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The Intended and Unintended Effects of Promoting Labor Market Mobility*

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ABSTRACT

Subsidizing the geographical mobility of unemployed workers may improve welfare by relaxing their financial constraints and allowing them to find jobs in more prosperous regions. We exploit regional variation in the promotion of mobility programs along administrative borders of German employment agency districts to investigate the causal effect of offering such financial incentives on the job search behavior and labor market integration of unemployed workers. We show that promoting mobility – as intended – causes job seekers to increase their search radius, apply for and accept distant jobs. At the same time, local job search is reduced with adverse consequences for reemployment and earnings. These unintended negative effects are provoked by spatial search frictions. Overall, the unconditional provision of mobility programs harms the welfare of unemployed job seekers.

Keywords: Job Search, Active Labor Market Policy, Labor Market Mobility, Unintended Consequence, Search Frictions
JEL Codes: J61, J68, D04, C21

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1 Introduction

Regional disparities in terms of employment opportunities are the cause of a wide range of policy interventions. While transferring resources from prosperous to disadvantaged areas is often not very successful (see e.g. Neumark and Kolko, 2010; Neumark and Simpson, 2015; v. Ehrlich and Seidel, 2018), stimulating the geographical mobility of labor could offer an attractive path for policy makers who aim to better match job seekers and vacancies. By reducing workers' mobility costs, such a policy may reduce geographic mismatch (Marinescu and Rathelot, 2018), counterbalance adverse shocks on local labor demand (Blanchard et al., 1992; Dao et al., 2017; Ganong and Shoag, 2017; Notowidigdo, 2020) and therefore improve overall welfare. However, despite this appealing prospect and the widespread use of such policies[1], micro-level evidence regarding the consequences for individual job seekers remains scarce. In this paper, we investigate how promoting geographical mobility by offering financial incentives to unemployed workers affects their job search strategies and labor market integration.

Our analysis considers a set of policy instruments – from now on called mobility programs (MPs) – that reduce financial constraints by subsidizing daily commuting or a residential relocation. Thereby, they aim to increase job seekers' willingness to search for and accept jobs in geographically-distant regions. Offering MPs and promoting geographical mobility may affect the behavior and the labor market performance of unemployed workers through various channels. Obviously, the aim of such a policy is to encourage job seekers to increase their search radius and therefore also the number of available vacancies. Moreover, they may shift their search effort from local to geographically-distant vacancies, which could improve employment prospects if they focus their search activities on prosperous regions with a higher labor demand (McQuaid, 2006). Existing studies highlight the positive returns to geographical mobility.[2] Hence, offering financial incen-

[1]For instance, comparable policy instruments such as relocation subsidies and housing vouchers have been offered in various US regions (see e.g. Mueller, 1981; Ludwig et al., 2005; Briggs and Kuhn, 2008), Sweden (Westerlund, 1998) or Romania (Rodríguez-Planas and Benus, 2010). Moreover, financial support for daily commuting is commonly used in many countries (e.g. Austria, Denmark, France, Italy, Japan or Switzerland), often in form of tax subsidies (see e.g. Potter et al., 2006, for an overview).

[2]For instance, Caliendo et al. (2017) show that unemployed job seekers in Germany who receive a relocation subsidy and move to a distant region earn higher wages and find more stable jobs compared to those who start employment without a subsidy. Relatedly, there is comprehensive evidence that geographical labor market mobility in general is often associated with improved employment prospects

tives to promote geographical mobility may improve labor market outcomes of workers who actually find a job in a distant region.

However, besides these intended effects, promoting geographical mobility by offering MPs to unemployed workers may also have unintended consequences. These have not been explored yet but are crucial to draw policy conclusions. First of all, when individual resources being available for job search are limited, the increase in the effort related to distant search might result in a *reduction of local search activities*, which can harm job finding prospects. Second, job seekers may face certain *constraints* that only become visible once enhancing the search radius. Such constraints are likely to limit individuals' ability to generate (acceptable) job offers from distant regions. As highlighted by Schmutz and Sidibé (2019), spatial search frictions could lead to a lower efficiency when searching in remote places. For instance, applying for vacancies in distant regions may require the use of different search methods and job seekers may suffer from the fact that they might have less knowledge about the specific characteristics of distant labor markets. Moreover, job seekers might overestimate the return to distant job search or realize that they have strong residential preferences once confronted with concrete job offers requiring residential mobility.

In other words, encouraging job seekers to apply outside of the local labor market could tie up resources that might be better invested in supporting local job search activities.[3] Therefore, offering MPs possibly hampers job finding prospects and prolongs unemployment even when job seekers shift their search activities to regional labor markets with better overall employment prospects. These unintended effects can be particularly severe since only relatively few job seekers eventually accept a distant job offer[4], while a substantially larger share of the population may adjust their search behavior in response to the promotion of geographical mobility.

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and earnings (see e.g. Burda and Hunt, 2001; Hunt, 2006; Brücker and Trübswetter, 2007; Emmler and Fitzenberger, 2020, who estimate postive returns to internal migration in Germany).

[3]Additionally, one might expect that the promotion of geographical mobility may create positive externalities on local job seekers by relaxing the labor market tightness in regions offering MPs more frequently. However, our later results will clearly show that such an effect is negligible relative to the negative effects provoked by spatial search frictions.

[4]For instance, the average annual interregional mobility rate within OECD countries is about 2.5% (OECD, 2020), while about 1% of job seekers in our estimation sample receive a relocation subsidy funding a long-distance move.

To provide first causal evidence on how promoting geographical mobility affects the search behavior of unemployed workers and their employment prospects, we use a unique empirical setting that also allows us to document unintended consequences. Specifically, we utilize exogenous regional variation in MP provision along the administrative borders of local employment agency (LEA) districts in Germany (similar to Dube et al., 2010, who exploit policy discontinuities at state borders in the US). This variation occurs because LEAs have autonomy in determining the budget that is available for promoting geographical mobility. As a result, job seekers living in a LEA district with a high intensity of MPs are more likely to be informed about the existence of the programs by their caseworkers. We can show that the variation in terms of the promotion of MPs does not coincide with other dimensions of the policy style, which allows us to isolate the causal effect of promoting job seekers' geographical mobility. Moreover, we can rely on detailed administrative records on unemployed job seekers, which are complemented by a large-scale survey. This allows us to obtain highly reliable information on labor market outcomes and detailed information on individuals' job search behavior.

The findings clearly show the existence of intended as well as unintended effects of MP provision. First of all, job seekers indeed enhance their job search radius and are more likely to apply for and accept distant jobs in response to a stronger provision of MPs. However, at the same time, we also find that they shift effort from local to distant search leading to a net reduction of the overall number of job applications. This has far-reaching implications as it leads to a deterioration of the job seekers' labor market outcomes in response to the promotion of MPs. For instance, increasing the intensity at which MPs are promoted by one standard deviation – for the average region this corresponds to an increase from 5% to 10% – reduces the employment probability and earnings by about 3.2% to 5.4% over a period of 24 months after entry into unemployment. Analyzing the underlying mechanisms supports the hypothesis that these negative effects are provoked by search frictions and individual constraints associated with distant job search. Specifically, the provision of MPs encourages unemployed workers to seek greater support from their caseworkers, albeit the latter provide fewer referrals to specific vacancies and more often rely on private job search agents. Apparently, both caseworkers and job seekers are less efficient when it comes to geographically-distant job search, e.g., due to insufficient

knowledge about the specific characteristics of distant labor markets. Finally, we consider heterogeneous effects for individuals who are expected to be more and less affected by individual search constraints. Therefore, we approximate the relevance of spatial search constraints by an out-of-sample prediction of individuals' probability to relocate. We can show that the negative employment and earnings effects are driven by job seekers who are particularly affected by spatial constraints and hence are less likely to relocate, but nevertheless increase their search radius in response to the promotion of MPs. Given the low overall geographical mobility among unemployed workers, this supports the notion that the unconditional provision of MPs might lead to an inefficient allocation of resources for a substantial share of the unemployed population.

While MPs are introduced with the intention to improve job seekers' labor market prospects, our findings provide a cautionary tale that achieving this goal might be difficult. By showing first causal evidence that documents the inefficiency of policies subsidizing geographical mobility, our results complement recent structural estimates highlighting the importance of spatial job search frictions (Schmutz and Sidibé, 2019; Ransom, 2019; Schluter and Wilemme, 2018). This also contributes important insights to the ongoing debate in labor and urban economics on effective policies to diminish spatial differences in wages and employment opportunities within developed countries (Dauth et al., 2018; Moretti and Kline, 2013) by counteracting the decreasing trend in labor mobility (Dao et al., 2017; Molloy et al., 2011). Our results show that promoting MPs indeed encourages job seekers to extend their search radius and accept distant jobs. However, we also show that the unconditional provision of MPs induces unintended costs harming the overall welfare of unemployed workers. To reduce the unintended costs and to make the provision of MPs more beneficial, our results advise to introduce a more tailored access to MPs combined with a specialized job search assistance for distant job seekers.

Our results regarding the unintentional effects due to the promotion of MPs contribute to the growing literature on unintended consequences of labor market policy. For instance, a number of studies have shown the presence of spillover or displacement effects on non-treated individuals for traditional programs, such as unemployment benefit extensions (Lalive et al., 2015), job search assistance (Blundell et al., 2004; Crépon et al., 2013; Gautier et al., 2018), training (Albrecht et al., 2009) or employment subsidies (Lise

et al., 2004). Finally, our findings also have implications for the econometric evaluation of labor market policy. Regional variation with respect to employment agencies' policy styles (similar to the measure we use in our empirical strategy) are often exploited as an instrumental variable to estimate the causal effects of being exposed to a particular program (see e.g. Frölich and Lechner, 2010; Boockmann et al., 2014; Markussen and Røed, 2014; Dean et al., 2015; Caliendo et al., 2017; Dauth, 2020). Our results question the validity of such instruments since we show that the policy style affects various dimensions of job search or counseling activities, independent of the actual program participation.[5]

In what follows, we explain the relevant institutional details and the data in Section 2. Section 3 presents the empirical strategy and evidence on the validity of the underlying identification assumptions. Section 4 presents and discusses the empirical results. Section 5 concludes and explains the policy implications.

2 Institutional Settings and Data

2.1 Regional Policy Styles and Mobility Programs in Germany

The administration of labor market policy in Germany has a clear hierarchical structure, with the *Federal Employment Agency* (FEA) being the head of 178 *Local Employment Agencies* (LEAs). On average, each LEA comprises about three counties (*Kreise*), had about 465,000 inhabitants and was responsible for a stock of 21,000 unemployed individuals in 2006. With respect to labor market policy, the FEA determines (i) the set of policy instruments available to job seekers, as well as (ii) the yearly budget for each LEA. The LEAs are responsible for implementing the labor market policy because they have knowledge about the specific needs of local labor markets. Therefore, LEAs have autonomy on how to allocate parts of the received funds from the FEA to the available policy measures. While about three quarters of the budget are reserved for *non-discretionary* measures with a legal claim by the job seekers, e.g. unemployment benefit payments, LEAs can allocate the remaining quarter across different *discretionary* measures such as

[5]This complements a strand of the literature that investigates anticipation effects of labor market programs. For instance, Black et al. (2003), Graversen and Van Ours (2008) and van den Berg et al. (2009) show that job seekers who expect to be treated in the future often leave unemployment to prevent a program participation.

training, workfare or mobility programs. This generates regional variation with respect to the intensity at which job seekers are exposed to certain policy instruments (see Fertig et al., 2006, for further details). In our empirical analysis, we isolate the exogenous part of the variation to provide causal evidence on how promoting geographical mobility affects the search behavior of unemployed workers and their employment prospects.

MPs, as one of the discretionary measures, were initially introduced in 1998 to encourage geographical mobility among unemployed job seekers. While the use of such programs was only modest immediately after their introduction in 1998, it remarkably increased with the implementation of a major labor market reform – the "Hartz Reform" – between 2003 and 2005 (see, e.g. Caliendo and Hogenacker, 2012, for details). Whereas only 84,000 job seekers participated in mobility programs in 1999, the number increased to 350,000 participants in 2006. However, MPs are a relative small program with total expenditures of €180 million in 2006, compared to other discretionary measures such as training or workfare (€2 billion each).

MPs can be disaggregated into six subprograms (see Table 1 for an overview), and while LEAs assign one single budget to MPs as a whole, caseworkers can decide which of the six subsidies they grant to the individual job seeker. All six subprograms have in common that eligibility is linked to a transition to employment, i.e. job seekers applying for MPs need to have a concrete job offer. Moreover, four out of the six programs directly aim to address the geographical mobility of unemployed workers. First, the travel cost assistance reimburses travel expenses related to the beginning of a new job up to an amount of €300. Second, the commuting assistance financially supports the daily commuting to work with €0.20 per kilometer for the first six months in the new job. Third, the separation assistance subsidizes temporary accommodation costs of up to €260 per month for a maximum period of 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 be eligible for both separation and relocation assistance, the daily commuting time to the new working location has to exceed 2.5 hours.

[Insert Table 1 about here]

However, two subsidy programs classified as MPs are unrelated (labeled MP^{UR} from now on) to geographical mobility but provide rather general support for the transition to employment. 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 programs aim to increase job seekers' overall flexibility to overcome financial barriers to the new job, but not necessarily geographical mobility. Nevertheless, they are categorized as MPs due to administrative reasons.

The application for all program types has to be submitted to the LEA before the actual event that should be subsidized takes place. Moreover, job seekers are only eligible if the prospective employer does not cover the requested costs, and subsequent program 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 labor market situation of the applicant and the available budget of the LEA for MPs. Of the 350,000 individuals who participated in one of the MPs in 2007 about 40% utilized the commuting assistance, while the usage of the other five subsidies is relatively evenly distributed.

2.2 Data

For the empirical analysis, we rely on two complementary data sources. First, we use administrative records on unemployed job seekers in Germany (the *IZA/IAB Administrative Evaluation Dataset*) as provided by the Institute for Employment Research (IAB).[6] It comprises a 5% random sample of entries into unemployment between 2001 and 2008 in Germany and covers longitudinal, individual information on employment, earnings, benefit payments and program participation. The data additionally include a broad range of socio-economic characteristics such as education, family status, health restrictions and the place of residence. We use the highly reliable administrative data to analyze job seekers' employment and earning prospects.

Second, we exploit extensive survey data on a subsample of unemployed job seekers as drawn from the administrative data above. The *IZA Evaluation Dataset Survey* comprises

[6]The administrative data can be accessed at the Research Data Center of the Federal Employment Agency at the IAB. For a detailed description of this dataset, see Caliendo et al. (2011); Eberle and Schmucker (2015)

survey information on 17,396 individuals who entered unemployment between June 2007 and May 2008 (see Arni et al., 2014, for details on the data).[7] The first interview took place shortly after entry into unemployment (on average 10 weeks). Besides an extensive set of socio-demographic and household characteristics, the survey contains information about labor market histories and personality traits. Most importantly for our analysis, it complements the administrative records as it allows a detailed analysis of job seekers' geographical mobility, their job search behavior and counseling received from their caseworkers.

For the purpose of the study, we impose the following restrictions to ensure that the two samples are comparable. Regarding the administrative data, we apply the same sample restrictions as implemented for the collection of the survey sample. First, we only consider entries into unemployment with a minimum duration of two weeks between June 2007 and May 2008. Second, the selected individuals must have been employed for at least three months before entering unemployment (no returnees from active labor market programs or periods of sickness, etc.) and eligible for unemployment benefits. For the survey sample, we restrict the analysis to individuals who report that they are actively searching for employment as only such persons received the questions on job search behavior 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. This leaves us with two separate estimation samples comprising 32,316 individuals from the administrative data and 12,326 individuals from the survey data.[8] Table 2 describes the distribution of outcome variables in the administrative and survey data.

[Insert Table 2 about here]

Based on the administrative records, we utilize information on labor market outcomes, including individuals' employment status (i.e. employment subject to social security contribution) and labor earnings, as well as information regarding the realized labor market mobility, i.e. whether the job seekers change their place of residence or receive MPs. The

[7]The survey data can be accessed via the International Data Service Center (IDSC) of the Institute of Labor Economics (IZA).

[8]The survey data and the administrative records cannot be merged due to data security reasons.

average values of the outcome variables are measured over a period of 24 months after entry into unemployment and are shown in Panel A of Table 2. Moreover, the survey data provide complementary information regarding individuals' job search behavior (see Panel B). We distinguish between measures that are specifically related to the geographical dimension of the search process – e.g. the search radius, the number of applications to distant vacancies – and general measures of the job search behavior, e.g. the total number of applications and various search channels. Moreover, we also consider information about the counseling activities of the caseworker which have been shown to play an important role in the job search process of unemployed job seekers (Behncke et al., 2010; Schiprowski, 2020). Here, we consider the number of caseworker meetings, vacancy referrals or notifications with respect to other labor market policies. All continuous outcomes variables elicited through the survey are winsorized at the top percentile.

3 Empirical Analysis

The purpose of the empirical analysis is to investigate how the provision of MPs affects the job search behavior and employment prospects of unemployed workers. The main challenge is to obtain a measure that (i) reflects the intensity at which a specific job seeker is exposed to the promotion of MPs, and (ii) is exogenous with respect to the job seeker's outcome variables. Therefore, we exploit regional variation in employment offices' policy styles as discussed in Section 2. In the following, we first describe how we construct the intensity measure and discuss its rationale. Afterwards, we explain our estimation strategy, i.e. how we integrate the regional variation with respect to the defined intensity measure into a border-pair fixed effects model accounting for a rich set of regional characteristics. Finally, we provide empirical evidence to justify the identifying assumptions.

3.1 Local Treatment Intensity, Identification and Estimation

The LEAs' autonomy in allocating their budget to different policy instruments such as training, wage subsidies or mobility programs generates regional variation in the intensity with which job seekers are treated with MPs, i.e. certain regions assign higher budgets to MPs than others, while unemployed workers are assigned to LEAs based on their place

of residence. LEAs allocate their budget based on (i) endogenous factors such as local labor market conditions or characteristics of the population, which are potentially related to the region-specific demand for and/or supply of MPs, and (ii) exogenous preferences of the administrative boards of the LEAs. The latter capture, for instance, their beliefs about the effectiveness of certain policy instrument (see e.g. Doerr and Kruppe, 2015). The identification strategy aims to isolate the part of the regional variation reflecting the exogenous preferences. Therefore, we first define a measure proxying the LEA's budget for MPs that is likely to be independent of job seekers' demand for programs supporting geographical mobility. In a second step, we restrict the analysis to a comparison of neighboring LEA districts ensuring that we compare regions that are similar in all relevant aspects except the intensity at which they promote of MPs.

3.1.1 Definition of Local Treatment Intensity

A particular challenge is that LEAs' spending on MPs is to some extent driven by the job seekers' demand for these programs. For instance, job seekers might ask for MPs during meetings with their caseworkers, which could affect budgets over time. This might be problematic given that such a behavior is influenced by job seekers' unobserved regional-specific preferences for geographical mobility that in turn could be correlated with their job search behavior and labor market outcomes. As a first step to overcome this problem, we make use of an administrative feature with respect to the provision of MPs during our observation period. As described in Section 2.1, MPs comprise six different measures, out of which only four programs (travel costs, commuting, separation and relocation assistance) aim to support geographical mobility among the unemployed, while the two other subsidies (transition and equipment assistance) promote employment in general, but have no direct link to geographically-distant job search. However, all six MPs are administrated under a single budget and each LEA determines a joint budget for all six subprograms. This implies that caseworkers in LEAs districts with a relatively higher MP budget can grant all six subsides more frequently at the same time.

While information about the LEAs' MP budget are not publicly available, we can construct the local treatment intensity TI_j as a proxy for the budget assigned to MPs in general that is likely to be independent of the job seekers' preferences for geographical

mobility:

$$TI_j = \frac{N_j^{\text{MP-UR}}}{N_j^{\text{UE}}} \times 100, \tag{1}$$

where N_j^{UE} denotes the average stock of unemployed job seekers in LEA district j (with $j = 1, ..., 178$) and $N_j^{\text{MP-UR}}$ the number of individuals receiving one of the two MPs that are *unrelated* to geographical mobility (transition and equipment assistance) in a given year.

This definition of the treatment intensity has two key advantages. First, it should be noted that we rely on the number of subsidy recipients rather than financial expenditures at the LEA level to construct the intensity measure TI_j. Thereby, we mitigate concerns that the MP budget is driven by the geographic location of LEA districts. This is important as one could expect that per-capita MP expenditures are higher in remote areas just because greater financial means are required to facilitate commuting or a residential relocation. Second, exploiting only variation with respect to the two subsidies that have no direct link to geographically-distant job search is crucial as it attenuates a possible impact of the individuals' regional-specific preferences for geographical labor market mobility on our treatment intensity measure (see Section 3.2 below for evidence on the validity of the identifying assumption). Considering the example from above, the treatment intensity TI_j is not affected by job seekers asking their caseworkers for financial support to increase their job search radius (e.g commuting or relocation assistance). Nevertheless, we can use the treatment intensity TI_j as a proxy for the LEAs' support of geographical mobility since caseworkers grant both related and unrelated MPs more frequently in LEAs assigning a relatively higher budget to MPs in general.

We assume that the preferences of the LEA for MPs influence the probability that job seekers receive knowledge about the availability of the subsidies and therefore potentially adjust their job search strategy (e.g. starting to apply for distant vacancies). In Germany, every job seeker is assigned to a caseworker who supports the search process. In regions with a high treatment intensity, caseworkers are more likely to inform job seekers about the availability of MPs during their regular meetings compared to low-intensity regions. Moreover, caseworkers in high-intensity regions may also be more likely to give a positive indication with respect to the final approval of the subsidy.[9] This implies that job seekers

[9] As discussed in Section 2.1, there is no legal claim to MPs and the final decision on subsidy receipt

would adjust their job search behavior even if one assumes perfect information, i.e. all job seekers know about the availability of MPs independent of the treatment intensity.

The construction of the treatment intensity relies on the assumption that LEAs on average promote the entire set of MPs rather than bringing a specific subsidy to the job seeker's attention. For instance, one could be concerned that for a given total MP budget, LEAs might substitute between the six subprograms, which would weaken the connection between TI_j and the LEA's promotion of geographical mobility. However, empirically we observe a strong positive correlation when comparing the treatment intensities calculated for related and unrelated MPs (see Figure A.1 in the Appendix). This applies to within-year observations (e.g. $\rho = 0.854$ in 2007) as well as over time, i.e across consecutive years ($\rho = 0.868$ between 2006 and 2007). In addition, we find a strong positive effect of TI_j on various measures of individual geographical mobility based on a regression model (see Section 4). This implies that the treatment intensity is rather determined by the joint budget allocation, while potential substitution effects seem to be negligible.

Another potential concern with our measure are complementarities such that certain mobility programs (e.g. relocation assistance) automatically come together with an unrelated MP (e.g. transition assistance), which would make TI_j endogenous because it could be influenced by the demand for MPs. However, first, we are not aware of any anecdotal evidence that this occurs and second, this is supported by empirical evidence in our sample. We find that among recipients of related MPs, only 11% also received an unrelated MP.

Finally, LEAs may reduce their budget for other labor market programs, such as training or workfare, when they assign a higher (total) budget to MPs and vice versa. If this would be the case, the treatment intensity could be affected by the budget allocated towards other programs, which in turn may have an impact on individual job search and labor market outcomes. However, one should bear in mind that the overall budget for MPs is rather small compared to other programs such that LEAs can transfer their budget towards MPs without necessarily reducing the job seekers' exposure to other programs. In Section 3.2, we test this assumption explicitly and show that the promotion of MPs is indeed empirically uncorrelated with other dimensions of the policy mix.

is at the caseworker's discretion.

3.1.2 Comparison of Neighboring Districts

While the definition of the treatment intensity reduces the influence of demand effects, it does not yet allow the estimation of the causal effect of the provision of MPs. In particular, LEA districts with stronger support of MPs might face a different composition of the unemployed workforce which is correlated with individuals' labor market outcomes. Therefore, we incorporate the local treatment intensity into a quasi-experimental setting. Specifically, we exploit discontinuities with respect to the provision of MPs along the administrative borders of the LEA districts (similar to Dube et al., 2010, who exploit policy discontinuities at state borders in the US). This is crucial as it relaxes the underlying identification assumption and only requires LEA districts on both sides of a joint border to be similar in all relevant characteristics except the budget allocated to MPs. In this regard, it is important to understand that LEA districts represent relatively small geographical entities and delineations of functional local labor markets in Germany typically result in larger geographical entities (see e.g. Kropp and Schwengler, 2016, who identify 50 local labor market regions, compared to 178 LEA districts). Multiple LEAs being part of larger local labor markets makes it likely that bordering LEA districts are similar to each other. Moreover, the regional level of LEAs is only used for the administration of employment services in Germany. Other regional policies (e.g. industry, infrastructure) are determined at the county, federal state or national level. This makes it unlikely that other types of regional policies vary at the LEA border and hence affect our results.

3.1.3 Estimation Strategy

Specifically, we estimate a border-pair fixed effects model of the following form:

$$Y_{ijb} = \alpha + \delta \ln(TI_j) + \beta X_i + \phi R_j + \kappa_b + \varepsilon_{ijb} \tag{2}$$

where i denotes the individual job seeker, j the LEA district in which the individual is located at the beginning of the unemployment spell and b a pair of bordering LEA districts such that κ_b denotes the border-pair fixed effects for any combination of two neighboring LEA districts. Since one LEA district usually has several neighboring districts, an individual living in region j can belong to different sets of boarder pairs b and therefore enters the estimation multiple times (depending on the number of neighboring regions).

Hence, we use sampling weights referring to the inverse of the number of neighboring LEA districts. The parameter of interest δ identifies the effect of MP provision on the outcome variables Y by comparing individuals living in similar, neighboring LEA districts but facing varying MP intensities. Specifically, we measure the treatment intensity in the year before the job seekers entered unemployment, which ensures that our estimation sample does not contribute to the construction of the treatment intensity (note that treatment intensities across years are strongly correlated; see Figure A.1b). Moreover, we include the natural logarithm of TI_j to ensure that regional differences regarding the overall level of treatment intensities do not bias our results.[10] Finally, our main specification accounts for a vector of regional and seasonal control variables R_j and individual-level control variables X (see Section 3.2 for details regarding the exact variables) to control for potential confounders.[11] Standard errors are clustered at the LEA district level.

3.2 Validity of the Identifying Assumption

For a causal interpretation of δ, we need to assume that the treatment intensity TI_j (conditional on border-pair fixed effects κ_b and local labor market conditions R_j) is unrelated to all unobserved characteristics that might be correlated with the outcome variables of interest. In the following, we test empirically whether this assumption is justified.

We first consider the unconditional treatment intensity. Unsurprisingly, as shown in Figure 1a, disadvantaged regions (predominately in the east and north of Germany) in particular tend to use mobility programs at a higher intensity. However, controlling for a large set of local labor market conditions already changes the picture completely. Specifically, we condition on the local unemployment rate, vacancy rate, GDP per capita and industry structure and time characteristics including the month of entry into unemployment and unemployment duration at the first interview. Additionally, we include lagged local emigration rates to capture region-specific preferences for geographical mobility. Figure 1b shows that when considering the residual variation after conditioning on these

[10] For instance, the average unconditional treatment intensity in East-Germany is about five times larger than in West-Germany, which also implies that differences between neighboring districts in levels are mechanically larger.

[11] We also estimate models including different sets of control variables (i.e. without individual or regional control variables) showing that our findings are robust with respect to the exact specification. The estimation results are shown in Table A.2 in Appendix A.

baseline regional characteristics, there is no longer visual support for the existence of region-specific patterns that might be a threat to our identification strategy.[12] In the regression model, we additionally control for LEA border-pair fixed effects and therefore only exploit variation between neighboring districts which can be assumed to be similar with respect to unobserved characteristics. In the following, we provide three empirical tests to examine the validity of the underlying identification assumption.

[Insert Figure 1 about here]

Regional indicators: First, we analyze the correlation between regional characteristics and the local treatment intensity. Specifically, we consider a set of regional indicators observed in the year before entry into unemployment in which we also measure the treatment intensity. As shown in Panel A of Table 3, macroeconomic indicators such as the local unemployment or vacancy rate and GDP are highly correlated with the unconditional treatment intensity. This is not surprising given that the budget allocation of the LEA is likely to depend on local labor market conditions. However, to examine the validity of our empirical strategy, it is more informative to consider the correlation after conditioning on border-pair fixed effects. This provides insights whether bordering regions with a high and low MP intensity are similar with respect to other economic factors that might be correlated with job search and labor market outcomes of unemployed workers. We show in Panel B of Table 3 that the conditional treatment intensity and other potentially relevant regional indicators reflecting economic as well as non-economic characteristics are not correlated.[13] This is key for our identification strategy as it suggests that differences in treatment intensities between bordering LEA districts are unrelated to other regional indicators.

[Insert Table 3 about here]

[12] We also test for the presence of regional clusters by regressing the treatment intensity on the average value of the treatment intensity in the neighboring districts. There is no evidence of regional clusters. The estimation results are available upon request.

[13] Besides, the baseline regional control variables (unemployment rate, vacancy rate and GDP), we also consider self-employment and insolvency rates as proxies for the risk-taking behavior of the workforce (see Cramer et al., 2002; Ekelund et al., 2005; Caliendo et al., 2009; Skriabikova et al., 2014). Moreover, fertility rates and the share of inhabitants aged 18-30 years proxy the current and expected future attractiveness of a region beyond typical macroeconomic indicators.

Individual-level balancing test: Second, we consider the correlation between observed individual characteristics and the conditional treatment intensity (similar to Altonji et al., 2005). For a causal interpretation of δ, we need to assume that the treatment intensity is independent of unobserved characteristics that are correlated with the outcome variables of interest after conditioning on observable local labor market conditions and border-pair fixed effects. We test this by considering the residual variation after regressing the local treatment intensity on border-pair fixed effects κ_b and regional, respectively seasonal characteristics R_j Specifically, we estimate a model of the following form:

$$\ln(TI_j) = \eta R_j + \kappa_b + V_{jb}. \tag{3}$$

Thereby, we eliminate the part of the variation in the LEAs policy mix that arises from differences with respect to local labor market conditions. The residual variation $\hat{V}_{jb}$ is expected to reflect the LEAs' preferences for MPs which are assumed to be independent of all characteristics that might have a direct impact on the individual labor market outcomes. We test this assumption by regressing the residual variation $\hat{V}_{jb}$ on the large set of individual characteristics X_i from the survey data.

[Insert Table 4 about here]

The results provide strong support for the validity of our approach. First of all, Table 4 shows that a large part of the variation of the local treatment intensity (about 88%) can be explained by the basic regional and seasonal characteristics as included in R_j and the border-pair fixed effects. Furthermore, once we condition on regional and seasonal characteristics (R_j), only a few of the observed individual-level characteristics have a significant influence on the conditional treatment intensity (see specification 2 in Table 4). Specifically, we consider socio-demographic and household information as well as labor market histories and personality traits, all together variables that have been proven to be important for labor market success and geographical mobility. In total, we observe 57 individual characteristics, while only five coefficients are significant at the 10% level and only a negligible part of the residual variation can be explained by the individual characteristics (see R^2). Please note that we also control for all available individual-level background information in our main regression.[14]

[14]For all outcomes measured based on survey data, this corresponds to the variables tested in Table 4.

Other dimensions of LEAs' policy style: So far, we presented evidence that the treatment intensity can be considered as exogenous after conditioning on baseline regional characteristics and LEA border-pair fixed effects. However, one could still be concerned that LEAs assigning a higher budget to MPs also adjust other dimensions of their policy mix such that any effect of the treatment intensity could possibly reflect changes regarding the budget allocation towards other policy instruments rather than MPs. We argue that this does not invalidate our analysis since the overall budget for MPs is rather small compared to other policy instruments (i.e. the budget for MP is less than a tenth compared to the budget for training or workfare) such that LEAs can transfer their budget towards MPs without reducing the job seekers' exposure to other programs. As a first test of this assumption, Panel B of Table 3 shows that the treatment intensity of other labor market policies is not correlated with the conditional treatment intensity (column 3 and 4).

[Insert Table 5 about here]

Furthermore, we exploit survey data indicating whether job seekers have already been informed about the possibility to participate in other labor market programs (training and workfare programs, and start-up subsidies) by their caseworker at the time of the interview or have received a benefit sanction. These variables are the most direct measures of the LEA's policy style since they reflect the caseworkers' information strategy and are largely unaffected by endogenous decisions of the job seeker. The results presented in Table 5 clearly show that the treatment intensity with respect to MPs is unrelated to a possible participation in other labor market programs and the imposition of benefit sanctions. Therefore, it appears plausible that we can indeed attribute any of the effect of the treatment intensity to the LEA's promotion of MPs.

4 Results

The main results are presented in several steps. First, relying on the rich survey data, we investigate the effect of the local treatment intensity on job seekers' search behavior in Section 4.1. Second, we focus on the administrative records and examine how the altered

When relying on the administrative records, we do not obtain personality traits, but other than that we control for a comparable set of covariates.

job search behavior affects job seekers' integration into employment (Section 4.2). Table 6 summarizes both sets of results, showing the estimated effect of the local treatment intensity $\hat{\delta}$ based on Equation (2).

[Insert Table 6 about here]

Afterwards, we discuss the magnitude of the estimated effects in light of our identification strategy that relies on a proxy for the budget allocated to MPs in Section 4.3. Finally, in Section 4.4 we provide evidence with respect to search frictions as the underlying mechanism by (i) considering counseling activities of the caseworker and (ii) estimating separate effects for job seekers with a high and low expected relocation probability, respectively.

4.1 Job Search Behavior

MPs are designed to increase the geographical mobility of unemployed workers by reducing the cost of searching and accepting employment in distant labor markets. Therefore, it can be expected that distant job search becomes generally more attractive compared to local search activities, which encourages job seekers to increase their geographical search radius and invest more effort into search activities in distant labor markets.[15] The estimation results in Panel A of Table 6 confirm the theoretical prediction. Job seekers living in LEA districts supporting MPs more intensively change their job search behavior devoting more resources to job search outside the local labor market. For instance, doubling the treatment intensity – which corresponds to an increase by one standard deviation – increases the probability of applying for a vacancy that is more than 50km away by about 2.5 percentage points ($p < 0.001$). Relative to the sample mean of 26.0% this corresponds to a 10% increase. Regarding the intensive margin of distant job search, we find similar effects with respect to the search radius and the number of job applications requiring a relocation. The search radius increases by about 13% ($p < 0.001$) and the number of distant job applications (which would require a relocation) by 10% ($p = 0.015$).

Next to the intended effect of promoting distant job search, the provision of MPs could also trigger presumably unintended effects regarding other dimensions of the individuals'

[15] See for instance Van den Berg and Gorter (1997), Manning and Petrongolo (2017) or Marinescu and Rathelot (2018) for a theoretical job search model that involves a decision about the optimal geographical search radius, where job seekers have a distaste for searching in distant regions.

job search behavior. For instance, local job search might be reduced in response to the increased search radius and shifted resources to distant search. Our results show that this is indeed the case, as the number of job applications to local jobs is significantly reduced by about 6% ($p = 0.001$). The effect on the total number of applications is also negative (-3.3%) and statistically significant ($p = 0.041$). This implies that job seekers living in areas with strong promotion of MPs indeed shift their search effort from local to geographically-distant regions, which leads to a reduction of overall search activities.

Moreover, the increased search radius may also affect the way in which unemployed workers search for vacancies, which can influence the arrival rate of job offers (see e.g. Van den Berg and Van der Klaauw, 2006; Weber and Mahringer, 2008). In particular, knowledge about the specific characteristics of the labor market can be important (Stigler, 1962; Rees, 1966) when job seekers aim to direct their applications to a specific job (Blau and Robins, 1990; Holtzer et al., 1991; Marinescu and Wolthoff, 2020). However, the presence of spatial search frictions (Schmutz and Sidibé, 2019) might make it more difficult to identify the most promising vacancies if they focus their search activities on markets where they have less information about the specific employers.

As we can also see in Panel A in Table 6, increasing the treatment intensity indeed affects the use of different search methods. It encourages job seekers to rely more often on the support of their caseworker (+1.6%, $p = 0.087$) and the job information system of the employment agency[16] (+3.8%, $p = 0.003$). However, a higher treatment intensity reduces the likelihood of exploiting active search channels (-1.8%, $p = 0.049$). This is particularly interesting since the latter refers to search methods that individuals would consult if they want to solicit specific predefined types of jobs, rather than reacting to job opportunities that come up at random, i.e. posting an own advertisement oneself, contacting a private agent, and direct application at companies. Since job seekers might have less knowledge about region-specific characteristics of geographically-distant labor markets (relative to the local labor market), encouraging them to increase their search radius seem to reduce their opportunities to directly target their job applications towards specific vacancies.

As a side note, these results also imply that the LEA's policy style is unlikely to be a credible instrument that enables identifying the causal effects of being exposed to

[16]This refers to a public job search portal that is operated by the employment agency.

a particular program as often done by empirical research (see e.g. Frölich and Lechner, 2010; Boockmann et al., 2014; Markussen and Røed, 2014; Dean et al., 2015; Caliendo et al., 2017; Dauth, 2020). Since the policy style itself can affect various dimensions of the job seekers' behavior before being exposed to any labor market program, it is likely to violate the exclusion restriction in a potential instrumental variable setting.

4.2 Realized Labor Market Outcomes

Based on survey information, the analysis so far has shown that promoting MPs encourages job seekers to increase their search radius, but it also triggers changes in other dimensions of the individual search behavior. In the next step, we now exploit the administrative records to follow job seekers over time and investigate how the altered search process affects their labor market mobility and integration. The results are depicted in Panel B of Table 6.

First, we can see that the increased search radius also translates into a higher realized labor market mobility. Increasing the treatment intensity by one standard deviation increases the (i) likelihood of moving to a different county by about 13% ($p < 0.001$), and (ii) the likelihood of actually making use of MPs or relocation assistance by about 29% ($p < 0.001$) or 20% ($p = 0.036$), respectively. Although it may not be surprising that the increased search radius translates into an increased relocation probability, it is reassuring for our empirical strategy that we observe consistent patterns in both datasets.

Ceteris paribus, one would expect that the increased geographical mobility improves the employment prospects of job seekers on average. However, we have also shown above that promoting MPs also (unintendedly) alters other dimensions of search behavior, such as reducing local search effort and the usage of different search methods. Therefore, the effect on labor market integration is a priori unclear.

We follow job seekers up to 24 months after entry into unemployment and assess how the promotion of MPs affects job seekers' employment probability and earnings. Figure 2 shows monthly effects of the local treatment intensity on the job seekers' employment status and average daily earnings. It can be seen that a higher MP intensity negatively affects the employment probabilities, thus prolonging unemployment (see Figure 2a). The magnitude of the negative effect increases steadily over the first year of unemployment.

Doubling the treatment intensity reduces the employment probability after one year by about two percentage points ($p = 0.001$). The effect becomes smaller and insignificant over the second year, but remains negative during the entire observation period.

[Insert Figure 2 and Figure 3 about here]

Figure 2b also shows a clear negative effect on earnings, which is partially explained by the reduced employment rates because non-employed individuals have zero earnings. However, while the effect on employment rates diminishes after the first year, the reduction of labor earnings gradually increases until the end of the observation period. This suggests that especially job seekers from regions with high treatment intensities tend to accept jobs with lower wages.

Cumulating the monthly outcomes over the entire observation window of 24 months (see Panel B of Table 6), shows an overall reduction in employment by 1.6% ($p = 0.033$) and earnings by 2.7% ($p = 0.002$) when doubling the treatment intensity. The stronger negative effect on earnings indicates that promoting MPs reduces the overall job match quality.

Finally, Figure 3 shows the effect of the treatment intensity on distant job search and labor market outcomes across the distribution of the treatment intensity based on a local linear regression. We plot the residual variation of the local treatment intensity after conditioning on border-pair fixed effects, regional and individual characteristics against the corresponding residual variation of the outcome variables. This allows us to detect any non-linearities regarding the estimated effects. We can see a linear increase with respect to the likelihood of applying to distant vacancies (Panel A), which is mirrored into a gradual decrease of employment (Panel B) and earnings (Panel C) with increasing treatment intensities. This further highlights the connection between the increased likelihood to search for distant vacancies and the weaker labor market performance and confirms the effects are not driven by outliers.

From a public policy perspective the results are worrying, as promoting MPs – which increases the geographical mobility of the unemployed – comes at the price of reduced labor market prospects, inducing additional costs due to higher benefit payments and lower tax revenues. In addition, spending more time in unemployment might also have

further consequences for the individual job seeker as it imposes individuals at greater risk of losing human capital (see e.g. Jacobson et al., 1993; Neal, 1995) or suffering from health issues (e.g. Sullivan and von Wachter, 2009) as well as stigma effects (see e.g. Vishwanath, 1989; Biewen and Steffes, 2010).

4.3 Quantifying the Effect Size

Our estimation strategy exploits regional variation with respect to the intensity at which unrelated MPs are used at the LEA level. Following the discussion in Section 3, this allows us to identify the causal impact of MP provision qualitatively. In what follows, we provide insights about the magnitude of the direct effects of exposure to MPs supporting geographical mobility.

The results presented in Section 4.1 and Section 4.2 quantify the overall impact of MP provision only under the assumption that a higher total MP budget at the LEA level increases the number of job seekers receiving one of the six subprograms equally. However, despite the fact that we observe a strong positive correlation between the fraction of job seekers receiving different types of MPs within a LEA district, a higher budget does not necessarily lead to an equivalent increase in all subprograms. Therefore, the coefficients obtained based on Equation (2) should be rather interpreted as a lower bound for the effect of promoting geographical mobility. In order to re-scale the effects and draw conclusions with respect to the direct effects of exposure to geographical MPs on individuals' labor market outcomes, we estimate a two-stage least squares (2SLS) model. We use the treatment intensity with respect to the two unrelated MPs (transition and equipment assistance) as an instrument for the treatment intensity in MPs related to geographical mobility (relocation, separation, commuting and travel cost assistance).

[Insert Table 7 about here]

Table 7 compares the baseline and the re-scaled 2SLS estimates. It can be seen that the first stage is about 0.5, which means that doubling the treatment intensity in unrelated MPs is associated with an increase in the treatment intensity in related MPs by about 50%. This implies that all coefficients from our baseline specification need to be multiplied by a factor of two in order to obtain the effect of promoting geographical mobility. Hence,

doubling the intensity at which LEAs support geographical mobility – for the average region this corresponds to an increase from 5% to 10% – reduces the total months employed within 24 months after entry into unemployment by about 3.2% and labor earnings by about 5.4% relative to the sample mean. Although these estimates may appear small at first sight, it should be noted that doubling the rate at which job seekers are informed about MPs seems to have effects in a similar order of magnitude as actually participating in traditional labor market programs such as training or job search assistance.[17]

4.4 Mechanisms

In the following, we aim to investigate the role of search frictions and constraints as the underlying mechanisms driving the negative employment and earnings effects. Job seekers might not be (fully) aware of such constraints when enhancing the search radius but come across these restrictions when exploring distant job opportunities. We first consider additional information from the survey data regarding the caseworkers' counseling activities. This is particularly interesting since the lack of personal knowledge about distant labor markets (as indicated by the results in Section 4.1) may encourage job seekers to exploit external support more often. Caseworkers are the main source of information for unemployed workers and they play an important role for their reintegration into the labor market (Behncke et al., 2010; Schiprowski, 2020). In addition, we investigate heterogeneous effects with respect to the job seekers' expected relocation probability. The latter is calculated based on an out-of-sample prediction and can be considered as a proxy for existing individual constraints with respect to spatial job search. Therefore, the analysis provides insights into the extent to which the negative employment effects may be provoked by job seekers who are particularly affected by spatial constraints and hence are unlikely to relocate.

4.4.1 Caseworker Counseling

It seems plausible that caseworkers who encourage job seekers to apply for jobs outside of the local labor market may also intensify their overall counseling activities, but it is a priori unclear whether and how they can effectively support geographically-distant job

[17]For instance, in their meta-analysis (Card et al., 2018) report median treatment effects of job search assistance or training on employment of about 2%–6%.

search activities. As an important tool to facilitate unemployed workers, employment agencies in many countries directly refer vacancies to job seekers (see e.g. Fougère et al., 2009; Engström et al., 2012; Bollens and Cockx, 2017; van den Berg et al., 2019). However, the effectiveness of such vacancy referrals depends on the caseworkers' knowledge about the firms and specific features of the labor market. Given that caseworkers presumably have less knowledge about distant (compared to local) labor markets, the relevance of vacancy referrals is likely to decrease with the job seekers' search radius, which possibly reduces their job finding prospects.

[Insert Table 8 about here]

As shown in Table 8, job seekers in regions with higher treatment intensities also meet with their caseworker more often. The likelihood of having three meetings or more (between the entry into unemployment and the first interview) increases by 2.8% ($p = 0.028$) when doubling the treatment intensity. However, despite the more frequent meetings, caseworkers less often provide referrals to specific vacancies. The likelihood of receiving any vacancy referral decreases by 19.4% ($p = 0.003$) and the total number of vacancy referrals by 6.3% ($p = 0.020$). This supports the notion that caseworkers might have less knowledge about the firms and specific features of distant labor markets, which reduces their ability to support the job seekers when applying for jobs in distant regions.

Moreover, the German UI system provides the possibility to rely on external support of private job search agents. Therefore, job seekers receive a placement voucher that allows them to choose a private agency that supports them during the search process, while the costs are covered by the employment agency. Our results show that in regions with a higher treatment intensity caseworkers offer (+17.2%, $p = 0.001$) and issue (+11.5%, $p = 0.032$) these vouchers more often. Since private agents are located all over the country, the increased usage of placement vouchers might be an attempt to overcome the caseworkers' difficulties associated with distant job search.[18]

[18]It should be noted that previous evidence indicates that private agents are often less effective than public employment services (see e.g. Behaghel et al., 2014; Krug and Stephan, 2016). This may explain why the more intense usage of private agencies does not translate into better employment prospects.

4.4.2 Expected Relocation Probability

So far, we highlighted the relevance of specific search frictions as observed in our data, e.g. the use of active search channels and counseling by the caseworker. However, there might be various other constraints adversely affecting job search activities or the acceptance of employment in distant regions, which could explain the negative effects on employment and earnings. For instance, job seekers might overestimate the return to distant job search or have strong residential preferences preventing them to finally accept distant job offers. To analyze the importance of these factors, we now consider heterogeneous effects for individuals who are expected to be more and less affected by such constraints.

To obtain a proxy for how important spatial constraints are on the individual level, we estimate the job seekers' probability to relocate (independently of the LEA's promotion of MPs) based on an out-of-sample prediction. Therefore, we draw an alternative sample of entries into unemployment (between June 2005 and May 2007) from the administrative records and estimate the determinants of individual's likelihood of changing the place of residence within 24 months after entry into unemployment. As explanatory variables, we include regional and seasonal characteristics, education, socio-demographic information and labor market histories that are available in both the survey and administrative data. Table A.3 in the Appendix shows the corresponding estimation results based on a logit model. Afterwards, we use the estimated coefficients to predict the individual relocation probability within our actual estimation sample (covering entries between June 2007 and May 2008).

Based on the predicted probability, we divide the sample into individuals with an expected relocation probability above and below the 75%-quantile of the corresponding distribution. We choose the 75%-quantile rather than the median to capture the part of the population facing a realistic chance of relocating. The underlying idea of this subgroup analysis is to divide our estimation sample into a group of unemployed workers whose relocation decision is less (i.e. with an expected relocation probability above the 75%-quantile), respectively more (i.e. with an expected relocation probability below the 75%-quantile) affected by spatial constraints.

[Insert Table 9 about here]

The results are presented in Table 9 and show an interesting pattern. First, we can see that the local treatment intensity has a much stronger effect on the labor market mobility of job seekers who have a high compared with a low expected relocation probability. For instance, the effect of the treatment intensity on the number of applications to distant vacancies (residential relocation) is about eight (nine) times larger among those in the top quartile of the distribution. These differences between the two groups are also statistical significant as indicated by the p-values in the last column. This shows that promoting MPs mainly increases the geographical mobility among job seekers whose relocation decision is generally less constrained. Nevertheless, also individuals who have a low expected relocation probability change their search strategy in response to the promotion of MPs, i.e. they also increase their search radius (although the effect is less than half of the effect of those with a high expected relocation probability).

For both groups, the increased search radius results in a shift of search effort from local to distant search, which is supported by the similar negative effect on the number of applications to local job offers. However, for the group of individuals with a low expected relocation probability it does not lead to significantly more applications to distant job offers presumably because existing constraints become visible to those job seekers while exploring distant job opportunities. This implies that the promotion of MPs leads to a reduction of the total number of job applications among those who have a relatively low expected relocation probability (below the 75%-quantile). Moreover, the number of vacancy referrals received by the caseworker is also predominately reduced among job seekers who are likely to be affected by spatial constraints (although the difference is not statistical significant at conventional levels).[19]

Second, the promotion of MPs also affects cumulated labor market outcomes of constrained and unconstrained job seekers very differently. We find that the negative effect of the local treatment intensity, especially the negative effect on earnings, is driven by those who have a relatively low expected relocation probability (below the 75%-quantile). Although we cannot reject the null hypothesis that the effects on employment and earnings are identical between the two groups, we can clearly see that the effect for above

[19]Descriptive statistics show that vacancy referrals also have a greater relevance among job seekers with a low expected relocation probability, which explains why the number of vacancy referrals is not negatively affected by the promotion of MPs among those with a high expected relocation probability.

75%-quantile group is very imprecisely estimated largely overlapping zero. For the group of individuals with a low relocation probability, we see large negative and strongly statistical significant effects. Hence, promoting MPs leads to weaker labor market outcomes only among job seekers who have an overall low likelihood to move and only increase their geographical mobility to a limited extent in response to the higher treatment intensity. This is a key result as it indicates that the negative effect of the local treatment intensity on labor market outcomes is provoked by job seekers whose relocation decision is more constrained and hence stay in the local market, but still change their job search strategy in response to the promotion of MPs.

5 Conclusion

Financial incentives are commonly used to promote the geographical mobility of labor. For instance, mobility programs aim to promote unemployed persons' reintegration into the labor market by relaxing their financial constraints associated with geographical mobility. The promotion of such policies could offer an attractive path for policy makers to equalize regional economic disparities. In contrast to the existing evidence highlighting the positive returns to geographical mobility for individual workers, we now show for the first time that the unconditional provision of financial support to promote the geographical mobility among unemployed job seekers does more harm than good.

Exploiting variation in the promotion of MPs along administrative borders of German employment agency districts, our results are twofold. On the one hand, individuals respond to the availability of MPs and increase their search radius, which leads to more geographical mobility among unemployed workers. Hence, employment agencies can actually stimulate the geographical mobility of labor through their counseling style. This is important as one could be concerned about deadweight effects, i.e. the notion that those who receive financial support would also move without the presence of the subsidies. On the other hand, our key finding is that promoting geographical mobility has unintended adverse effects on the labor market prospects of unemployed workers. In fact, we find that job seekers shift their search activities from local to distant labor markets leading to a net decrease of the total number of applications. In combination with spatial search frictions

– i.e. job seekers and their caseworkers are less efficient when searching in distant areas – this consequently leads to a significant reduction in employment probabilities as well as earnings when being exposed to stronger promotion of MPs during their unemployment spell. This effect is strongest for individuals whose actual relocation decision is constrained and are more likely to stay in the local market, but still change their job search strategy in response to the promotion of MPs. It appears that offering MPs prompts job seekers to search for distant jobs which ties up resources, while at the same time only very few individuals also accept a job offer from a distant labor market and benefit from the increased labor market mobility.

This has important implications beyond our specific context as it shows that spatial search frictions and constraints seem to be an important factor that prevents unemployed workers from starting employment in distant labor markets. Our causal findings therefore complement recent structural estimates by Schmutz and Sidibé (2019) who highlight the importance of such frictions relative to mobility costs that could be reduced through financial subsidies. One could be concerned that many job seekers who change their search strategy in response to the promotion of geographical mobility are not aware of the difficulties related to distant job search and possibly over-estimate the associated returns.

Finally, what should policy do given that the unconditional support of MPs reduces the overall welfare of unemployed workers? We argue that the efficiency of a regime promoting geographical mobility could be improved through (i) a more tailored provision of MPs and (ii) specialized job search assistance for distant job seekers. First, the provision of MPs should be targeted towards job seekers who are actually able to find and willing to accept employment in a distant region. This could be achieved by assessing individuals' a priori willingness to relocate based on caseworkers' assessment assisted by data-driven profiling. For instance, our own results show that unmarried, highly-educated job seekers without children are most likely to relocate, while previous studies have identified various other determinants of labor market mobility such as educational mismatch (Borjas et al., 1992), regional disparities (Kennan and Walker, 2011) or job seekers' personality (Jaeger et al., 2010; Caliendo et al., 2015). Second, additional job search assistance for job seekers who aim to apply for distant vacancies should focus on two dimensions: First, when promoting geographical mobility caseworkers should ensure that this does not come at the cost of

a reduction in local search activities. Second, enhancing the quality of distant counseling seems crucial to reduce search frictions. Local caseworkers also seem to be restricted in their ability to support distant job search, arguably due to a lack of knowledge about firms and specific features of distant labor markets or a lack of contacts with potential employers. Hence, increasing interregional collaboration – e.g. with caseworkers from other employment offices or private job agents – may improve job search efficiency.

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Tables and Figures

Table 1: Institutional settings: mobility programs (MPs) in Germany

Program	Support	Eligibility requirement
MPs related to geographical mobility		
1) Travel cost assistance	Travel expenses related to the beginning of employment Lump-sum subsidy up to €300	Beginning of new employment
2) Commuting assistance	Daily commuting to work Subsidy of 20 cent/km for the first six months of employment	Beginning of new employment Home and workplace are not identical (municipality level)
3) Separation assistance	Costs for maintaining two households Monthly subsidy of up to €260 for the first six months of employment	Beginning of new employment Potential daily commuting time > 2.5h Permanent relocation not reasonable
4) Relocation assistance	Transportation costs related to permanent relocation Lump-sum subsidy up €4,500	Beginning of new employment Potential daily commuting time > 2.5h Relocation within two years after the beginning of employment
MPs unrelated to geographical mobility (MP^{UR})		
5) Equipment assistance	Costs for work equipment and work clothes typically not covered by employee Lump-sum subsidy of up to €260	Beginning of new employment
6) Transition assistance	Subsistence between beginning of employment and first wage payment Interest-free loan up to €1000	Beginning of new employment

Table 2: Descriptive statistics: Outcome variables

Outcome variable	Mean	SD
A. Administrative records ($N = 32,316$)		
Realized labor market outcomes within 24 months		
Total no. of months employed	12.74	8.21
Total labor earnings	24,189	21,846
Realized geographical mobility within 24 months		
Relocation (on county-level)	0.206	0.405
Participating in MP	0.065	0.238
Receiving relocation assistance	0.011	0.102
B. Survey data ($N = 12,326$)		
Job search behavior		
Applied for any distant vacancy	0.260	0.439
Search radius in km	130.2	309.8
No. of job applications to distant vacancies	0.245	0.635
No. of job applications to local vacancies	1.346	1.587
No. of total job applications	1.591	1.747
Search channels		
caseworker	0.655	0.475
job information system of employment agency	0.552	0.497
any active search channel[(a)]	0.736	0.441
Counseling by caseworker		
Meetings with caseworker: three or more	0.578	0.494
Vacancy referrals by employment agency		
Any job offer	0.117	0.321
No. of job offers	0.239	0.382
Placement through private agency		
Notification received	0.085	0.278
Voucher received	0.065	0.247
Notifications about labor market policies		
Workfare programs	0.021	0.142
Job creation scheme	0.025	0.156
Training programs	0.165	0.371
Start-up subsidy	0.066	0.248
Benefit sanction	0.055	0.228

Note: Shares unless indicated otherwise.
[(a)] Active search channels include: positing an advertisement myself, unsolicited applications and contacting a private agent.

Table 3: Correlation between treatment intensity and regional indicators

	A. Unconditional treatment intensity TI_j		B. Conditional treatment intensity $(TI_j \vert \kappa_b)$	
	Correlation ρ	$P-$value	Correlation ρ	$P-$value
Lagged regional indicators				
Unemployment rate	0.480	[0.000]	-0.019	[0.980]
Vacancy rate	-0.513	[0.000]	-0.036	[0.633]
GDP per capita	-0.476	[0.000]	-0.080	[0.290]
Self-employment rate	0.188	[0.012]	0.069	[0.360]
Fertility rate	-0.079	[0.295]	-0.067	[0.376]
Insolvency rate	0.133	[0.078]	-0.074	[0.329]
Population share 18-30 years	0.231	[0.002]	0.098	[0.194]
Treatment intensities of other labor market policies				
Benefit sanctions	-0.283	[0.000]	0.013	[0.867]
Training programs	0.084	[0.268]	0.132	[0.080]
Workfare programs	0.456	[0.000]	0.102	[0.175]
Start-up subsidies	-0.251	[0.001]	0.087	[0.251]

Note: Depicted are correlation coefficients between the unconditional, respectively conditional treatment intensity and macroeconomic indicators as well as treatment intensities of other labor market policies. The variables are measured at the LEA district level j and in $t-1$. $P-$values in brackets.

Table 4: Balancing test on individual characteristics using survey data

	(1) Unconditional treatment intensity		(2) Conditional treatment intensity	
	Coef.	SE	Coef.	SE
A. Socio-demograhic and household characteristics				
School leaving degree (Ref.: None)				
Lower sec. degree	-0.076	(0.064)	0.013	(0.014)
Middle sec. degree	0.307***	(0.064)	0.020	(0.014)
(Upper sec. degree	0.093	(0.061)	0.012	(0.013)
Higher education (Ref.: None)				
Internal/external prof. training	0.166***	(0.035)	0.011*	(0.007)
University degree	0.213***	(0.048)	0.011	(0.008)
Language skills				
writing German good	0.055	(0.057)	0.000	(0.015)
speaking German good	-0.072**	(0.032)	0.001	(0.009)
writing English good	-0.179***	(0.033)	-0.009	(0.006)
speaking English good	-0.117***	(0.030)	0.003	(0.006)
Female	-0.107***	(0.023)	0.002	(0.005)
German citizenship	0.066	(0.047)	0.025**	(0.013)
Migration background	-0.521***	(0.058)	-0.010	(0.007)
Age (Ref.: 16-24 years)				
25-34 years	-0.020	(0.029)	-0.004	(0.008)
35-44 years	-0.099***	(0.038)	-0.017**	(0.008)
45-55 years	0.003	(0.038)	-0.004	(0.010)
Married	0.060**	(0.024)	0.002	(0.006)
Children (Ref.: None)				
One child	0.001	(0.024)	0.001	(0.006)
Two children or more	-0.087***	(0.032)	0.003	(0.007)
Homeowner	0.011	(0.006)		
Personality traits[a)]				
Openness	0.015	(0.011)	0.007***	(0.002)
Conscientiousness	-0.002	(0.009)	-0.001	(0.002)
Extraversion	-0.006	(0.011)	-0.003	(0.002)
Neuroticism	-0.008	(0.009)	-0.001	(0.002)
Locus of control (standardized)	-0.009	(0.009)	-0.002	(0.002)
B. Current unemployment spell and labor market history				
Time between entry into UE and interview (Ref.: 7 weeks)				
8 weeks	-0.073	(0.062)	-0.014	(0.022)
9 weeks	-0.169***	(0.060)	-0.015	(0.023)
10 weeks	-0.219***	(0.063)	-0.010	(0.024)
11 weeks	-0.306***	(0.063)	-0.017	(0.025)
12 weeks	-0.363***	(0.066)	-0.003	(0.028)
13 weeks	-0.403***	(0.078)	-0.012	(0.030)
14 weeks	-0.487***	(0.066)	-0.020	(0.031)
Unemployment benefit recipient (Yes=1)	0.036	(0.038)	0.008	(0.009)
Level of UI benefits (€100/month)	0.019**	(0.008)	-0.001	(0.002)
Lifetime months in unemployment (div. by age-18)	0.958***	(0.117)	0.042**	(0.017)
Lifetime months in employment (div. by age-18)	-0.105***	(0.032)	-0.007	(0.007)
No previous wage	0.017	(0.033)	-0.001	(0.008)
Last hourly wage in €	-0.016***	(0.003)	-0.001	(0.001)
Employment status before UE (Ref.: Other)	ref.			
Regular employed	0.094***	(0.034)	0.002	(0.008)
Subsidized employed	0.166**	(0.050)	-0.001	(0.011)
School, apprentice, military, etc.	0.102**	(0.041)	0.010	(0.010)
Parental leave	0.052	(0.056)	0.014	(0.013)
Constant	-4.595***	(0.139)	-0.032	(0.227)
LEA border-pair fixed effects	No		Yes	
No. of observations	12,326		12,326	
$P-$value joint significance				
Education	0.000		0.454	
Socio-demographics	0.000		0.141	
Labor market history	0.000		0.191	
Personality traits	0.514		0.071	
R^2 (individual characteristics X_i)	0.141		0.003	
R^2 (baseline regional/seasonal characteristics R_j)			0.875	

Note: Standard errors in parenthesis are clustered at the LEA district level. ***/**/* indicate statistically significance at the 1%/5%/10%-level.

[a)] Measured with different items on a 7-point Likert-scale and standardized to have mean of zero and a variance of one.

Table 5: Correlation between local treatment intensities on other dimensions of policy style

	Effect of local treatment intensity TI_{jt-1}		
	Coef.	SE	Relative effect size[(a)]
Other dimensions of policy style based on survey data ($N = 12,326$)			
Notifications about other ALMP programs			
training programs	−0.0088	(0.0079)	− 5.3%
workfare programs	−0.0004	(0.0022)	− 1.9%
start-up subsidy	0.0030	(0.0029)	+ 4.6%
Benefit sanction imposed	−0.0012	(0.0034)	− 2.1%
Control variables			
Individual characteristics	Yes		
Regional/seasonal characteristics	Yes		
LEA border-pair fixed effects	Yes		

Note: Depicted is the effect of the log local treatment intensity based on the empirical model specified in Equation 2. All outcome variables are measured during the first survey interview 7-14 weeks after the entry into unemployment. Standard errors in parenthesis are clustered at the LEA district level. ***/**/* indicate statistical significance at the 1%/5%/10%-level.
[(a)] Refers to the effect of doubling the local treatment intensity relative to the sample average.

Table 6: The effect of local treatment intensities on job search and labor market outcomes

	Effect of local treatment intensity TI_{jt-1}		
	Coef.	SE	Relative effect size[(a)]
A. Job search behavior based on survey data ($N = 12,326$)			
Applied for any distant vacancy ($\geq$ 50km away)	0.0251***	(0.0059)	+ 9.7%
Log (search radius in km)	0.1254***	(0.0345)	+ 13.3%
No. of job applications to distant vacancies	0.0236**	(0.0097)	+ 9.6%
No. of job applications to local vacancies	−0.0767***	(0.0240)	− 5.7%
No. of total job applications	−0.0531**	(0.0259)	− 3.3%
Search channels			
caseworker	0.0106*	(0.0062)	+ 1.6%
job information system of employment agency	0.0210***	(0.0071)	+ 3.8%
any active search channel[(b)]	−0.0136**	(0.0069)	− 1.8%
B. Realized outcomes based on administrative data ($N = 32,316$)			
Realized geographical mobility within 24 months			
Relocation (on county-level)	0.0266***	(0.0067)	+ 13.4%
Participating in MP	0.0193***	(0.0029)	+ 29.1%
Receiving relocation assistance	0.0021**	(0.0010)	+ 20.3%
Realized labor market outcomes within 24 months			
Total no. of months employed	−0.2025**	(0.0949)	− 1.6%
Total labor earnings in €	−644.37***	(206.31)	− 2.7%
Control variables			
Individual characteristics	Yes		
Regional/seasonal characteristics	Yes		
LEA border-pair fixed effects	Yes		

Note: Depicted is the effect of the log local treatment intensity based on the empirical model specified in Equation 2. All outcome variables presented in Panel A are measured during the first survey interview 7-14 weeks after the entry into unemployment. Administrative outcome variable presented in Panel B are measured over a period of 24 months after entry into unemployment. Standard errors in parenthesis are clustered at the LEA district level. ***/**/* indicate statistical significance at the 1%/5%/10%-level.

[(a)] Refers to the effect of doubling the local treatment intensity relative to the sample average.

[(b)] Active search channels include: positing an advertisement myself, unsolicited applications and contacting a private agent.

Table 7: Two-stage least squares estimation: scaling of estimated effects

	Effect of local treatment intensity TI_j			
	Baseline		2SLS	
	Coef.	SE	Coef.	SE
A. Job search behavior based on survey data ($N = 12,326$)				
First stage			0.515***	(0.0270)
$F-$statistic for weak identification			364.31	
Job search behavior				
Applied for any distant vacancy ($\geq$ 50km away)	0.0251***	(0.0059)	0.0487***	(0.0118)
Log (search radius in km)	0.1254***	(0.0345)	0.2432***	0.0674
No. of job applications to distant vacancies	0.0236**	(0.0097)	0.0457**	(0.0185)
No. of job applications to local vacancies	-0.0767***	(0.0240)	-0.1488***	(0.0471)
No. of total job applications	-0.0531**	(0.0259)	-0.1031**	(0.0505)
Search channels				
caseworker	0.0106*	(0.0062)	0.0205*	(0.0121)
job information system of employment agency	0.0210***	(0.0071)	0.0407***	(0.0141)
any active search channel[(a)]	-0.0136**	(0.0069)	-0.0264**	(0.0130)
B. Realized outcomes based on administrative data ($N = 32,316$)				
First stage			0.491***	(0.0239)
$F-$statistic for weak identification			422.39	
Realized geographical mobility within 24 months				
Relocation (on county-level)	0.0266***	(0.0067)	0.0542***	(0.0138)
Participating in MP	0.0193***	(0.0029)	0.0393***	(0.0057)
Receiving relocation assistance	0.0021**	(0.0010)	0.0043**	(0.0019)
Realized labor market outcomes within 24 months				
Total no. of months employed	-0.2025**	(0.0949)	-0.4122 **	(0.1960)
Total labor earnings in €	-644.37***	(206.31)	$-1{,}311.98$***	(426.23)
Control variables				
Individual characteristics	Yes		Yes	
Regional/seasonal characteristics	Yes		Yes	
LEA border-pair fixed effects	Yes		Yes	

Note: Depicted is the effect of the log local treatment intensity. The baseline specification shows the effect of the local treatment intensity based on MPs unrelated to geographical mobility. Two-stage least square estimates (2SLS) refer to the effect of the local treatment intensity based on MPs related to geographical mobility instrumented by the local treatment intensity based on MPs unrelated to geographical mobility. Standard errors in parenthesis are clustered at the LEA district level. ***/**/* indicate statistical significance at the 1%/5%/10%-level.

[(a)] Active search channels include: positing an advertisement myself, unsolicited applications and contacting a private agent.

Table 8: The effect of local treatment intensities on counseling activities

	Effect of local treatment intensity TI_{jt-1}		
	Coef.	SE	Relative effect size[(a)]
Counseling activities of caseworker based on survey data ($N = 12,326$)			
Meetings with caseworker: three or more	0.0160^{**}	(0.0073)	+ 2.8%
Vacancy referrals by employment agency			
Any job offer	-0.0226^{***}	(0.0076)	− 19.4%
No. of job offers	-0.0151^{**}	(0.0065)	− 6.3%
Placement through private agency			
Voucher offered	0.0156^{***}	(0.0049)	+ 17.2%
Voucher received	0.0075^{**}	(0.0035)	+ 11.5%
Control variables			
Individual characteristics	Yes		
Regional/seasonal characteristics	Yes		
LEA border-pair fixed effects	Yes		

Note: Depicted is the effect of the log local treatment intensity based on the empirical model specified in Equation 2. All outcome variables are measured during the first survey interview 7-14 weeks after the entry into unemployment. Standard errors in parenthesis are clustered at the LEA district level. ***/**/* indicate statistical significance at the 1%/5%/10%-level.
[(a)] Refers to the effect of doubling the local treatment intensity relative to the sample average.

Table 9: The effect of the local treatment intensity by expected relocation probability

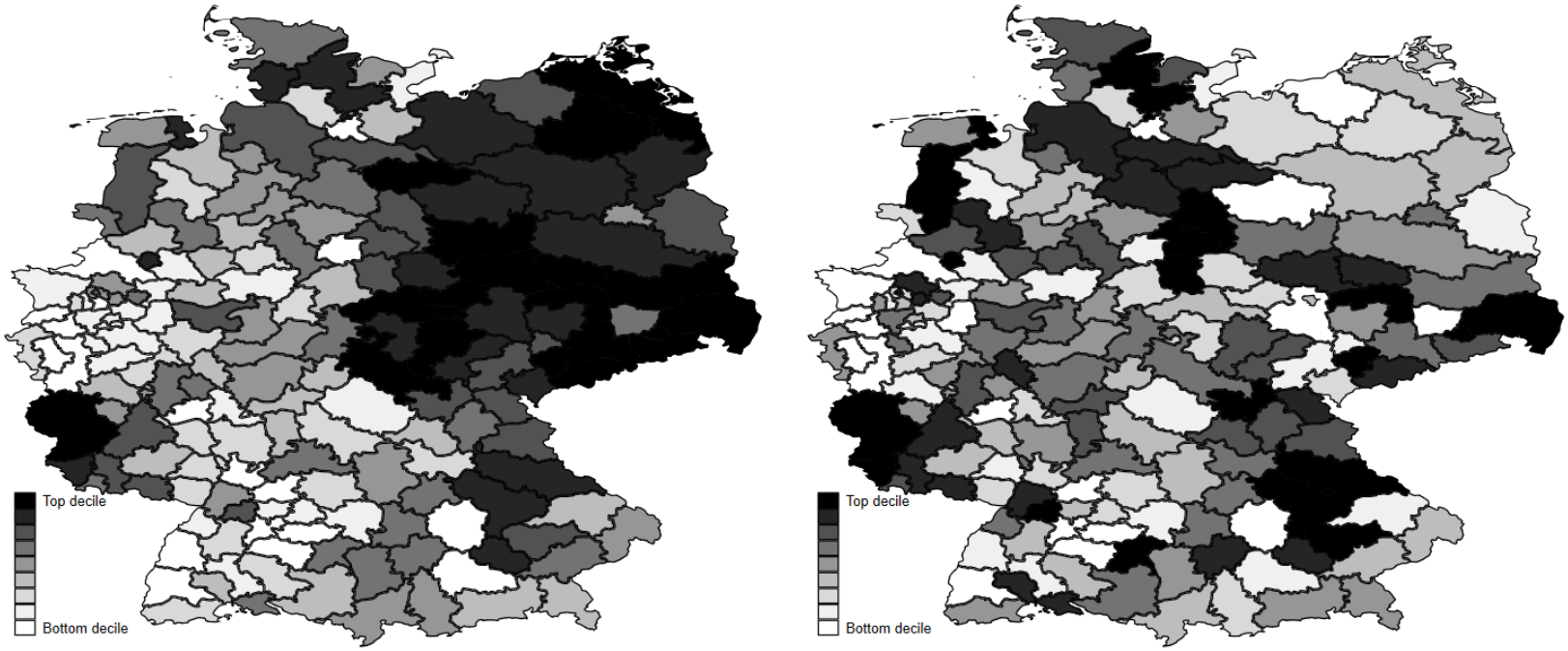
	Effect of local treatment intensity TI_{jt-1}						
			Expected relocation probability[(a)]				
	(1) Full sample		(2) below 75%-quantile		(3) above 75%-quantile		Difference (3) - (2)
	Coef.	SE	Coef.	SE	Coef.	SE	$P-$value[(b)]
A. Survey data							
Job search behavior and counseling							
Applied for any distant vacancy ($\geq$ 50km away)	0.0251***	(0.0059)	0.0197***	(0.0062)	0.0403**	(0.0174)	0.260
Log (search radius in km)	0.1254***	(0.0345)	0.0938***	(0.0349)	0.2202**	(0.1054)	0.247
No. of job applications to distant vacancies	0.0236**	(0.0097)	0.0116	(0.0090)	0.0801**	(0.0199)	0.035
No. of job applications to local vacancies	−0.0767***	(0.0240)	−0.0761***	(0.0279)	−0.0956*	(0.0578)	0.758
No. of total job applications	−0.0531**	(0.0259)	−0.0645**	(0.0299)	−0.0155	(0.0607)	0.474
Any active search channel[(c)]	−0.0136**	(0.0069)	−0.0125	(0.0078)	−0.0251*	(0.0138)	0.416
No. of vacancy referrals by employment agency	−0.0151**	(0.0065)	−0.0192***	(0.0074)	−0.0033	(0.0155)	0.364
No. of observation	12,326		9,090		3,236		
B. Administrative data							
Realized geographical mobility within 24 months							
Relocation (on county-level)	0.0266***	(0.0067)	0.0110**	(0.0050)	0.0990***	(0.0276)	0.001
Participating in MP	0.0193***	(0.0031)	0.0095	(0.0027)	0.0465***	(0.0076)	0.000
Receiving relocation assistance	0.0021**	(0.0010)	0.0004	(0.0010)	0.0036	(0.0025)	0.236
Realized labor market outcomes within 24 months							
Total no. of months employed	−0.2025**	(0.0949)	−0.1974*	(0.1039)	−0.0871	(0.2177)	0.641
Total labor earnings in €	−644.37***	(206.32)	−694.85***	(227.17)	−117.74	(494.18)	0.276
No. of observations	32,316		24,237		8,079		
Control variables							
Individual characteristics	Yes		Yes		Yes		
Regional/seasonal characteristics	Yes		Yes		Yes		
LEA border-pair fixed effects	Yes		Yes		Yes		

Note: Standard errors in parenthesis are clustered at the LEA district level. ***/**/* indicate statistical significance at the 1%/5%/10%-level.
[(a)] Expected relocation probability predicted based on a logit model for entries into unemployment between June 2005 and May 2007. The dependent variable is an indicator for a relocation within 24 months and the explanatory variables include age, gender, marital status, children living in the same household, education (school leaving degree and higher education), previous income, the reason for terminating the last job, time spent in unemployment/employment within the last five years, as well as baseline regional and seasonal characteristics.
[(b)] $P-$values are obtained based on a fully-interacted model.
[(c)] Active search channels include: positing an advertisement myself, unsolicited applications and contacting a private agent.

Figure 1: Geographical distribution of local treatment intensities in Germany

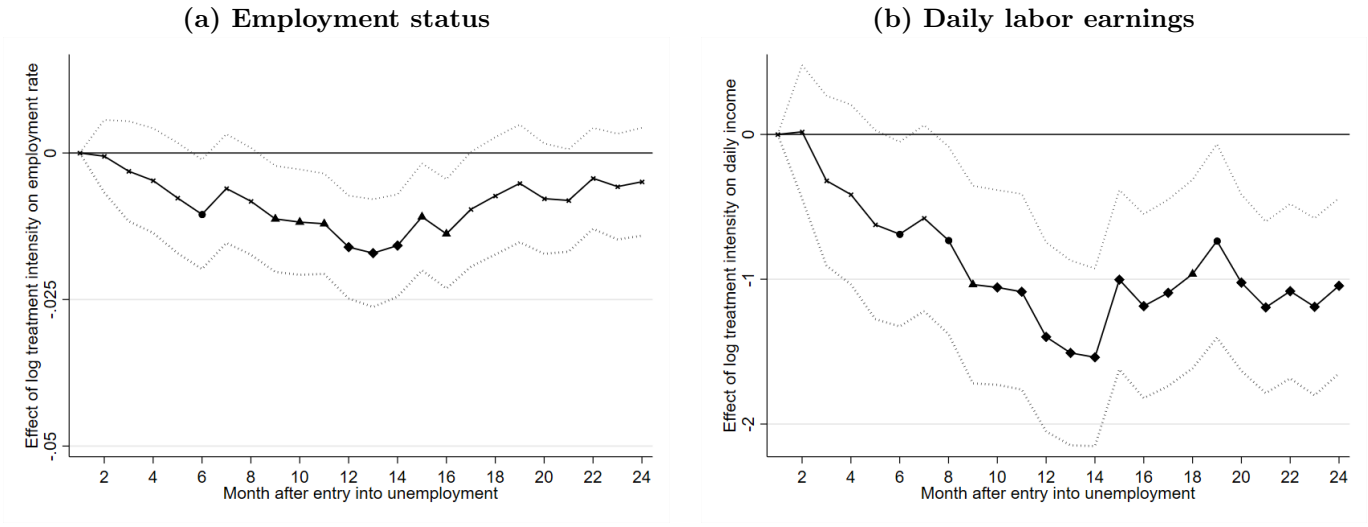
(a) Unconditional

(b) Conditional on regional characteristics



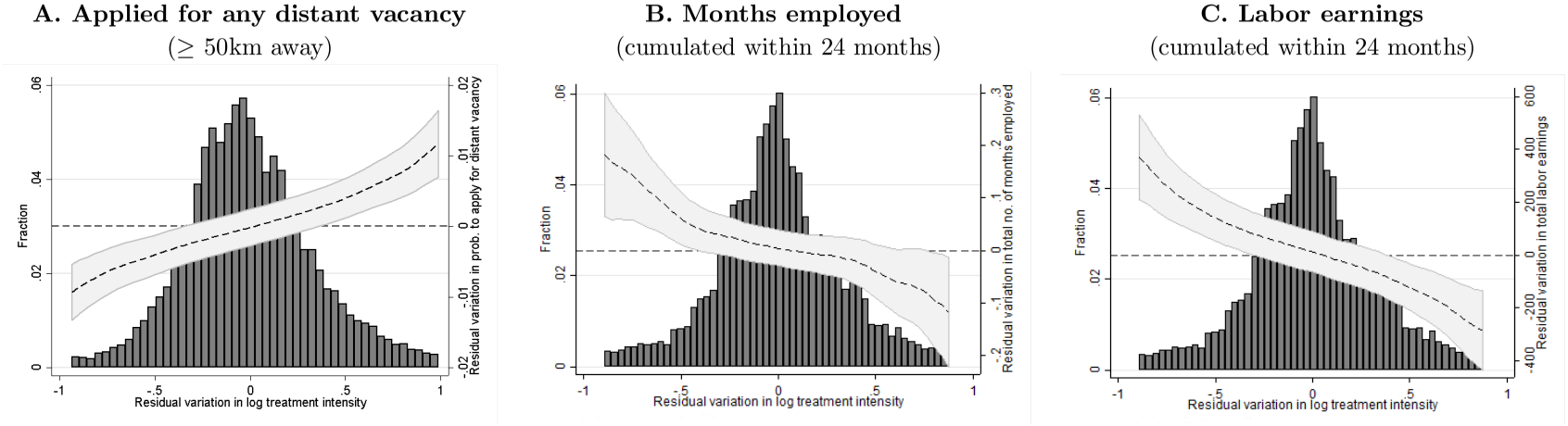
Note: Depicted is the geographical distribution in 2006 of a) the unconditional treatment intensity and b) the log treatment intensity conditional on baseline regional characteristics (unemployment rate, vacancy rate, GDP per capita, past emigration rates, dummy for East Germany).
Source: Statistic of the German Federal Employment Agency.

Figure 2: Effect of local treatment intensity on labor market outcomes over time



Note: Depicted are the effects (including 90% confidence intervals) of the local treatment intensity on monthly labor market outcomes relative to entry into unemployment for the full sample of unemployed workers obtained in the administrative records ($N = 32,220$). Standard errors clustered at LEA district level.

Figure 3: Distribution of local treatment intensity, distant job search and labor market outcomes

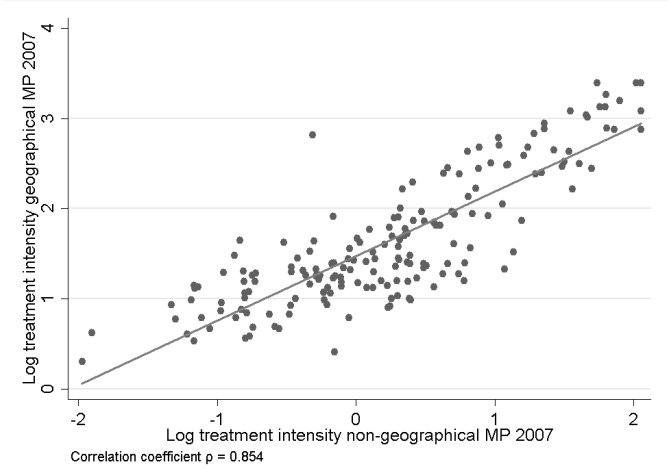


Note: Residuals are obtained based regressions of the respective variable (local treatment intensity/outcome variable) on border-pair fixed effects, individual and regional characteristics for the full sample of unemployed workers obtained in the survey data (Panel A; $N = 12,326$) and the administrative records (Panel B and C; $N = 32,220$). The histogram shows the density of residuals in local treatment intensities along the left y-axis (top and bottom 1% excluded). The dashed line plots a local linear regression of residuals in the corresponding outcome variable on residuals in local treatment intensities including 90% confidence intervals along the right y-axis. Standard errors clustered at LEA district level.

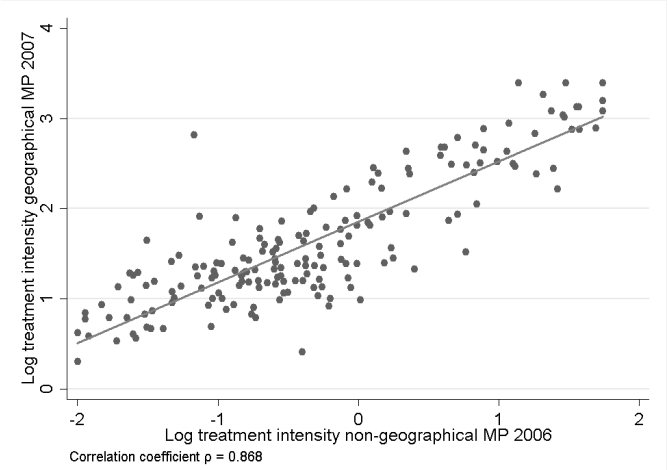
A Additional Tables

Figure A.1: Promotion of geographical and non-geographical MPs

(a) Correlation between MPs in given year



(b) Correlation between MPs across years



Note: Depicted are scatter plots of log treatment intensities in geographical and non-geographical MPs: (a) measured within the same year (2007) and (b) measured in different years (2006 and 2007).

Table A.1: Sensitivity analysis using survey outcomes: Preferences towards other ALMPs

	Effect of local treatment intensity for other ALMPs			
	Training programs		Workfare programs	
	Coef.	SE	Coef.	SE
A. Distant job search in first survey wave ($N = 12,326$)				
Applied for any distant vacancy	-0.0111	(0.0068)	0.0072	(0.0124)
Log (search radius in km)	-0.0813	(0.0420)	0.0375	(0.0780)
No. of job applications to distant vacancies	-0.0048	(0.0177)	0.0134	(0.0155)
B. Other job search characteristics in first survey wave ($N = 12,326$)				
No. of total job applications	0.0655	(0.0592)	-0.0100	(0.0517)
Search channels				
caseworker	0.0149*	(0.0090)	-0.0037	(0.0092)
any active search channel[(a)]	0.0111	(0.0087)	0.0087	(0.0079)

Note: Standard errors in parenthesis are clustered at the LEA district level. ***/**/* indicate statistical significance at the 1%/5%/10%-level.
[(a)] Active search channels include: positing an advertisement myself, unsolicited applications and contacting a private agent.

Table A.2: Sensitivity analysis: step-wise inclusion of covariates

	Effect of local treatment intensity TI_j					
	Coef.	SE	Coef.	SE	Coef.	SE
A. Job search behavior based on survey data ($N = 12,326$)						
Applied for any distant vacancy ($\geq$ 50km away)	0.0227***	(0.0057)	0.0231***	(0.0061)	0.0251***	(0.0059)
Log (search radius in km)	0.1066***	(0.0334)	0.1100***	(0.0354)	0.1254***	(0.0345)
No. of job applications to distant vacancies	0.0196**	(0.0088)	0.0226**	(0.0095)	0.0236**	(0.0097)
No. of job applications to local vacancies	-0.0855***	(0.0299)	-0.0854***	(0.0234)	-0.0767***	(0.0240)
No. of total job applications	-0.0659***	(0.0246)	-0.0628***	(0.0252)	-0.0531**	(0.0259)
Search channels						
caseworker	0.0123**	(0.0054)	0.0119**	(0.0059)	0.0106*	(0.0062)
job information system of employment agency	0.0208***	(0.0060)	0.0161**	(0.0066)	0.0210***	(0.0071)
any active search channel[(a)]	-0.0059	(0.0065)	-0.0108	(0.0068)	-0.0136**	(0.0069)
B. Realized outcomes based on administrative data ($N = 32,316$)						
Realized geographical mobility within 24 months						
Relocation (on county-level)	0.0204***	(0.0059)	0.0261***	(0.0069)	0.0266***	(0.0067)
Participating in MP	0.0275***	(0.0033)	0.0192***	(0.0031)	0.0193***	(0.0029)
Receiving relocation assistance 0.0015*	(0.0009)	0.0019**	(0.0009)	0.0021**	(0.0010)	
Realized labor market outcomes within 24 months						
Total no. of months employed	-0.1273	(0.0890)	-0.1830*	(0.0974)	−0.2025**	(0.0949)
Total labor earnings in €	-1195.62***	(220.12)	-879.36***	(237.49)	−644.37***	(206.31)
Control variables						
Individual characteristics	No		No		Yes	
Regional characteristics	No		Yes		Yes	
Seasonal characteristics	Yes		Yes		Yes	
LEA border-pair fixed effects	Yes		Yes		Yes	

Note: Depicted is the effect of the log local treatment intensity based on the empirical model specified in Equation 2. All outcome variables presented in Panel A are measured during the first survey interview 7-14 weeks after the entry into unemployment. Administrative outcome variable presented in Panel B are measured over a period of 24 months after entry into unemployment. Standard errors in parenthesis are clustered at the LEA district level. ***/**/* indicate statistical significance at the 1%/5%/10%-level.

[(a)] Refers to the effect of doubling the local treatment intensity relative to the sample average.

[(b)] Active search channels include: positing an advertisement myself, unsolicited applications and contacting a private agent.

Table A.3: Marginal effects of individual characteristics on relocation probability

	Relocation within 24 months after entry into UE	
	Coef.	SE
Female	0.014 ***	(0.001)
Married	-0.017***	(0.002)
Age in years (Ref.: 45-54 years)		
25-34 years	0.101***	(0.002)
35-44 years	0.089***	(0.002)
45-55 years	0.031***	(0.002)
Children (Ref.: None)		
One child	-0.022***	(0.003)
Two children or more	-0.060***	(0.003)
School leaving degree (Ref.: None)		
Lower sec. degree	-0.024***	(0.003)
Middle sec. degree	0.038***	(0.003)
Upper sec. degree	0.066***	(0.003)
Higher education (Ref.: None)		
Internal/external prof. training	0.012***	(0.001)
University degree	0.064***	(0.003)
Last wage (€100/day)	0.001	(0.002)
Resigned last job	0.039***	(0.003)
Months employed in last five years (×10)	-0.004***	(0.001)
Months unemployed in last five years (×10)	-0.001	(0.001)
Entry into unemployment - year (Ref.: 2005)		
2006	-0.001	(0.003)
2007	0.054***	(0.004)
Entry into unemployment - month (Ref.: January)		
February	0.012***	(0.002)
March	0.014***	(0.003)
April	0.019***	(0.003)
May	0.033***	(0.003)
June	0.041***	(0.003)
July	0.036***	(0.003)
August	0.048***	(0.003)
September	0.056***	(0.003)
October	0.051***	(0.003)
November	0.064***	(0.003)
December	0.059***	(0.003)
Regional characteristics on LEA district level		
Vacancy rate	0.009***	(0.001)
Unemployment rate	0.029***	(0.001)
Share of workforce		
in agricultural sector	-0.007***	(0.001)
in industry sector	0.001***	(0.000)
in service sector	-0.001***	(0.000)
Emigration rate	-0.005***	(0.001)
GDP per capita in €1,000	-0.002***	(0.000)

Note: Marginal effects from logit estimation based on administrative records. The outcome variable refers to an indicator whether the individual changed the place of residence on the county-level within 24 months after entry into unemployment. Explanatory variables are selected based on their availability in administrative and survey data. Standard errors in parenthesis. ***/**/* indicate statistical significance at the 1%/5%/10%-level.