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Job search and hiring in local labor markets: Spillovers in regional matching functions☆

Peter Haller[a], Daniel F. Heuermann[b,*]

[a] Institute for Employment Research (IAB), Regensburger Str. 104, 90478 Nürnberg, Germany
[b] Department of Economics, University of Regensburg, 93040 Regensburg, Germany

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ABSTRACT

In this paper we take a fresh look at the job matching process within local labor markets in Germany. Drawing on smaller geographic units than the previous literature, we estimate regional matching functions on NUTS 3 level for the years 2000 to 2010. The elasticity between matches and unemployment ranges between 0.4 and 0.5 with 75% of this effect being driven by the impact that unemployment has on matches in neighboring regions. The effect of vacancies on matches is substantially smaller but also robustly positive. Bayesian model comparison tests suggest that spillovers from unemployment and vacancies are confined to local labor markets, which are best approximated by geographical distance rather than by present or past infrastructure or commuter numbers. Spillovers from unemployment arise exclusively after a series of major labor market reforms ('Hartz Reforms') have been implemented between 2003 and 2005, indicating that the reforms have contributed to an increased spatial mobility of the unemployed.

1. Introduction

As one key trend in labor market dynamics, commuting is on the rise. In the US, the average one-way commuting distance has increased by 39% from 13.7 to 19.0 km between 1980 and 2011 (United States Department of Transportation, 2009). In the UK, it has grown by 12% from 13.4 km in 2001 to 15.0 km in 2011 (UK Census, 2011). Similarly, in Germany it has risen by 14% from 14.6 to 16.6 km between 1999 and 2009 (BBSR, 2012). As a consequence, a growing share of workers is employed outside their home region. In Germany, the share of workers crossing at least one county border on their way to work has increased from 28% in 2000 to 38% in 2013.

With a rising mobility of workers, administrative regions increasingly integrate into larger local labor markets. Within these local labor markets, the job matching process is strongly influenced by job search and recruitment activities of workers and firms in adjacent regions (Burda and Profit, 1996, Burgess and Profit, 2001, Fahr and Sunde, 2006a,b, Hynninen, 2005). In their pioneering work, Burda and Profit (1996) show for the Czech Republic that unemployment and vacancies affect the number of matches in neighboring regions. These effects decay in a non-linear way with distance. Burgess and Profit (2001) provide evidence that a rising number of unemployed within one region in Britain increases the number of filled vacancies in neighboring regions while reducing the outflow from unemployment therein. These findings are confirmed by Fahr and Sunde (2006a,b) for Germany and Hynninen (2005) for Finland.[1]

In this paper we take a fresh look at the job matching process within local labor markets in Germany. Estimating regional matching

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* Corresponding author.
E-mail addresses: peter.haller@iab.de (P. Haller), daniel.heuermann@ur.de (D. Heuermann).

[1] In a related literature, the matching function is disaggregated by industry and occupation (see, e.g., Anderson and Burgess, 2000 and Stops, 2014).

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functions on NUTS 3 level for the years 2000 to 2010, we provide new evidence on the influence that unemployment and vacancies unfold on job matches within and across regions. In addition, we contribute to the literature in four major respects.

First, we shed light on how the specific definition of a local labor market shapes our estimates of spillover effects. Within most existing studies, local labor markets have been modeled by means of either contiguity or distance matrices.[2] As a key shortcoming, contiguity matrices ignore job search and hiring activities between more distant regions, which can hardly be reconciled with a rising incidence of (long-distance) commuting. In addition, neither contiguity nor distance matrices take into account regional accessibility by means of public and private transport or the real incidence of commuting. As a specific form of measurement error, this is likely to lead to biased estimates. Equally important, the lack of a comparative analysis can be regarded as a foregone opportunity to further our understanding of how the way we aggregate single regions into local labor markets influences our estimates of regional spillovers. Drawing on information on past and present infrastructure endowments and on commuter flows between regions, we construct nine different spatial weight matrices. These matrices reflect a broad range of definitions of local labor markets and differ substantially in the importance they assign to unemployment and vacancies in neighboring regions. Using Bayesian posterior model probabilities, we compare the results obtained from these matrices in order to examine whether the size of spillovers depends on how we model spatial dependencies between regions.

Second, we conduct a thorough comparison of the spatial models most commonly used in regional science in order to examine which of them fits the data generating process in regional matching functions best. Doing so, we devote particular attention to the question whether these spillovers are 'local' or 'global' in nature and thereby shed light on the geographical scope of spillovers from unemployment and vacancies. In addition, throughout all models we disentangle the effects of an increasing incidence of commuting on the number of matches from the confounding impact of worker relocation by controlling for local population numbers.

Third, we focus on NUTS 3 regions as the smallest geographical units that can be analyzed with the data currently available. Doing so, we address the problem that the spatial units employed in prior studies are rather large. Each of the 137 labor market regions used by Fahr and Sunde (2006a,b) covers on average an area of about 2600 km^2 with a radius of 29 km. This not only stands in contrast to the finding by Manning and Petrongolo (2011) that local labor markets are relatively small. With an average commuting distance of about 17 km, defining local labor markets of this size also severely restricts the insights that can be gained from an analysis of spillover effects from job search and hiring behavior, since most activities by construction take place within regions. NUTS 3 regions cover on average an area of 880 km^2, which is equal to 68% of the area of an average county in the US. As such, they are about 70 percent smaller than the labor market regions used so far, allowing for a more precise identification of spillover effects.[3]

Finally, specific to the German context, we shed first light on whether the labor market reforms of the early 2000s ('Hartz Reforms') have lived up to the objective of increasing the regional mobility of the unemployed. In order to address this issue we examine whether the number of matches responds more strongly to unemployment in neighboring regions after the implementation of the reforms compared to the period before. While not to be taken as causal, these results provide tentative evidence on whether the reforms have increased the willingness of unemployed to commute longer distances for taking up a job.

Our findings can be summarized as follows. First, the Spatial Durbin Error Model turns out as the best-fitting model in the context of regional matching functions. This supports the view that spillovers from unemployment and vacancies on matches are confined to local labor markets. Second, we find robust evidence for the existence of positive spillovers from unemployment, indicating that job seekers extend their job search into neighboring regions. These spillovers amount in size to about 75% of the total effect that unemployment has on matches. The effect of vacancies on matches within and across regions is smaller, but also significantly positive. These results are robust to the use of different spatial weight matrices. In fact, more realistic measures for neighborhood relations based on present and past rail and road connections yield largely the same results as physical proximity, which turns out as the most adequate way of modeling spatial interactions in regional matching functions. In line with the argument by LeSage and Pace (2014b), this finding puts the long-standing debate on how to correctly specify spatial weight matrices into perspective. Finally, we find that the size of regional spillovers from unemployment has increased after the Hartz-reforms, suggesting that in line with expectations the reforms have contributed to an increased regional mobility of the unemployed.

The paper is organized as follows. In the next section we derive the different spatial models, that we later test against each other, from matching theory. Section 3 contains a description of the data and provides first evidence on the spatial distribution of matches, unemployment and vacancies in Germany. In Section 4 we first evaluate the performance of the models and compare the results from using different spatial weight matrices. We then conduct different robustness checks and examine how the Hartz-reforms have influenced the matching process within and across regions. Section 5 concludes.

2. Empirical approach

2.1. Specification of the matching function

In the context of labor markets, matching functions express the job finding process between workers and firms as a relation between hires, unemployment and vacancies

$$M = m\,(U, V) \tag{1}$$

where the number of successful matches M within one period is determined by the stock of unemployed U and the number of vacancies V (Petrongolo and Pissarides, 2001). Specifying m in Cobb-Douglas form yields the matching function

$$M = AU^{\alpha}\,V^{\beta} \tag{2}$$

where A denotes overall matching efficiency, which is constant across time and space. Applied to the level of regions $r = 1,\ldots,R$ and augmented by a time dimension $t = 1,\ldots,T$, Eq. (2) can be transformed into the regional matching function

$$M_{rt} = AU_{rt}^{\alpha}V_{rt}^{\beta} \tag{3}$$

As a structural difference to the national level, where only a small share of workers commutes across country borders, job search and hiring behavior on regional level are not confined to single spatial

[2] Notable exceptions are Manning and Petrongolo (2011), who allow for labor markets of individual workers to overlap, and Schmutz and Sidibé (2015), who include sectoral dissimilarities between cities as an alternative measure of distance into a structural model.

[3] Due to a higher overall population density, the average number of persons living in each county (200,000) is about twice as large as the corresponding number for the US (100,000).