are more likely to inform job seekers about the availability of the programmes, compared to low intensity regions. Moreover, there is no legal claim to MAPs, although the final decision on subsidy receipt is at the caseworker's discretion (see Section 2.1). Therefore, in addition to the information channel, caseworkers in high treatment intensity regions are also more likely to give a positive indication with respect to the final approval of the subsidy due to higher available budgets. This feature ensures that our instrument remains relevant even if one assumes perfect information among job seekers, i.e. all job seekers know about the availability of MAPs independent of the treatment intensity.

It can be expected that both, the information and the approval channel, affect the job seekers' willingness to apply for distant vacancies. Column 1 of Table 3 shows the first-stage estimates where we regress a binary indicator for distant job search on the instrument and control

variables (see equation 5). It can be seen that our instrument has a significant impact on the job seeker's willingness to apply for distant vacancies. Doubling the treatment intensity increases the probability of distant job search by about 4 percentage points. For instance, for the average region, this would imply that increasing the local treatment intensity from 7 to 14% increases the individual probability of applying for distant vacancies from 28 to 32%. The resulting F-statistic of 13.9 is sufficiently large (> 10) to reject the hypothesis of a weak instrument (see Staiger and Stock, 1997).

[Insert Table 3 about here]

Independence The independence condition requires the instrument to be randomly assigned. This assumption only holds if we manage to isolate the variation in our instrument that arises due to different preferences among LEAs from the part of the variation that is due to regional differences that also affect individuals' labour market outcomes. Figure 3a shows the geographical distribution of our instrument Z among LEA districts. The endogenous assignment of Z can be clearly seen, i.e. in particular disadvantaged regions (predominately in the east and north of Germany) tend to use MAPs at a higher intensity. Therefore, we control for a large set of local labour market conditions including the local unemployment rate, vacancy rate, GDP per capita and industry structure and time characteristics including the month of entry into unemployment and the duration between the entry into unemployment and the first interview.

[Insert Figure 3 about here]

However, even after having controlled for labour market indicators, one might be concerned that there are further unobserved regional differences, like preferences for the geographical mobility of the workforce, that simultaneously influence the instrument and the individual outcome variables. Therefore, we additionally control for local emigration rates to capture time-constant regional-specific preferences for geographical mobility. We measure the emigration rates before the introduction of the MAPs in 1998 to have a proxy for regional preferences that is independent of the LEA's policy.[7] Again, year-specific preferences are ruled out by using the lagged treatment intensity as an instrument. As shown in Figure 3b, when considering the instrument conditional on the regional characteristics, there is no longer evidence for the existence of regional-specific regional patterns that might be a threat to our identification strategy.

[7] We include dummy variables characterising 5%-quantiles of the average yearly emigration rate at the county level in the period 1995 to 1997 (see Table B.1 in the Supplementary Appendix B for full specification).

In order to provide further evidence for the plausibility of the exogeneity assumption, we analyse (i) the correlation between the observed individual characteristics and the instrument as an indicator for potential correlation between unobserved characteristics and the instrument (similar to the test by Altonji et al., 2005, who compare individual control variables based on different values of the instrument), and (ii) the existence of regional clusters, i.e. whether the LEA's preferences are affected by the preferences of neighbouring districts. With respect to the first, in a first step (equation 7) we regress the instrument on regional characteristics R_{jt} and time characteristics T_t to eliminate the part of the instrumental variation that arises due to regional and seasonal differences. The resulting residuals $\hat{V}_{jt}$ are expected to reflect the LEAs' preferences for MAPs. In a second step (equation 8), we regress the residuals $\hat{V}_{jt}$ on the large set of individual characteristics X_i.

$$Z_{jt-1} = \alpha_1 R_{jt} + \alpha_2 T_t + V_{jt} \tag{7}$$

$$\hat{V}_{jt} = \alpha_3 X_i + U_i \tag{8}$$

Table 4 summarises the estimation results. It can be seen that the regional characteristics explain a large part (72%) of the instrumental variation (see upper panel of Table 4). Furthermore, once adjusted for the regional characteristics, only a few of the observed individual characteristics have a significant influence on the adjusted instrument (lower panel of Table 4). Overall, we observe 55 individual characteristics, while only five coefficients are significant at the 10% level, three at the 5% level, and one at the 1% level (see column two of Table 4) and the R^2 strongly decreases when conditioning on regional characteristics.[8]

[Insert Table 4 and 5 about here]

Furthermore, we provide evidence of the absence of regional clusters with respect to the instrumental variable. The existence of regional clusters would question the exogeneity of LEAs' preferences as it would suggest that the preferences of one LEA are influenced by those of neighbouring states. Therefore, we regress the instrumental variable on the average value of the instrumental variable in the neighbouring districts. The results are shown in Table 5. It can be seen that the significant correlation between the LEA's treatment intensity and those of the neighbouring LEA districts disappears completely once we include the regional control variables. In summary, the presented evidence suggests that our instrument, conditional on regional characteristics, creates exogenous variation with respect to the job seekers willingness

[8] Full estimation results for Equation 7 and 8 can be found in Table B.2 and B.3 in the Supplementary Appendix B.

to apply for distant jobs. In Section 4.4, we present further robustness checks with respect to unobserved regional heterogeneity.

Exclusion restriction The exclusion restriction requires that the instrument has no influence on the outcome variables other than through its effect on the probability of searching for distant jobs. In order to test whether the exclusion restriction is fulfilled and we identify the correct channel, i.e. the LEA's preferences for MAPs, we run different placebo tests within the first stage using the treatment intensity for other ALMP programmes (job creation schemes, vocational training), the intensity of benefit sanctions and the likelihood of corporate insolvencies as alternative instruments. All three factors might be correlated with our instrument and influence the individual decision to search for distant jobs.[9] As shown in columns 2 to 5 in Table 3, none of the alternative factors have a significant impact on the individual's willingness to apply for distant jobs. This makes us confident that the LEA's preferences for MAPs is the only factor affecting individuals' search radius, thus supporting the validity of the exclusion restriction.[10]

Monotonicity Finally, the monotonicity condition requires the probability of searching for distant jobs to be a (positive) monotonic function of the instrument. The assumption would be violated if some individuals reduce distant job search due to a higher treatment intensity (existence of defiers). In our case, one might be concerned about the commuting assistance as it is included in the instrument and encourages job seekers to apply for jobs within commuting time, hence possibly reducing search activities which would involve a relocation. However, in practice caseworkers inform job seekers about all types of MAPs (not commuting assistance only), which makes it very unlikely that a job seeker decides to stop searching for distant jobs once he/she receives the information.[11] In addition, we also re-estimate the first stage using the entries into commuting assistance only to construct the instrument. If the monotonicity assumption is violated (due to commuting assistance), we would expect to find a negative coefficient for the treatment intensity of commuting assistance. However, column 6 of Table 3 shows a

[9] A higher intensity in MAPs might automatically imply a lower likelihood receiving other ALMP programmes, which might have an impact on individuals' willingness to search for distant jobs. Similar arguments apply to benefit sanctions that might be used by employment agencies to influence the individual's search behaviour. The local intensity of corporate insolvencies is used due to findings by Neffke et al. (2016) showing that firm closures affect the regional mobility of displaced workers.

[10] We will provide further evidence for the validity of the exclusion restriction in Section 4.1, where we discuss the reduced-form estimates of various search characteristics on the instrument.

[11] It should also be noted that the commuting assistance primarily supports long-distance commuting since the absolute amount of the subsidy is higher the larger the commuting distance. Therefore, we expect that the subsidy increases the potential commuting time that a job seeker would accept rather than reducing the willingness to apply for distant vacancies.

clearly positive and significant coefficient. This means that the presence of commuting assistance does not reduce the job seekers' willingness to search for distant jobs. Therefore, based on our argumentation and the first-stage evidence, we assume that the monotonicity assumption is fulfilled.

4 Baseline Results

We now analyse how the higher willingness to search for distant vacancies due to the regional-specific promotion of MAPs affects other dimensions of the job seekers' behaviour and subsequent labour market outcomes. Table 6 presents our main results, column 1 contains the unconditional comparison between distant and local job seekers, column 2 the OLS results and column 3 the 2SLS results using the conditional treatment intensity as an instrument for distant job search. Substantial differences are partially visible between the OLS and the 2SLS results, which can be explained by two reasons. (i) The OLS estimates simply compare average local and distant job seekers, while due to the LATE interpretation 2SLS results are only informative for job seekers who actually change their search behaviour due to the availability of the MAPs. This group might differ substantially from the full population of all distant job seekers. (ii) A second explanation refers to the potential endogeneity of the search behaviour. As local and distant job seekers might differ systematically with respect to unobserved characteristics, assuming that we use a valid instrument, 2SLS estimates are expected to allow for a causal interpretation of the result, whereas OLS estimates might suffer from a selection bias.

4.1 Job Search Behaviour

Panel A of Table 6 presents the results with respect to individuals' job search behaviour as measured in the first wave of the survey. As discussed in Section 2.2, MAPs reduce the costs of distant job search, which is expected to encourage job seekers to devote more effort to distant job search. This is confirmed empirically by the first-stage estimation (see Section 3.1 and Table 3). However, as the increased effort in distant job search might result in a reduction of local search activities, the net effect on total effort level is theoretically ambiguous. Our estimation results now show that job seekers who apply for distant vacancies due to the LEA's promotion of MAPs send out about 1.3 fewer applications per week for local jobs (see 2SLS estimate in column 3 in Table 6). This illustrates the substitution effect in the sense that job seekers seem to shift their effort from local to distant job search in response to MAPs. The increase in the number

of applications for distant jobs corresponds to the reduction in local job search as indicated by the insignificant effect on the total number of applications. Furthermore, using the instrumental variable approach, we find a positive effect of 4.7% on reservation wages. However, this is not statistically significant at conventional levels.

[Insert Table 6 about here]

It should be noted that by using the 2SLS estimator, we implicitly assume that our instrument affects the decision to search for distant jobs first, whereby based on this decision, job seekers determine the remaining search strategy (as included in Y in the second stage). Alternatively, one could argue that job seekers simultaneously decide about all aspects of their job search strategy including the search radius as well as the level of search effort and the choice of different search methods, which would imply a violation of the exclusion restriction (as discussed in Section 3.3). However, with respect to search effort, we argue that the decision to search for distant jobs is a necessary condition for investing effort in distant search at all. Therefore, the decision on search radius has to be taken first, before deciding on how to divide search effort. Moreover, Table B.4 in the Supplementary Appendix B shows the results of the reduced-form estimation of various job search characteristics on the instrument. It can be seen that the local treatment intensity only affects the allocation of search effort through the decision to search for distant jobs (as explained before), while there is no impact on reservation wages or the search channels used. This suggest that our empirical strategy is appropriate and identifies the impact of distant job search on search characteristics (as included in Y) for those job seekers who start searching for distant jobs due to the availability of MAPs.

The findings are particularly interesting as they show that providing incentives to apply for distant vacancies comes at the cost of reduced search effort in other dimensions, in this case local job search activities. Therefore, considering the estimated effects with respect to the allocation of the search effort does not allow drawing conclusions about the effectiveness of the policy. This ambiguity with respect to the overall effectiveness of the MAPs is also emphasised by the insignificant effect on the reservation wage, which can be expected to be the sum of two counteracting effects: on the one hand, the higher job-offer arrival rate and the reduced search costs imply a higher reservation wage, while on the other hand, job seekers potentially reduce the reservation wage due to the lower costs of accepting a distant job-offer. In summary, the findings show that job seekers adjust their behaviour significantly with respect to the LEA's information policy, while we need to consider realised labour market outcomes to evaluate the

programme effectiveness.

4.2 Labour Market Outcomes

To finally answer the question of whether MAPs can promote unemployed individuals' reintegration into the labour market, in a next step we consider realised labour market outcomes with respect to the employment status and earnings. Therefore, Panel B of Table 6 shows the empirical results for the labour market outcomes. With respect to regular employment, it can be seen that the increase in distant job search effort (due to MAPs) leads to a 16 percentage point higher probability of being regularly employed 12 months after entry into unemployment (see column 3). In addition to the static estimation of the employment probability at t_{12}, we also estimate the monthly exit rate to employment within the 12 months period starting at entry into unemployment. Therefore, we apply a discrete time duration model where – in contrast to the standard literature, which usually applies a logit or complementary log-log specification – we specify a linear probability model to adopt the 2SLS estimator. The duration model complements the static estimation as it allows making conclusions with respect to the job-finding prospects. The static model only considers existing employment spells at t_{12}, while the duration model considers all transitions to employment, even those that might have already ended before t_{12}. Similar to the static employment effect, we find a 6.3 percentage point higher exit rate into regular employment for distant job seekers.

Another interesting observation is that the increased search radius in response to the MAPs leads to a reduction in subsidised self-employment (while it has no significant effect on regular self-employment). In Germany, unemployed job seekers are eligible for generous start-up subsidies when starting their own business (see e.g. Caliendo and Künn, 2011). Unemployed individuals try to escape unemployment by starting their own business, in particular when regular jobs are very limited. Our finding now indicates that the availability of MAPs seem to reduce the dependence on start-up subsidies, most likely as it increases job seekers' search radius and hence job opportunities.

Finally, Panel B of Table 6 shows information regarding hourly and monthly earnings as well as working hours (conditional on being employed in wave 2). It can be seen that distant job seekers (due to the availability of MAPs) realise significantly higher hourly earnings than local job seekers (+15%) but work for fewer hours per week (-4.4 hours). Overall, this results in a zero effect on monthly earnings. Comparing our findings to those by Caliendo et al. (2017), it can be seen that supporting the geographical mobility of unemployed workers in Germany

generally leads to more favorable labour market outcomes. However, since the setting in both cases differs substantially,[12] this triggers the question about the exact mechanism behind the effects. Therefore, in the following we will shed light on the question of whether our results are driven by those who actually become geographically mobile (relocation or increase in commuting distance) as a result of the altered search strategy (increase in search radius).

4.3 Geographical Mobility as an Underlying Mechanism

In a first step, we show in Panel C of Table 6 that distant job search causally leads to higher geographical mobility. Column 3 shows that distant job search (due to the availability of MAPs) leads to a significantly higher likelihood of relocating (14% points), increasing the commuting distance above 50 km (16% points), and actually participating in one of the MAPs (17% points). Given that Caliendo et al. (2017) show the positive impact of residential relocation on labour market outcomes, this finding supports the hypothesis that our results on employment and earnings are driven by those becoming geographically mobile.

[Insert Table 7 about here]

Therefore, in a second step we re-estimate the treatment effects based on two sub-samples comprising individuals who (i) did not move residence between the first and second interview wave, and (ii) did not relocate and the working location is within a radius of 50 kilometres.[13] Table 7 shows the results. In the first column, we report again the main effects on the different outcomes (see column 3 in Table 6), while columns 2 and 3 contain the effects for sub-samples (i) and (ii), respectively. First of all, it can be seen that the results with respect to job search behaviour (Panel A) do not change for the restricted samples. This indicates that searching for distant jobs (due to the availability of the MAPs) has an identical impact on individuals independent of whether they finally become geographically mobile or not. However, the effects on employment and earnings completely disappear for the non-mobile population, indicating that the positive and significant effects in the main (pooled) sample are predominately driven by those who eventually also accept a distant job. This is a fundamental result as it suggests that geographical mobility (relocation or commuting) is indeed the main mechanism through which

[12] While Caliendo et al. (2017) compare individuals who actually find a distant job by means of a relocation assistance to those who start a new job without a subsidy, we now focus on the initially decision to apply for distant vacancies without conditioning on successful job-finding.

[13] We refrain from presenting separate results for those who actually relocated or increased commuting radius due to low sample size. The resulting F-statistics are very low and hence we face a weak instrument problem.

an increase in search radius (due to the availability of MAPs) affects labour market outcomes, while there is a direct effect on job search behaviour.

4.4 Robustness Analysis

Unobserved Regional Heterogeneity In the main estimation, we use the lagged treatment intensity with respect to MAPs as an instrument for the decision to search for distant jobs. Thereby, we assume that conditional on X_i, R_{jt} and T_t the instrument is independent of regional-specific preferences for geographical mobility that might be correlated with the individual outcome variables. As this assumption is crucial for our identification strategy to hold, we test its justification by (i) applying an alternative instrument that is less likely to be correlated with regional-specific preferences for geographical mobility and (ii) including regional fixed effects.

As described in Section 2.1, two of the six MAPs are not directly related to geographical mobility but are nevertheless categorised as MAPs due to administrative reasons, which implies that the LEA assigns a joint budget to all six MAPs. We exploit this administrative feature to construct an alternative instrument that only takes entries into transition and equipment assistance into account. Using the alternative instrument will reduce the potential influence of unobserved regional heterogeneity as the two programmes are not directly related to the geographical mobility of the unemployed. Nevertheless, it can be expected to remain relevant for individuals' decision to search for distant jobs as entries into all six programmes are positively correlated due to one joint budget. As a second robustness check, we include regional fixed effects to cover time-invariant unobserved regional heterogeneity. However, the low number of observation within the survey prevents regional fixed effects at the LEA level. Therefore, we include fixed effects at a higher regional level and divide Germany into six different geographical areas.[14] In combination with the dummy variables for past emigration rates, this allows us to compare only LEA districts that are located within one of the six regions and the workforce had similar preferences for regional mobility in the past.

[Insert Table 8 about here]

Table 8 shows the estimation results for selected outcome variables.[15] The first two columns

[14]The classification is based on the geographical position of the federal state and the available number of observations in the survey: 1) North-West: Bremen, Hamburg, Lower Saxony, Schleswig-Holstein; 2) North-East: Berlin, Brandenburg, Mecklenburg-Western Pomerania; 3) West: North Rhine-Westphalia, 4) East: Saxony, Saxony-Anhalt, Thuringia; 5) South-West: Baden-Wuerttemberg, Hesse, Rhineland-Palatinate, Saarland; 6) South-East: Bavaria.

[15]The results for other outcome variables are similarly robust and are available upon request.

contain the main estimation results using the original instrument excluding and including regional fixed effects, while columns 3 and 4 show the results using the alternative instrument. First of all, it can be seen that the first stage estimates are (as expected) smaller for the alternative instrument, but still statistically significant. The resulting F-statistic decreases below the critical value of 10 suggesting that there might be a weak instrument problem. We have to keep this in mind when interpreting the results. The estimated coefficients for the different outcome variables are very similar across columns. Moreover, although minor differences in point estimates exist, all results would lead to exact the same conclusions as based on the main estimation results. In summary, the impact of remaining unobserved regional heterogeneity affecting the instrument and individuals' outcome variables also seems to be negligible.

[Insert Table 9 about here]

Panel Attrition Another potential major concern in our study is selective attrition between the first and second interview. This might be particularly relevant in our setting as individuals who change their place of residence usually face a lower probability of being contacted in the second wave. We test the sensitivity of our results with respect to selective panel attrition by focusing on the job search characteristics because these outcome variables are measured at the first interview and hence, are observable for all individuals in the survey. Table 9 shows the 2SLS estimation results using the main estimation sample (restricted to individuals participating in wave 2, column 1) as well as the full sample in wave 1 (column 2). It can be seen that the regression coefficients are almost identical between the two samples. This clearly indicates that selective panel attrition is not an issue here and does not bias our results.

5 Conclusion

We use rich survey data on unemployed job seekers in Germany to analyse the impact of mobility assistance programmes (MAPs) on the individuals' job search behaviour and labour market outcomes. These programmes aim to encourage geographical mobility among job seekers. The German ALMP offers a wide range of financial support, e.g. subsidies for travel costs to distant job interviews or relocation costs. Job search theory predicts that the availability of MAPs will lead to an increase in the search effort for distant job vacancies, as the subsidy reduces the relative costs for distant job search compared to local job search. However, theory remains ambiguous with respect to the effect on overall search effort, as well as resulting job-finding

probabilities. Therefore, this study provides first empirical evidence on the question of whether the existence of MAPs affects individuals' willingness to search for distant jobs and hence their job search strategy and labour market outcomes.

Based on survey data on inflows into unemployment in Germany, we use regional differences in terms of the intensity with which MAPs are offered to job seekers as an instrumental variable to generate exogenous variation on the individual probability of searching for distant jobs. The idea is that job seekers living in a LEA district with a high intensity of MAPs also face a higher probability of receiving knowledge about the existence of these programmes (via the caseworker) which is expected to increase their willingness to search for distant jobs. This exogenous variation in the first stage allows us to estimate the causal effect of searching for distant jobs on other search characteristics and in particular subsequent labour market outcomes.

Our estimation results confirm the theoretical prediction that job seekers intensify their search effort with respect to distant job vacancies if they have access to MAPs. We further show that this increase in search effort for distant jobs results in an equal reduction in search effort for local jobs. This means that job seekers do not increase their overall search effort but rather shift resources from local to distant job search in response to the MAP. The increase in search radius results in higher employment rates, higher wages and a reduction of subsidised self-employment. The latter suggests that access to the programmes apparently reduces the dependence on other forms of governmental support, in this case start-up subsidies. This is a promising finding especially in the light of the relative low costs per participant for MAPs. Furthermore, we show that the increased search radius causally leads to higher geographical mobility among job seekers (in terms of both relocation and commuting), which in turn explains the positive employment and earnings effects for distant job seekers.

In addition, our findings have two other important implications. First, earlier studies find positive effects of participation in MAPs on labour market outcomes (e.g. Caliendo et al., 2017). However, the positive evidence might be reduced by deadweight effects, which can expected to be relatively large with such programmes, in the sense that those who move would also move without the subsidy. This paper now shows that deadweight effects do not seem to play a major role as individuals truly respond to the availability of MAPs and adjust their job search behaviour. The existence of the programmes leads to distant job search and it can be expected that without the programme people would not have moved, at least not to the same extent. Second, the instrumental variable approach gives our estimates the interpretation of local average treatment effects (LATE, see Imbens and Angrist, 1994), i.e. the estimates reflect the

impact on those job-seekers who start searching for distant jobs due to the LEA's support of MAPs. We argue that this parameter holds strong interest for policy-makers as they have full control over the (regional) intensity of MAPs (instrument). Given the high regional disparities in terms of unemployment rates within European countries, this paper provides evidence that the introduction or expansion of MAPs might be an effective tool to increase the search radius of job seekers and hence reduce unemployment. Moreover, with the progressive European integration and the reduction of transaction/moving costs, such a policy might be also an effective tool to stimulate mobility between countries and employment at the European level.

For policy-makers, it is important to understand that for the impact on labour market outcomes both the information about the availability of the programmes as well as the size of the budget appear to be crucial. Simply increasing the degree to which job seekers are informed about the availability of the programmes (without increasing the budget) will increase their search radius but will most likely not change their labour market outcomes. This is because the positive employment and earning effects are generated by those who actually become geographically mobile and accept distant jobs. Moreover, the availability of MAPs has a similar impact on subsidy take-up and the likelihood of moving, which emphasises the importance of the subsidy itself. Therefore, policy-makers are advised to simultaneously increase the degree of information as well as the budget for MAPs to increase job seekers' search radius and achieve an impact on labour market outcomes.

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Tables and Figures

Table 1: Selected Observed Differences between Local and Distant Job Seekers

	Local job seekers	Distant job seekers	P-value
No. of observations	4,625	1,799	
1)Socio-demographic and household characteristics			
Age (in years)	37.17	31.65	0.00
Women	0.54	0.39	0.00
Upper secondary school	0.25	0.40	0.00
University degree	0.17	0.35	0.00
Married or cohabiting	0.46	0.22	0.00
Two or more children	0.17	0.08	0.00
2)Labor market history			
Unemployment benefit receipt	0.76	0.74	0.02
Level of unemployment benefit (missings=0)	489.36	494.91	0.67
Share of months spent in employment since age 18	0.66	0.55	0.00
3)Personality traits[(a)]			
Openness	4.97	5.23	0.00
Conscientiousness	6.22	6.21	0.44
Extraversion	5.15	5.21	0.04
Neuroticism	3.81	3.60	0.00
Locus of control	4.99	5.13	0.00
4)Expectations and socio-cultural characteristics			
Expected probability to participate in ALMP program[(b)]			
Low (0-3)	0.25	0.24	0.55
Medium (4-6)	0.16	0.14	0.01
High (7-10)	0.24	0.25	0.79
Expected monthly net income in €	1,275	1,526	0.00
Partner is full-time employed[(c)]	0.50	0.30	0.00
Home-ownership	0.42	0.30	0.00
Car-ownership	0.66	0.63	0.02
High language skills English	0.24	0.46	0.00
5)Regional characteristics			
Living in West Germany	0.71	0.65	0.00
Local unemployment rate in %	8.97	9.45	0.00
Local vacancy rate in %	11.38	11.08	0.11
Share of working population in industry sector	26.36	25.48	0.00

Note: All numbers are percentages unless otherwise indicated. P-values are based on two-tailed t-tests on equal means between local and distant job seekers.
[(a)] Personality traits are measured with different items on a 7-Point Likert-Scale.
[(b)] Expected ALMP probabilities are measured on a 0-10 scale increasing from low to high and categorised into three groups.
[(c)] Includes also partners not living in the same household.

Table 2: Differences in Job Search Behaviour and Labour Market Outcomes

	Local job seekers	Distant job seekers	P-value
No. of observations	4,625	1,799	
A. Job search behaviour (measured in wave 1)			
Average weekly no. of job applications			
Total	1.36	2.21	0.00
Local jobs	1.36	1.29	0.33
Distant jobs	0.00	0.92	0.00
Hourly reservation wage in € [a]	7.07	7.69	0.00
B. Labour market outcomes (measured in wave 2)			
Regular employed	0.50	0.54	0.00
Regular self-employed	0.03	0.05	0.00
Subsidized self-employed	0.03	0.04	0.07
Hourly earnings in € [b]	8.18	9.27	0.00
Weekly working hours [b]	35.78	41.73	0.00
Monthly earnings in € [b]	1,267	1,675	0.00
C. Realised geographical mobility (measured in wave 2)			
Relocation between wave 1 and wave 2 (on county level)	0.03	0.12	0.00
Receipt of mobility assistance [c]	0.01	0.06	0.00
Distance to working location $>$ 50km [c]	0.10	0.20	0.00

Note: All numbers are percentages unless otherwise indicated. P-values are based on two-tailed t-tests on equal means between local and distant job seekers.
[a] Reservation wages are only observed for a smaller sub-sample of individuals, i.e., those who are still unemployed during the first interview (local job seekers: N=3,332; distant job seekers: N=1,191).
[b] Earnings and working hours in wave 2 are only observed for a smaller sub-sample of individuals, i.e., those who are already (self-)employed at the second interview (local job seekers: N=2,818; distant job seekers: N=1,173).
[c] Information on job characteristics are only observed for sub-sample of those who find a regular job (excluding self-employment) before the second interview (local job seekers: N=2,665; distant job seekers: N=997).

Table 3: First-stage Estimation Results and Placebo Tests

	Baseline	Placebo tests				Check monotonicity
		I	II	III	IV	
	(1)	(2)	(3)	(4)	(5)	(6)
Applied for distant vacancies (D_i)						
Log local treatment intensity (Z_j)						
Mobility assistance programs (MAPs)	0.040***					
	(0.011)					
Vocational training		0.014				
		(0.010)				
Job creation schemes			0.004			
			(0.014)			
Sanctions				-0.009		
				(0.013)		
Insolvencies					0.007	
					(0.009)	
Commuting assistance						0.024***
						(0.007)
Control variables						
Individual characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Regional characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Time characteristics	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	6,424	6,424	6,424	6,424	6,424	6,424
F-statistic of weak identification	13.850	2.131	0.073	0.452	0.612	11.223

Note: Dependent variable: D_i - indicator for distant job search. OLS estimation. */**/*** indicates statistical significance at the 10%/5%/1%-level. Standard errors are in parenthesis and clustered at the LEA-level. Full estimation results for the baseline can be found in Table B.1 in the Supplementary Appendix B.

Table 4: Sensitivity Analysis: The Impact of Individual Characteristics on the Adjusted Instrument

	Instrumental variable	
	Raw	Adjusted
	Z_j	$\hat{V}_j$
	(1)	(2)
Equation 7: Regional and time characteristics R_j, T_t		
R^2		0.722
Adjusted R^2		0.719
Equation 8: Individual characteristics X_i		
Number of statistically significant coefficients at		
10%-level (*)	18	5
5%-level (**)	15	3
1%-level (***)	13	1
R^2	0.171	0.016
Adjusted R^2	0.164	0.007

Note: Depicted are the number of statistically significant variables (in total 55) at the 10%/5%/1%-level, when estimating the effect of observed individual characteristics on predicted residuals after regressing the instrumental variable on regional characteristics. $P-$Values are shown in brackets.

Table 5: Test on the Existence of Regional Clusters

	OLS	OLS
	(1)	(2)
Log local treatment intensity (Z_j)		
Log average treatment intensity in neighbouring districts	0.856***	-0.140
	(0.062)	(0.231)
Regional characteristics R_j		✓
No. of observations	176	176
R^2	0.525	0.682
Adjusted R^2	0.522	0.551

Note: Depicted are OLS estimates regressing the LEA's log treatment intensity in 2006 on log average treatment intensity of all neighbouring LEA districts. Regional characteristics include those of the district j itself, as well as the average values of the neighbouring districts. Standard errors in parenthesis. */**/*** indicate statistically significance at the 10%/5%/1%-level.

Table 6: Main Estimation Results

	OLS (1)	OLS (2)	2SLS (3)
A. Job search behaviour (measured in wave 1)			
Average number of job applications per week			
Local jobs	-0.064	-0.031	-1.338***
	(0.069)	(0.078)	(0.343)
Total (local + distant jobs)	0.849***	0.812***	0.273
	(0.078)	(0.087)	(0.352)
Log hourly reservation wage[(a)]	0.064***	-0.018*	0.047
	(0.013)	(0.009)	(0.062)
B. Labour market outcomes (measured in wave 2)			
Regular employment	0.046***	0.001	0.157*
	(0.014)	(0.015)	(0.089)
Exit rate to regular employment[(b)]	0.011***	-0.0001	0.063***
	(0.003)	(0.004)	(0.021)
Regular self-employment	0.016***	0.012**	-0.008
	(0.006)	(0.006)	(0.043)
Subsidised self-employment	0.009*	0.008	-0.092**
	(0.005)	(0.006)	(0.041)
Log hourly earnings[(c)]	0.081***	0.033**	0.146**
	(0.019)	(0.016)	(0.073)
Weekly working hours[(c)]	5.950***	1.449***	-4.384*
	(0.493)	(0.469)	(2.408)
Log monthly earnings[(c)]	0.291***	0.073**	-0.140
	(0.026)	(0.021)	(0.103)
C. Realised geographical mobility (measured in wave 2)			
Relocation between wave 1 and wave 2 (on county level)	0.097***	0.075***	0.136***
	(0.009)	(0.009)	(0.042)
Receipt of mobility assistance[(d)]	0.051***	0.038***	0.168***
	(0.007)	(0.007)	(0.031)
Distance to working location > 50km[(d)]	0.095***	0.067***	0.155**
	(0.015)	(0.016)	(0.067)
Control variables			
Individual characteristics	No	Yes	Yes
Regional characteristics	No	Yes	Yes
Time characteristics	No	Yes	Yes
No. of observations	6,424	6,424	6,424
F-statistic for weak identification			13.85

Note: Depicted are estimated differences between distant and local job seekers for different outcome variables using OLS and 2SLS estimation. Standard errors are shown in parenthesis and are clustered at the regional level (LEA district). ***/**/* indicate statistically significance at the 1%/5%/10%-level. Full estimation results for selected outcomes variables can be found in Table B.1 in the Supplementary Appendix B.

[(a)] Reservation wages are only observed for individuals who are still unemployed during the first interview (N=4,523; F-statistic=7.86).

[(b)] Results are based on a discrete time duration model.

[(c)] Earnings and working hours are only observed for individuals in (self-)employment at the second interview (N=3,991; F-statistic=10.40).

[(d)] Information on job characteristics are only observed for sub-sample of those who find a regular job (excluding self-employment) before the second interview (N=3,662; F-statistic=8.577).

Table 7: Subgroup Analysis: Underlying Mechanisms

	Baseline sample	Non-mover[(a)]	Non-mobile[(b)]
	(1)	(2)	(3)
First stage: Applied for distant vacancies			
Local treatment intensity	0.040***	0.040***	0.044***
	(0.011)	(0.011)	(0.011)
A. Job search behaviour (measured in wave 1)			
Average number of job applications per week			
Local jobs	-1.338***	-1.344***	-1.247***
	(0.343)	(0.350)	(0.303)
Total (local + distant jobs)	0.273	0.146	0.154
	(0.352)	(0.356)	(0.318)
Log hourly reservation wage[(c)]	0.047	0.038	0.036
	(0.062)	(0.064)	(0.062)
B. Labour market outcomes (measured in wave 2)			
Regular employment	0.157*	0.077	0.045
	(0.089)	(0.093)	(0.094)
Subsidised self-employment	-0.092**	-0.085**	-0.068
	(0.041)	(0.043)	(0.046)
Log hourly wage in wave 2[(d)]	0.146**	0.121	0.110
	(0.073)	(0.076)	(0.076)
Control variables			
Individual characteristics	Yes	Yes	Yes
Regional characteristics	Yes	Yes	Yes
Time characteristics	Yes	Yes	Yes
No. of observations	6,424	6,080	5,644
F-statistic for weak identification	13.850	13.895	15.599

Note: Depicted are estimated differences between distant and local job seekers for several outcome variables using 2SLS. Standard errors are shown in parenthesis and are clustered at the regional level (LEA district). ***/**/* indicate statistically significance at the 1%/5%/10%-level.

[(a)] Non-mover refers to those individuals who have not moved their place of residence between wave 1 and 2.

[(b)] Non-mobile refers to those individuals who neither have moved their place of residence between wave 1 and 2 nor report that their working place (in wave 2) is more than 50km away from their place of residence.

We refrain from presenting separate results for those who actually did relocate or increase commuting radius due to low sample size. The resulting F-statistics are very low and hence, we face a weak instrument problem.

[(c)] Reservation wages are only observed for individuals who are still unemployed during the first interview.

[(d)] Wages are only observed for individuals in employment at the second interview.

Table 8: Robustness Analysis: Unobserved Regional Heterogeneity

	Instrumental variable			
	Original		Alternative	
	2SLS	2SLS	2SLS	2SLS
	(1)	(2)	(3)	(4)
First stage: Applied for distant vacancies				
Instrumental variable: Local treatment intensity				
Original	0.04***	0.037***		
	(0.011)	(0.012)		
Alternative			0.022***	0.018**
			(0.008)	(0.009)
A. Job search behaviour (measured in wave 1)				
Average number of job applications per week				
Local jobs	-1.338***	-1.247***	-1.335***	-1.260***
	(0.343)	(0.334)	(0.339)	(0.334)
Total (local + distant jobs)	0.273	0.328	0.238	0.274
	(0.352)	(0.344)	(0.348)	(0.344)
Log hourly reservation wage[(a)]	0.047	0.044	0.038	0.038
	(0.062)	(0.064)	(0.062)	(0.064)
B. Labour market outcomes (measured in wave 2)				
Regular employment	0.157*	0.173*	0.218**	0.227**
	(0.089)	(0.089)	(0.091)	(0.089)
Subsidised self-employment	-0.092**	-0.094**	-0.091**	-0.094**
	(0.041)	(0.041)	(0.042)	(0.042)
Log hourly wage in wave 2[(b)]	0.146**	0.158**	0.162**	0.173**
	(0.073)	(0.076)	(0.076)	(0.078)
C. Realised geographical mobility (measured in wave 2)				
Relocation between wave 1 and wave 2 (on county level)	0.136***	0.126***	0.150***	0.134***
	(0.040)	(0.040)	(0.041)	(0.040)
Control variables				
Individual characteristics	Yes	Yes	Yes	Yes
Regional characteristics	Yes	Yes	Yes	Yes
Time characteristics	Yes	Yes	Yes	Yes
Regional fixed effects[(c)]	No	Yes	No	Yes
No. of observations	6,424	6,424	6,424	6,424
F-statistic for weak identification	13.850	9.609	7.208	4.334

Note: Depicted are estimated differences between distant and local job seekers for several outcome variables using 2SLS as well as the corresponding first stage estimation results. The alternative instrument does only include entries into transition and equipment assistance while the original instrument considers entries in all six mobility programs (see Equation 4). Standard errors are shown in parenthesis and are clustered at the regional level (LEA district). ***/**/* indicate statistically significance at the 1%/5%/10%-level.

[(a)] Reservation wages are only observed for individuals who are still unemployed during the first interview (N=4,523).

[(b)] Wages are only observed for individuals in employment at the second interview (N=3,991).

[(c)] The classification is based on geographical position of the federal state and available number of observations in the survey. The following six fixed effects are included: 1) North-West: Bremen, Hamburg, Lower Saxony, Schleswig-Holstein; 2) North-East: Berlin, Brandenburg, Mecklenburg-Western Pomerania; 3) West: North Rhine-Westphalia, 4) East: Saxony, Saxony-Anhalt, Thuringia; 5) South-West: Baden-Wuerttemberg, Hesse, Rhineland-Palatinate, Saarland; 6) South-East: Bavaria.

Table 9: Robustness Analysis: Panel Attrition - Job Search Behaviour

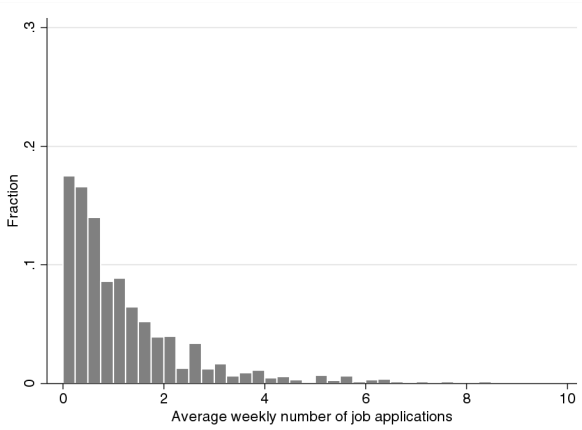
	Baseline sample (1)	Full sample wave 1 (2)
First stage: Applied for distant vacancies		
Local treatment intensity	0.040***	0.043***
	(0.011)	(0.008)
A. Job search behaviour (measured in wave 1)		
Average number of job applications per week		
Local jobs	-1.338***	-1.353***
	(0.343)	(0.313)
Total	0.273	0.219
	(0.352)	(0.32)
Log hourly reservation wage[(a)]	0.047	-0.003
	(0.062)	(0.075)
Control variables		
Individual characteristics	Yes	Yes
Regional characteristics	Yes	Yes
Time characteristics	Yes	Yes
No. of observations	6,424	12,326
F-statistic for weak identification	13.85	27.74

Note: Depicted are the 2SLS estimation results with respect to the job search behaviour for the main estimation sample (compare Table 6) and a full sample including all individuals interviewed in wave 1. Standard errors are shown in parenthesis and are clustered at the regional level (LEA district). ***/**/* indicate statistically significance at the 1%/5%/10%-level.

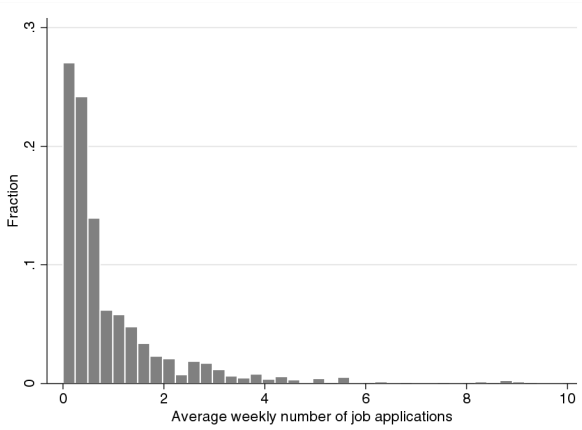
[(a)]Reservation wages are only observed for individuals who are still unemployed during the first interview. Main estimation sample: N=4,523, F-statistic=7.86. Full sample: N=8,872; F-statistic=19.08.

Figure 1: Distribution of Job Search Effort

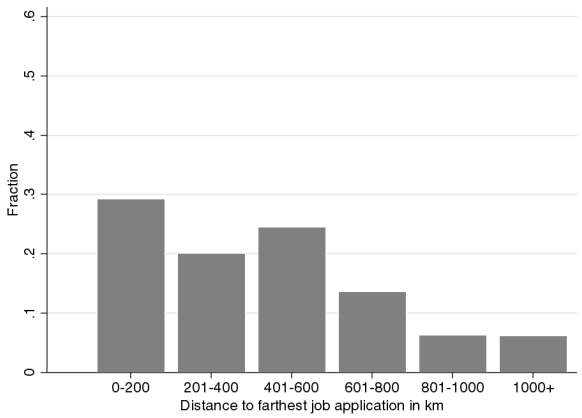
(a) Weekly number of applications in local jobs



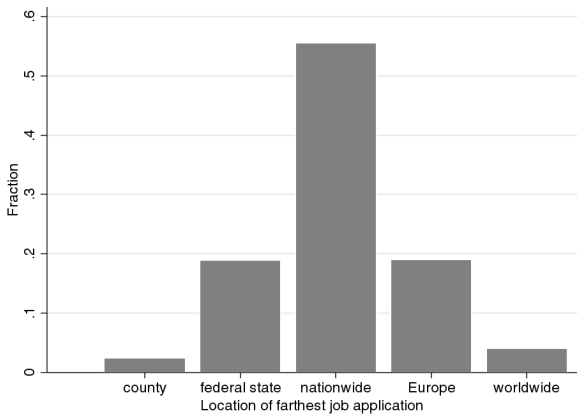
(b) Weekly number of applications in distant jobs



(c) Distance to farthest job application

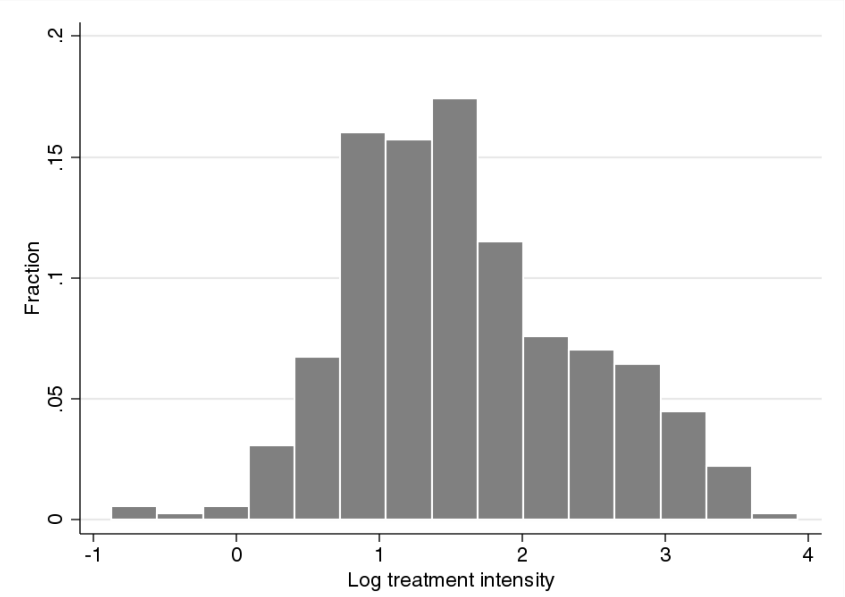


(d) Location of farthest job application



Note: (a) depicts the distribution of weekly applications in local jobs for all individuals (N=6,424), while (b), (c) and (d) depict three dimensions of distant search effort for distant job seekers only (N=1,799).

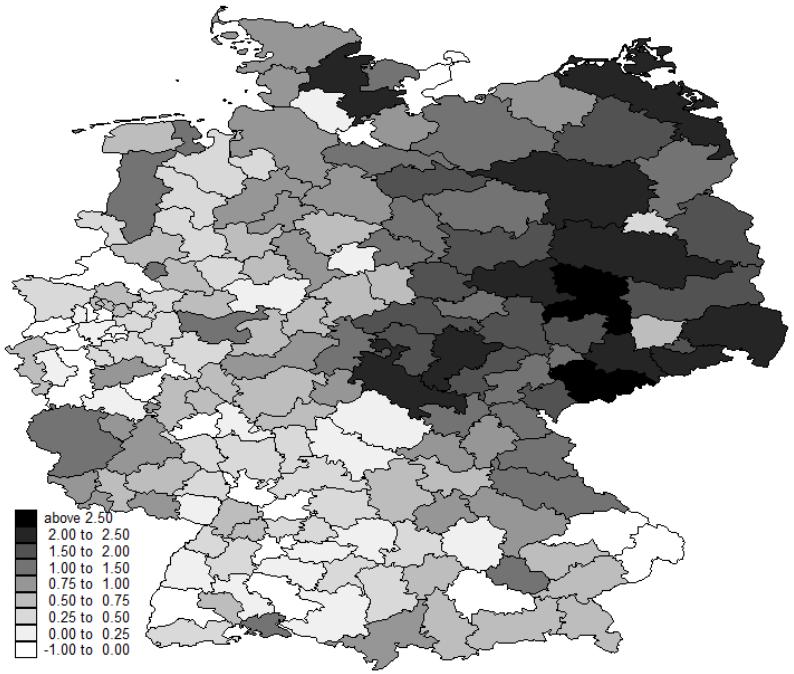
Figure 2: Distribution of Log Treatment Intensity



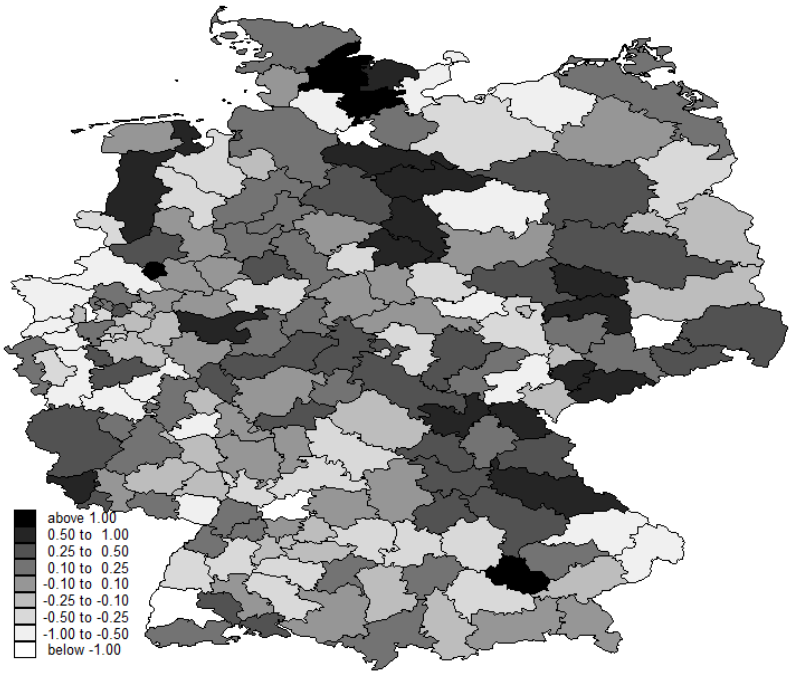
Note: Depicted is the log treatment intensity (original instrument) among German LEA districts pooled for 2006 and 2007.

Figure 3: Geographical Distribution of Local Treatment Intensities in Germany

(a) Unconditional Log Treatment Intensity Z_j

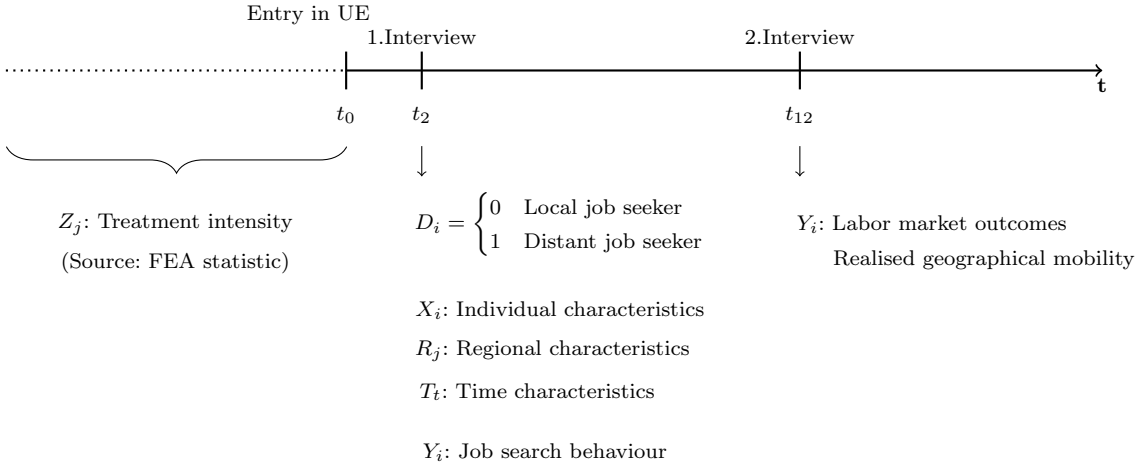


(b) Conditional Log Treatment Intensity $(Z_j|R_j)$



Note: Depicted is the geographical distribution of the unconditional log treatment intensity in 2006 (Figure 3a) and the log treatment intensities in 2006 conditional on regional characteristics (Figure 3b) among LEAs in Germany.
Source: Statistic of the German Federal Employment Agency.

Figure 4: Empirical Setting



Individual characteristics (X_i)
1)Scoio-demographic and household characteristics: Age, gender, marital status, school leaving degree, level of higher education, children in household.
2)Labour market history: Unemployment benefit receipt, level of unemployment benefits, share of months spent in employment/unemployment since age 18, employment status before unemployment.
3)Personality traits: Openness, conscientiousness, extraversion, neuroticism, locus of control.
4)Expectations and socio-cultural characteristics: Expected probability to participate in ALMP program, expected monthly net income, number of good friends outside the family, father has A-level qualification, life satisfaction, writing and language skills in German/English, employment status partner, home-/car-ownership.
Regional characteristics (R_j)
Place of residence (East- or West-Germany), local unemployment rate, local vacancy rate, local GDP per capita, local share of working population in different sectors (agriculture, industry and service), average regional emigration rate 1995-1997.
Time characteristics (T_t)
Calender month of entry into unemployment, time between entry into unemployment and the first interview.

Note: This figure illustrates the setting of the empirical study. All individuals enter unemployment at t_0 and received the first (second) interview after two (12) months. The distant job search indicator D as well as the control variables X_i and R_j are measured at the first interview (t_2). Concerning outcome variables, the job search behaviour is measured at t_2, while the labour market outcomes and realised geographical mobility are measured at t_{12}. The instrument is constructed based on the last year before entry into unemployment (t_{-12} – t_0).

Supplementary Appendix

Mobility Assistance Programmes for Unemployed Workers, Job Search Behaviour and Labour Market Outcomes

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Section A provides technical details on the spatial job search model discussed in Section 2.2.

Section B provides additional tables supplementing the discussion of Section 3.3 and the estimation results presented in Section 4.

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A Technical Details on the Spatial Job Search Model

The following section discusses the implications of the spatial search model in further detail. Based on the model setup presented in Section 2.2, the optimal search strategy is to accept any wage offer with a net wage that exceeds the individual reservation wage ϕ and reject any offer with a net wage that is below ϕ. The reservation wage is defined as the lowest net wage at which the job seeker is indifferent between accepting the job offer and remaining unemployed. For a given discount factor r, the inter-temporal value of accepting a job is defined as the actual net wage:

$$rV_l = w_l \quad \text{for local jobs, respectively} \quad rV_d = w_d - \kappa \quad \text{for distant jobs.} \tag{A.1}$$

The net wage of a local job is simply given as w_l, while the wage of distant jobs is given as the net wage w reduced by the cost associated to the relocation. Given the search cost function $c(e_l, e_d)$, the inter-temporal values of remaining unemployed is given as:

$$rV_u = -c(e_l, \lambda e_d) + \alpha_l(e_l) \int_0^\infty \{V_l(w_l) - V_u\} dF_l(w_l) + \alpha_d(e_d) \int_0^\infty \{V_d(w_d) - V_u\} dF_d(w_d), \tag{A.2}$$

which is, by definition, equal to the reservation wage $\phi = rV_u$ and yields the reservation wage, as defined in equation 1:

$$\phi = -c(e_l, \lambda e_d) + \alpha_l(e_l) E_{F_l} \max\left\{\frac{w_l - \phi}{r}, 0\right\} + \alpha_d(e_d) E_{F_d} \max\left\{\frac{w_d - (\kappa + \phi)}{r}, 0\right\} \tag{A.3}$$

First-order Condition: Given the job offer rates, the cost function and the wage distribution a job seeker chooses the optimal level of effort on local and distant job search to maximises his/her inter-temporal utility: $\frac{\partial \phi}{\partial e_l} = \frac{\partial \phi}{\partial e_d} = 0$. Hence, the equilibrium condition can be characterised by:

$$\frac{\partial \alpha_l}{\partial e_l} E_{F_l} \max\left\{\frac{w_l - \phi}{r}, 0\right\} - \frac{\partial c}{\partial e_l} = \frac{\partial \alpha_d}{\partial e_d} E_{F_d} \max\left\{\frac{w_d - (\kappa + \phi)}{r}, 0\right\} - \lambda \frac{\partial c}{\partial e_d} \tag{A.4}$$

where the job seeker equalises the marginal utility with respect to both types of job search (equivalent to equation 2).

Second-order Condition: For ease of notation, let $R_l = \max\left\{\frac{w_l - \phi}{r}, 0\right\}$ and $R_d = \max\left\{\frac{w_d - (\kappa + \phi)}{r}, 0\right\}$ which can be interpreted as the expected discounted returns to local/distant job search. For condition 2, characterising a maximum it must be true that:

$$\frac{\partial^2 \phi}{\partial e_d^2} \frac{\partial^2 \phi}{\partial e_l^2} - \frac{\partial^2 \phi}{\partial e_d e_l} = \left(R_d \frac{\partial^2 \alpha_d}{\partial e_d^2} - \lambda^2 \frac{\partial^2 c}{\partial e_d^2}\right)\left(R_l \frac{\partial^2 \alpha_l}{\partial e_l^2} - \frac{\partial^2 c}{\partial e_l^2}\right) - \lambda \frac{\partial^2 c}{\partial e_l \partial e_d} > 0 \tag{A.5}$$

$$\text{and} \quad \frac{\partial^2 \phi}{\partial e_d^2} = R_d \frac{\partial^2 \alpha_d}{\partial e_d^2} - \lambda^2 \frac{\partial^2 c}{\partial e_d^2} < 0. \tag{A.6}$$

Search Effort: The effect of λ, respectively κ, on e_d and e_l can be derived by taking the total differential of equation 2, which is given as:

$$\left(R_d\frac{\partial^2\alpha_d}{\partial e_d^2} - \lambda^2\frac{\partial^2 c}{\partial e_d^2} + \lambda\frac{\partial^2 c}{\partial e_l \partial e_d}\right)de_d - \frac{\partial R_d}{\partial \kappa}\frac{\partial \alpha_d}{\partial e_d}d\kappa$$
$$= \left(R_l\frac{\partial^2\alpha_l}{\partial e_l^2} - \frac{\partial^2 c}{\partial e_l^2} + \lambda\frac{\partial^2 c}{\partial e_l \partial e_d}\right)de_l - \left(e_d\lambda\frac{\partial^2 c}{\partial e_d^2} + \frac{\partial c}{\partial e_d}\right)d\lambda. \tag{A.7}$$

By assuming that $d\kappa = 0$ and $de_l = 0$, respectively $de_d = 0$, we can derive the derivative of e_d, respectively e_l, with respect to λ:

$$\frac{\partial e_d}{\partial \lambda} = e_d\frac{\lambda\frac{\partial^2 c}{\partial e_d^2} + \frac{\partial c}{\partial e_d}\frac{1}{e_d}}{R_d\frac{\partial^2\alpha_d}{\partial e_d^2} - \lambda^2\frac{\partial^2 c}{\partial e_d^2} + \lambda\frac{\partial^2 c}{\partial e_l \partial e_d}} \tag{A.8}$$

$$\frac{\partial e_l}{\partial \lambda} = -e_d\frac{\lambda\frac{\partial^2 c}{\partial e_d^2} + \frac{\partial c}{\partial e_d}\frac{1}{e_d}}{R_l\frac{\partial^2\alpha_l}{\partial e_l^2} - \frac{\partial^2 c}{\partial e_l^2} + \lambda\frac{\partial^2 c}{\partial e_l \partial e_d}} \tag{A.9}$$

Moreover, we can derive the effect of κ on e_d, respectively e_l, in a similar way:

$$\frac{\partial e_d}{\partial \kappa} = -\frac{\frac{\partial R_d}{\partial \kappa}\frac{\partial \alpha_d}{\partial e_d}}{R_d\frac{\partial^2\alpha_d}{\partial e_d^2} - \lambda^2\frac{\partial^2 c}{\partial e_d^2} + \lambda\frac{\partial^2 c}{\partial e_l \partial e_d}} \tag{A.10}$$

$$\frac{\partial e_l}{\partial \kappa} = \frac{\frac{\partial R_d}{\partial \kappa}\frac{\partial \alpha_d}{\partial e_d}}{R_l\frac{\partial^2\alpha_l}{\partial e_l^2} - \frac{\partial^2 c}{\partial e_l^2} + \lambda\frac{\partial^2 c}{\partial e_l \partial e_d}} \tag{A.11}$$

Assuming that the marginal costs of job search increases with respect to the level of effort: $\frac{\partial^2 c}{\partial e_d^2} > 0$ and $\frac{\partial^2 c}{\partial e_l^2} > 0$, the numerator of equation A.8 and A.9 becomes positive. Moreover, the numerator of A.10 and A.11 is negative without any further assumptions. Therefore, assuming

$$\lambda^2\frac{\partial^2 c}{\partial e_d^2} - R_d\frac{\partial^2\alpha_d}{\partial e_d^2} > \lambda\frac{\partial^2 c}{\partial e_l \partial e_d} \tag{A.12}$$

ensures that

$$\frac{\partial e_d}{\partial \lambda} < 0 \quad \text{and} \quad \frac{\partial e_d}{\partial \kappa} < 0,$$

and

$$\frac{\partial^2 c}{\partial e_l^2} - R_l\frac{\partial^2\alpha_l}{\partial e_l^2} > \lambda\frac{\partial^2 c}{\partial e_l \partial e_d} \tag{A.13}$$

leads to

$$\frac{\partial e_l}{\partial \lambda} > 0 \quad \text{and} \quad \frac{\partial e_l}{\partial \kappa} > 0.$$

For instance, assuming that for given levels of search effort e_l and e_d the change of the marginal search costs is the same for an additional unit of e_l, respectively e_d, i.e.: $\frac{\partial^2 c(e_l,e_d)}{\partial e_l^2} = \frac{\partial^2 c(e_l,e_d)}{\partial e_d^2} = \frac{\partial^2 c(e_l,e_d)}{\partial e_l \partial e_d}$, condition A.12 will hold without any further assumptions, while it will depend on $\lambda, F_l(w_l)$ and $\alpha_l(e_l)$ whether condition A.13 is fulfilled.

Reservation Wages: The effect of λ on the reservation wage can be directly derived from equation 1 is given as:

$$\frac{\partial \phi}{\partial \lambda} = R_l \frac{\partial \alpha_l}{\partial e_l} \frac{\partial e_l}{\partial \lambda} + R_d \frac{\partial \alpha_d}{\partial e_d} \frac{\partial e_d}{\partial \lambda} - \frac{\partial c}{\partial e_l} \frac{\partial e_l}{\partial \lambda} - \frac{\partial c}{\partial e_d} \frac{\partial e_d}{\partial \lambda} - e_d,$$

which becomes negative if the increase of e_l with respect to λ is sufficiently small:

$$\frac{\partial e_l}{\partial \lambda} < \frac{e_d + \frac{\partial c}{\partial e_d} \frac{\partial e_d}{\partial \lambda} - R_d \frac{\partial \alpha_d}{\partial e_d} \frac{\partial e_d}{\partial \lambda}}{\frac{\partial c}{\partial e_l} - R_l \frac{\partial \alpha_l}{\partial e_l}}. \tag{A.14}$$

Similarly, the effect of κ on the reservation wages is given as:

$$\frac{\partial \phi}{\partial \kappa} = \alpha_d \frac{\partial R_d}{\partial \kappa} + R_d \frac{\partial \alpha_d}{\partial e_d} \frac{\partial e_d}{\partial \kappa} + R_l \frac{\partial \alpha_l}{\partial e_l} \frac{\partial e_l}{\partial \kappa} - \frac{\partial c}{\partial e_d} \frac{\partial e_d}{\partial \kappa} - \frac{\partial c}{\partial e_l} \frac{\partial e_l}{\partial \kappa},$$

and becomes positive if the increase of e_l with respect to κ is sufficiently small:

$$\frac{\partial e_l}{\partial \kappa} < \frac{\frac{\partial c}{\partial e_d} \frac{\partial e_d}{\partial \kappa} - \alpha_d \frac{\partial R_d}{\partial \kappa} - R_d \frac{\partial \alpha_d}{\partial e_d} \frac{\partial e_d}{\partial \kappa}}{\frac{\partial c}{\partial e_l} - R_l \frac{\partial \alpha_l}{\partial e_l}}. \tag{A.15}$$

B Supplementary Tables

Table B.1 shows the full estimation results for the first-stage estimates, as well as the second-stage estimates for three selected outcome variables: (i) the total number of average job applications per week measured in wave 1; (ii) a dummy variable indicating regular employment in wave 2; and (iii) the realised log hourly wage in wave 2. All estimates refer to the baseline specification using the original instrument.

Table B.2 shows the full estimation results of all regional and seasonal characteristics on the log local treatment intensity using the original instrument referring to equation 7.

Table B.3 shows the full estimation results of all individual characteristics on the log local treatment intensity (column 1), respectively the residual variation after conditioning of regional and seasonal characteristics, using the original instrument. The results refer to equation 8.

Table B.4 shows the reduced-form estimation with respect to job search characteristics.

Table B.1: Baseline Estimation Results: Full Specification

	1st stage		2nd stage					
	Distant job search in wave 1		Avg. weekly number of total applications in wave 1		Regular employed in wave 2		Log hourly wage in wave 2	
	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE
Log treatment intensity (original)	0.040***	(0.011)						
Distant job search (1=yes)			0.273	(0.352)	0.157*	(0.089)	0.146**	(0.073)
Socio-demographic characteristics								
School leaving degree (Ref.: None)								
Lower sec. degree	-0.040	(0.039)	-0.191	(0.233)	0.081**	(0.041)	0.060	(0.048)
Middle sec. degree	-0.039	(0.039)	-0.143	(0.231)	0.067*	(0.039)	0.104**	(0.045)
(Spec.) Upper sec. degree	-0.026	(0.041)	-0.319	(0.226)	0.052	(0.043)	0.175***	(0.047)
Higher education (Ref.: None)								
Internal/external prof. training	0.089***	(0.019)	0.017	(0.188)	0.104***	(0.023)	0.055*	(0.030)
University degree	0.231***	(0.024)	-0.070	(0.197)	0.127***	(0.031)	0.141***	(0.040)
Female	-0.004	(0.014)	0.122*	(0.073)	0.031**	(0.015)	-0.052***	(0.017)
Living in West-Germany	0.045*	(0.027)	0.153	(0.125)	-0.009	(0.029)	0.128***	(0.030)
German citizenship	0.027	(0.029)	-0.251	(0.335)	0.095***	(0.034)	0.013	(0.042)
Migration background	-0.006	(0.019)	0.123	(0.093)	0.018	(0.022)	0.008	(0.026)
Age (Ref.: 16-24 years)								
25-34 years	-0.069***	(0.022)	-0.391***	(0.119)	0.089***	(0.019)	0.042**	(0.018)
35-44 years	-0.151***	(0.023)	-0.386**	(0.158)	0.078***	(0.026)	0.036*	(0.021)
45-55 years	-0.165***	(0.026)	-0.512***	(0.149)	-0.026	(0.025)	0.020	(0.023)
Married or cohabiting	-0.024*	(0.014)	-0.037	(0.098)	-0.019	(0.018)	0.017	(0.015)
Children (Ref.: None)								
One child	-0.050***	(0.014)	0.039	(0.099)	0.021	(0.019)	0.037**	(0.018)
Two children or more	-0.054***	(0.019)	-0.173*	(0.099)	-0.001	(0.023)	0.094***	(0.021)
Type of job looking for (Ref.: None)								
Full- or part-time employment	0.077*	(0.042)	-0.189	(0.225)	-0.413***	(0.041)	-0.258***	(0.083)
Full-time employment only	0.060***	(0.014)	0.058	(0.081)	0.024	(0.018)	0.015	(0.019)
Part-time employment only	-0.040***	(0.015)	-0.363***	(0.099)	-0.086***	(0.027)	0.052**	(0.025)
Labor market history								
Unemployment benefit recipient	0.032	(0.024)	0.293	(0.281)	0.006	(0.028)	0.010	(0.037)
Level of UI benefits (€100/month)	0.006***	(0.002)	0.026**	(0.011)	-0.004*	(0.002)	0.026***	(0.003)
Share lifetime months unemployed	0.009**	(0.004)	-0.007	(0.023)	-0.019***	(0.005)	-0.021***	(0.005)
Share lifetime months employed	-0.000	(0.001)	-0.002	(0.002)	0.001*	(0.001)	0.001	(0.001)
Employment status before UE (Ref.: Other)								
Regular employed	-0.021	(0.019)	-0.068	(0.094)	0.100***	(0.020)	0.028	(0.026)
Subsidized employed	-0.009	(0.027)	0.209	(0.241)	0.046	(0.031)	-0.041	(0.032)
School, apprentice, military, etc.	0.094***	(0.024)	-0.150	(0.143)	0.048*	(0.026)	-0.031	(0.032)
Maternity leave	-0.051**	(0.021)	-0.019	(0.126)	-0.057*	(0.034)	0.043	(0.042)
Personality traits								
Openness (standardized)	0.029***	(0.005)	0.064*	(0.036)	-0.015*	(0.008)	-0.004	(0.008)
Conscientiousness (standardized)	0.000	(0.006)	0.092***	(0.029)	0.009	(0.006)	0.001	(0.006)
Extraversion (standardized)	-0.007	(0.006)	0.068**	(0.031)	-0.009	(0.007)	0.007	(0.007)
Neuroticism (standardized)	-0.012**	(0.006)	-0.067*	(0.035)	0.008	(0.007)	-0.018**	(0.008)
Locus of control (standardized)	0.005	(0.006)	0.015	(0.029)	0.013**	(0.006)	0.008	(0.007)
Expectations and socio-cultural characteristics								
No. of good friends outside family	0.001	(0.001)	0.006	(0.005)	-0.000	(0.001)	-0.000	(0.001)
Father has A-level qualification	0.018	(0.015)	-0.114	(0.081)	-0.015	(0.016)	0.010	(0.016)
Employment status partner (Ref.: No partner)								
Full-time employed	-0.080***	(0.016)	0.119	(0.091)	0.021	(0.017)	0.055***	(0.020)
Part-time employed	-0.043*	(0.026)	0.394***	(0.137)	0.050**	(0.025)	0.045*	(0.027)
Education	-0.027	(0.028)	-0.074	(0.115)	-0.006	(0.025)	-0.016	(0.025)
Unemployed	0.003	(0.031)	0.217	(0.224)	-0.028	(0.032)	0.000	(0.042)
Other	-0.020	(0.026)	0.532**	(0.217)	-0.014	(0.031)	0.090***	(0.032)
Problems with childcare (Ref.: None)								
Some problems	-0.031	(0.022)	-0.137	(0.113)	-0.038	(0.029)	-0.014	(0.027)
Big problems	0.011	(0.022)	0.020	(0.158)	-0.077**	(0.033)	-0.025	(0.041)
Life satisfaction (Ref.: Medium (4-6))								
Low (0-3)	0.043**	(0.019)	0.170	(0.124)	-0.064***	(0.021)	-0.049*	(0.026)
High (7-10)	-0.022*	(0.012)	-0.189***	(0.060)	0.011	(0.013)	0.020	(0.013)
Expected ALMP participation probability (Ref.: Missing)								
Low (0-3)	0.008	(0.017)	-0.076	(0.171)	0.039*	(0.023)	0.026	(0.025)
Medium (4-6)	0.007	(0.019)	-0.208	(0.186)	0.018	(0.021)	0.007	(0.026)

Continued on next page.

Continued Table B.1.

High (7-10)	0.027	(0.020)	-0.022	(0.169)	0.019	(0.024)	0.004	(0.026)
Expected monthly net income (Ref.: Missing)								
≤ 25%-quantile	-0.044**	(0.019)	0.148	(0.168)	-0.253***	(0.027)	-0.140***	(0.025)
25-50%-quantile	-0.051**	(0.025)	0.152	(0.184)	-0.212***	(0.028)	-0.084***	(0.030)
50-75%-quantile	-0.018	(0.022)	0.176	(0.186)	-0.235***	(0.029)	-0.059**	(0.026)
>75%-quantile	0.073***	(0.027)	0.298	(0.252)	-0.263***	(0.030)	0.065**	(0.030)
High writing ability German language	0.077**	(0.032)	0.183	(0.158)	0.009	(0.045)	-0.004	(0.046)
High speaking ability German language	-0.013	(0.022)	0.030	(0.113)	0.031	(0.026)	0.015	(0.026)
High writing ability English language	0.053***	(0.018)	0.069	(0.075)	0.038*	(0.020)	0.017	(0.020)
High speaking ability English language	0.067***	(0.018)	0.139*	(0.084)	-0.036*	(0.022)	-0.001	(0.020)
Home-ownership	-0.047***	(0.012)	0.102	(0.078)	0.009	(0.014)	0.040***	(0.014)
Car-ownership	-0.004	(0.011)	0.075	(0.059)	0.070***	(0.014)	0.050***	(0.016)
Regional characteristics								
Local unemployment rate in %	0.008**	(0.003)	0.026	(0.021)	-0.009**	(0.004)	0.003	(0.004)
GDP per capita in €	-0.001	(0.001)	-0.002	(0.004)	0.000	(0.001)	0.000	(0.001)
Local vacancy rate in %	0.003	(0.002)	0.002	(0.008)	-0.001	(0.002)	0.005***	(0.002)
Share of working population in sector (Ref.: Agriculture)								
in Manufacturing sector	-0.004	(0.004)	0.066***	(0.016)	0.004	(0.004)	0.004	(0.004)
in Service sector	-0.004	(0.004)	0.067***	(0.016)	0.004	(0.004)	0.003	(0.004)
Average emigration rate 1995-1997 (quantile) (Ref.: 0-5%)								
5-10%	-0.024	(0.029)	0.046	(0.117)	0.041	(0.041)	0.027	(0.049)
10-15%	-0.041	(0.027)	0.345**	(0.164)	0.042	(0.048)	0.079*	(0.040)
15-20%	-0.110***	(0.034)	-0.004	(0.159)	0.061	(0.051)	0.112***	(0.041)
20-25%	-0.014	(0.027)	0.129	(0.133)	0.033	(0.046)	0.024	(0.041)
25-30%	-0.049	(0.031)	0.220	(0.169)	0.062	(0.048)	0.064	(0.039)
30-35%	-0.053	(0.034)	0.137	(0.146)	0.010	(0.047)	0.074*	(0.045)
35-40%	-0.038	(0.028)	0.195	(0.252)	0.040	(0.055)	0.064	(0.042)
40-45%	-0.015	(0.033)	0.118	(0.151)	-0.014	(0.050)	0.041	(0.043)
45-50%	-0.056	(0.036)	0.207	(0.186)	0.036	(0.048)	0.126***	(0.040)
50-55%	-0.052*	(0.027)	0.123	(0.159)	0.031	(0.053)	0.053	(0.040)
55-60%	-0.055*	(0.030)	0.148	(0.150)	0.005	(0.047)	0.045	(0.042)
60-65%	-0.093**	(0.036)	0.078	(0.173)	0.057	(0.050)	0.064	(0.042)
65-70%	-0.079**	(0.038)	0.070	(0.185)	0.076	(0.048)	0.033	(0.045)
70-75%	-0.098***	(0.029)	0.073	(0.234)	0.079	(0.051)	0.074	(0.046)
75-80%	-0.077***	(0.029)	0.719***	(0.245)	0.061	(0.049)	0.101**	(0.051)
80-85%	-0.057*	(0.032)	0.229	(0.196)	0.072	(0.045)	0.088*	(0.047)
85-90%	-0.032	(0.034)	0.151	(0.199)	0.028	(0.046)	0.070*	(0.042)
90-95%	-0.038	(0.037)	0.023	(0.230)	0.060	(0.056)	0.039	(0.042)
95-100%	-0.049	(0.032)	0.259	(0.200)	0.048	(0.050)	0.058	(0.045)
Seasonal characteristics								
Month of entry into unemployment								
July 2007	-0.012	(0.032)	-0.263*	(0.156)	-0.053	(0.039)	-0.002	(0.041)
August 2007	0.047	(0.031)	-0.033	(0.134)	-0.050	(0.037)	0.002	(0.030)
September 2007	0.009	(0.029)	0.135	(0.145)	-0.023	(0.033)	0.028	(0.034)
October 2007	-0.016	(0.031)	0.018	(0.137)	0.008	(0.034)	0.015	(0.034)
November 2007	-0.014	(0.028)	-0.089	(0.140)	0.005	(0.038)	0.016	(0.032)
December 2007	0.005	(0.035)	-0.251	(0.170)	-0.063	(0.038)	0.044	(0.036)
January 2008	-0.008	(0.033)	-0.211	(0.170)	-0.074*	(0.038)	0.048	(0.041)
February 2008	-0.064*	(0.034)	-0.094	(0.167)	-0.069*	(0.040)	0.033	(0.043)
March 2008	-0.005	(0.032)	-0.041	(0.152)	-0.061	(0.038)	0.058	(0.038)
April 2008	0.006	(0.030)	0.443*	(0.263)	-0.050	(0.036)	0.030	(0.034)
May 2008	-0.040	(0.030)	-0.109	(0.132)	-0.085**	(0.034)	-0.001	(0.036)
Time between entry into unemployment and first interview								
8 weeks	0.028	(0.034)	-0.244	(0.188)	-0.042	(0.047)	0.056	(0.060)
9 weeks	0.064*	(0.035)	-0.197	(0.206)	-0.045	(0.051)	0.066	(0.061)
10 weeks	0.038	(0.035)	-0.355	(0.218)	-0.103**	(0.050)	0.069	(0.060)
11 weeks	0.063*	(0.038)	-0.467**	(0.237)	-0.100*	(0.055)	0.052	(0.062)
12 weeks	0.097**	(0.039)	-0.640***	(0.215)	-0.122**	(0.055)	0.008	(0.066)
13 weeks	0.064	(0.045)	-0.727***	(0.237)	-0.058	(0.059)	0.004	(0.071)
14 weeks or more	0.073*	(0.044)	-0.904***	(0.236)	-0.114**	(0.058)	0.052	(0.067)
Constant	0.641*	(0.381)	-4.765***	(1.562)	-0.089	(0.383)	0.962**	(0.428)
Observations	6,424		6,424		6,424		3991	
R^2	0.216		0.058		0.110		0.286	
Adjusted R^2	0.203		0.043		0.096		0.268	
F-statistic for weak identification	13.850							

Note: Depicted are full 2SLS estimation result for the 1st stage (column 1) and the 2nd stage for three selected outcome variables (column 2-4). ***/**/* indicate statistically significance at the 1%/5%/10%-level. Standard errors in parenthesis.

Table B.2: Full Estimation Results of Regional and Seasonal Characteristics on Log Local Treatment Intensity

	Log local treatment intensity Z_j			
	Coeff.	SE	Coeff.	SE
Regional characteristics				
Local unemployment rate in %	-0.007	(0.005)	-0.003	(0.004)
GDP per capita in €1,000	-0.008***	(0.001)	-0.007***	(0.001)
Local vacancy rate in %	-0.017***	(0.002)	-0.013***	(0.002)
Share of working population in (Ref.: Agriculture sector)	ref.		ref.	
in Manufacturing sector	-0.089***	(0.005)	-0.041***	(0.005)
in Service sector	-0.091***	(0.005)	-0.044***	(0.005)
Average regional mobility rate 1995-97 (quantile) (Ref.: 0-5%)	ref.		ref.	
5-10%	-0.345***	(0.047)	-0.208***	(0.043)
10-15%	-0.342***	(0.046)	-0.187***	(0.042)
15-20%	-0.267***	(0.050)	-0.062	(0.047)
20-25%	-0.434***	(0.050)	-0.152***	(0.047)
25-30%	-0.444***	(0.049)	-0.171***	(0.046)
30-35%	-0.378***	(0.048)	-0.187***	(0.046)
35-40%	-0.277***	(0.050)	-0.081*	(0.046)
40-45%	-0.236***	(0.049)	-0.118**	(0.046)
45-50%	-0.970***	(0.049)	-0.787***	(0.050)
50-55%	-0.508***	(0.052)	-0.339***	(0.048)
55-60%	-0.370***	(0.050)	-0.219***	(0.047)
60-65%	-0.140***	(0.051)	-0.056	(0.047)
65-70%	-0.170***	(0.054)	-0.267***	(0.051)
70-75%	-0.397***	(0.051)	-0.225***	(0.048)
75-80%	-0.189***	(0.051)	-0.173***	(0.047)
80-85%	-0.064	(0.053)	-0.111**	(0.049)
85-90%	0.103*	(0.054)	0.141***	(0.052)
90-95%	-0.001	(0.059)	0.006	(0.055)
95-100%	-0.148***	(0.055)	-0.163***	(0.052)
Living in West-Germany	-1.245***	(0.033)		
Place of residence (Ref.: North)				
West			-0.721***	(0.025)
South-West			-0.411***	(0.026)
South-East			-0.287***	(0.029)
North-East			0.703***	(0.037)
Mid-East			1.017***	(0.036)
Seasonal characteristics				
Month of entry into unemployment (Ref.: June 2007)	ref.		ref.	
July 2007	0.043	(0.041)	0.037	(0.037)
August 2007	0.032	(0.038)	0.032	(0.034)
September 2007	0.054	(0.039)	0.045	(0.035)
October 2007	0.052	(0.039)	0.057	(0.035)
November 2007	0.023	(0.039)	0.018	(0.035)
December 2007	0.034	(0.044)	0.009	(0.039)
January 2008	0.300***	(0.046)	0.298***	(0.041)
February 2008	0.504***	(0.045)	0.499***	(0.040)
March 2008	0.521***	(0.042)	0.516***	(0.038)
April 2008	0.526***	(0.040)	0.524***	(0.035)
May 2008	0.523***	(0.039)	0.519***	(0.035)
Time between entry into UE and interview (Ref.: 7 weeks)	ref.		ref.	
8 weeks	0.037	(0.051)	0.024	(0.046)
9 weeks	0.024	(0.052)	0.016	(0.047)
10 weeks	0.040	(0.053)	0.039	(0.048)
11 weeks	0.010	(0.056)	0.005	(0.050)
12 weeks	0.065	(0.059)	0.056	(0.053)
13 weeks	-0.057	(0.065)	-0.028	(0.058)
14 weeks or more	0.012	(0.061)	0.005	(0.054)
Constant	7.237***	(0.459)	1.521***	(0.463)
No. of observations	3,889		3,889	
R^2	0.722		0.779	
Adjusted R^2	0.719		0.776	

Notes: OLS estimates of regional and seasonal characteristics on local treatment intensity (type I-instrument). ***/**/* indicate statistically significance at the 1%/5%/10%-level. Standard errors in parenthesis. The number of observations refers to the realized combinations of LEA districts, months of entry into unemployment and weeks between the entry into unemployment and the interview.

[a] The following regional fixed effects are constructed based on federal states: 1) North (Bremen, Hamburg, Lower Saxony, Schleswig-Holstein), 2) West (North Rhine-Westphalia), 3) South-West (Baden-Wuerttemberg, Hesse, Rhineland-Palatinate, Saarland), 4) South-East (Bavaria), 5) Mid-East (Saxony, Saxony-Anhalt, Thuringia), 6) North-East (Berlin, Brandenburg, Mecklenburg-Western Pomerania).

Table B.3: Full Estimation Results of Individual Characteristics on IV Residuals

	Uncond. instrument Z_j		Adjusted instrument $\hat{V}_j$			
	Coeff.	SE	Coeff.	SE	Coeff.	SE
School leaving degree (Ref.: None)	ref.		ref.		ref.	
Lower sec. degree	-0.123*	(0.069)	-0.042	(0.038)	-0.046	(0.034)
Middle sec. degree	0.218***	(0.069)	-0.025	(0.038)	-0.027	(0.034)
(Spec.) Upper sec. degree	0.073	(0.072)	-0.061	(0.039)	-0.043	(0.036)
Higher education (Ref.: None)	ref.		ref.		ref.	
Internal/external prof. training	0.152***	(0.038)	0.027	(0.021)	0.019	(0.019)
University degree	0.180***	(0.045)	0.044*	(0.025)	0.026	(0.022)
Female	-0.107***	(0.025)	0.016	(0.013)	0.006	(0.012)
German citizenship	0.054	(0.060)	0.011	(0.033)	0.016	(0.030)
Migration background	-0.388***	(0.037)	-0.038*	(0.020)	-0.014	(0.018)
Age (Ref.: 16-24 years)	ref.		ref.		ref.	
25-34 years	-0.011	(0.033)	0.028	(0.018)	0.020	(0.016)
35-44 years	-0.063*	(0.037)	-0.008	(0.020)	-0.006	(0.018)
45-55 years	-0.018	(0.039)	-0.003	(0.021)	0.008	(0.019)
Married or cohabiting	0.076***	(0.029)	0.012	(0.016)	0.011	(0.014)
Children (Ref.: None)	ref.		ref.		ref.	
One child	-0.042	(0.029)	-0.024	(0.016)	-0.013	(0.014)
Two children or more	-0.089**	(0.036)	0.004	(0.020)	-0.009	(0.018)
Unemployment benefit recipient	0.144***	(0.030)	0.032*	(0.016)	0.033**	(0.015)
Level of UI benefits (€100/month)	-0.019***	(0.003)	-0.003*	(0.002)	-0.003**	(0.002)
Lifetime months in unemployment (div. by age-18)	0.072***	(0.008)	0.006	(0.004)	0.006	(0.004)
Lifetime months in employment (div. by age-18)	-0.002*	(0.001)	-0.001	(0.001)	-0.001	(0.001)
Employment status before UE (Ref.: Other)	ref.		ref.		ref.	
Regular employed	0.066*	(0.038)	-0.008	(0.021)	-0.012	(0.019)
Subsidized employed	0.042	(0.053)	-0.009	(0.029)	-0.024	(0.026)
School, apprentice, military, etc.	0.092**	(0.046)	0.020	(0.025)	0.016	(0.023)
Maternity leave	0.089	(0.066)	0.008	(0.036)	0.013	(0.032)
Openness (standardized)	-0.022**	(0.011)	0.008	(0.006)	0.011*	(0.005)
Conscientiousness (standardized)	0.007	(0.011)	-0.001	(0.006)	0.001	(0.006)
Extraversion (standardized)	-0.006	(0.011)	-0.014**	(0.006)	-0.008	(0.006)
Neuroticism (standardized)	-0.019*	(0.011)	-0.010	(0.006)	-0.009*	(0.006)
Locus of control (standardized)	-0.005	(0.011)	-0.002	(0.006)	-0.009	(0.006)
No. of good friends outside family	0.006***	(0.002)	-0.000	(0.001)	-0.001	(0.001)
Father has A-level qualification	0.015	(0.028)	-0.027*	(0.015)	-0.021	(0.014)
Employment status partner (Ref.: No partner)	ref.		ref.		ref.	
Full-time employed	0.042	(0.029)	-0.009	(0.016)	-0.007	(0.014)
Part-time employed	-0.086*	(0.045)	-0.021	(0.025)	-0.031	(0.022)
Education	-0.022	(0.044)	0.014	(0.024)	0.023	(0.022)
Unemployed	0.207***	(0.057)	0.005	(0.031)	0.002	(0.028)
Other	0.002	(0.048)	0.023	(0.026)	0.016	(0.024)
Problems with childcare (Ref.: None)	ref.		ref.		ref.	
Some problems	0.093*	(0.048)	0.016	(0.026)	0.025	(0.024)
Big problems	0.111*	(0.059)	0.068**	(0.032)	0.050*	(0.029)
Life satisfaction (Ref.: Medium (4-6))	ref.		ref.		ref.	
Low (0-3)	-0.038	(0.038)	-0.013	(0.021)	-0.008	(0.019)
High (7-10)	-0.045**	(0.023)	0.014	(0.012)	0.004	(0.011)
Expected ALMP participation probability (Ref.: Missing)	ref.		ref.		ref.	
Low (0-3)	0.120***	(0.038)	0.005	(0.021)	0.014	(0.019)
Medium (4-6)	0.034	(0.041)	-0.010	(0.022)	0.003	(0.020)
High (7-10)	0.031	(0.038)	0.011	(0.021)	0.016	(0.019)
High writing ability German language	0.103	(0.070)	0.035	(0.038)	0.041	(0.035)
High speaking ability German language	-0.049	(0.043)	-0.002	(0.023)	0.016	(0.021)
High writing ability English language	-0.122***	(0.033)	-0.001	(0.018)	-0.010	(0.016)
High speaking ability English language	-0.140***	(0.033)	-0.007	(0.018)	-0.008	(0.017)
Job search (Ref.: None)	ref.		ref.		ref.	
Full- or part-time employment	0.186**	(0.072)	0.012	(0.039)	0.028	(0.036)
Full-time employment only	0.066**	(0.029)	-0.010	(0.016)	0.003	(0.014)
Part-time employment only	-0.376***	(0.041)	-0.034	(0.022)	-0.020	(0.020)
Homeowner	0.146***	(0.022)	0.037***	(0.012)	0.020*	(0.011)
Expected monthly net income (Ref.: Missing)	ref.		ref.		ref.	
$\leq$ 25%-quantile	0.220***	(0.044)	0.019	(0.024)	0.016	(0.022)
25-50%-quantile	0.052	(0.047)	0.002	(0.026)	-0.007	(0.023)
50-75%-quantile	-0.043	(0.044)	0.004	(0.024)	0.004	(0.022)
>75%-quantile	-0.178***	(0.047)	-0.021	(0.025)	-0.015	(0.023)
Carowner	0.062***	(0.022)	0.030**	(0.012)	0.040***	(0.011)
Constant	-3.419***	(0.123)	-0.091	(0.067)	-0.114*	(0.061)
Including regional fixed effects[(a)]	No		No		Yes	
Observations	6424		6424		6424	
R^2	0.171		0.018		0.018	
Adjusted R^2	0.164		0.010		0.009	

Notes: OLS estimates of individual characteristics on IV residuals of the original instrument. ***/**/* indicate statistically significance at the 1%/5%/10%-level. Standard errors in parenthesis.

[(a)]The following regional fixed effects are constructed based on federal states: 1) North (Bremen, Hamburg, Lower Saxony, Schleswig-Holstein), 2) West (North Rhine-Westphalia), 3) South-West (Baden-Wuerttemberg, Hesse, Rhineland-Palatinate, Saarland), 4) South-East (Bavaria), 5) Mid-East (Saxony, Saxony-Anhalt, Thuringia), 6) North-East (Berlin, Brandenburg, Mecklenburg-Western Pomerania).

Table B.4: Reduced-form Estimation: The Effect of Local Treatment Intensities on Job Search Behavior

	OLS (1)
A. Job search behavior (measured in wave 1)	
Average number of job applications per week	
Distant jobs	0.090***
	(0.023)
Local jobs	-0.134**
	(0.062)
Total	-0.045
	(0.067)
Log hourly reservation wage[(a)]	-0.011
	(0.008)
Preparation of business start-up	0.008
	(0.007)
No. of search channels (0=low, 10=high)	-0.068
	(0.052)
No. of active search channels[(b)] (0=low, 5=high)	-0.033
	(0.026)
Control variables	
Individual characteristics	Yes
Regional characteristics	Yes
Time characteristics	Yes
No. of observations	6,424

Note: Depicted are reduced-form effects of the log treatment intensity on job search outcomes measured in wave 1. Standard errors are shown in parenthesis and are clustered at the regional level (LEA district). ***/**/* indicate statistically significance at the 1%/5%/10%-level.
[(a)] Reservation wages are only observed for individuals who are still unemployed during the first interview (N=4,523).
[(b)] Active search channels include: posting an advertisement myself, contacting social networks, contacting a private agent (with/without) agency voucher and direct applications at companies.