

# The Geography of Recruitment

## *An extended abstract*

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Why aren't all vacancies posted in online? In 2020, 95% of US population had access to the Internet<sup>1</sup>, and online job boards and hiring have seen a massive growth since their introduction in early 2000s. The marginal cost of posting a vacancy online is virtually 0, but around a third of jobs are still filled offline (Carnevale, Jayasundera, and Repnikov, 2014).

In this paper, I argue that we can answer this question through the lenses of the geography of recruitment. The decision to recruit beyond the city, region, or state boundaries is in many ways similar to the decision to post a vacancy on the Internet: both actions open the firm to new potential employees. If we can pin down the circumstances under which firms choose to advertise their job openings in labour markets that are different or larger than their local one, we get closer to explaining why the shift to hiring online hasn't been absolute, and why it doesn't appear to have led to substantial changes in employment and mobility.

The main obstacle to studying firms' recruitment behaviour – its spatial dimension in particular – is the lack of suitable data. Traditional data sources, such as JOLTS, focus on the number of vacancies over time rather than on how and where are the jobs openings advertised. The best data on firm recruitment in the US is from 1982<sup>2</sup> and it includes no data on hiring across space. Online vacancy postings, which are a rich tool for analysing recent labour market trends, reveal little about firms' spatial hiring decisions beyond the binary decision whether to post online. At the same time, firms and workers do match across space: the majority of long-distance moves within the US are to take up a new job (Amior, 2019; Balgova, 2019), which means that firms must recruit outside of their local labour markets.

To observe firms' decisions about hiring across space I turn to help-wanted ads in US newspapers in 1990<sup>3</sup>. Because newspapers differ in where they are distributed, and because

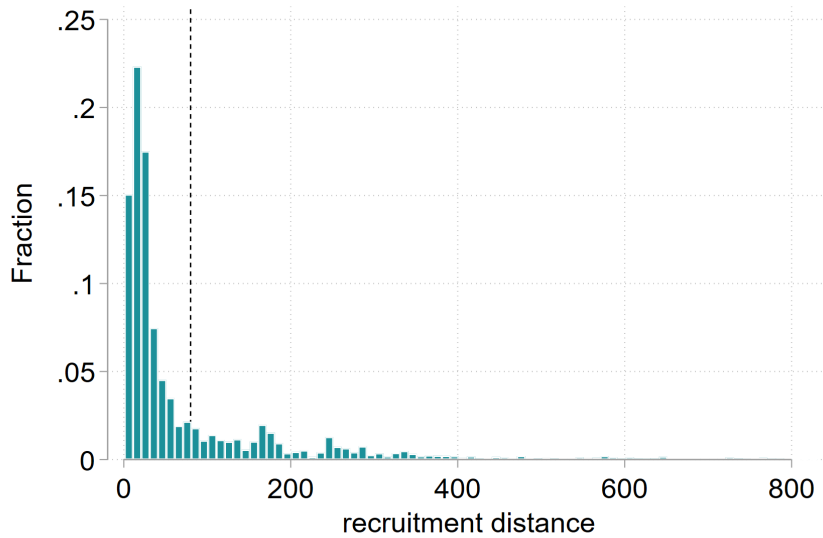
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<sup>1</sup>The Federal Communications Commission estimates that in 2019 about 14.5 million individuals lacked access to terrestrial connection; see <https://docs.fcc.gov/public/attachments/FCC-21-18A1.pdf>.

<sup>2</sup>The Employment Opportunities Pilot Project

<sup>3</sup>I collect a random sample of newspapers available on the digital archive *Newspapers.com*.

Figure 1: Distribution of positive recruitment distance



*Note:* Distribution of the positive ( $> 0$ ) distance between the location of the job and the location of the newspaper, in km. The dashed vertical line denotes 80km, the boundary of extreme commute as defined by the US Census Bureau.

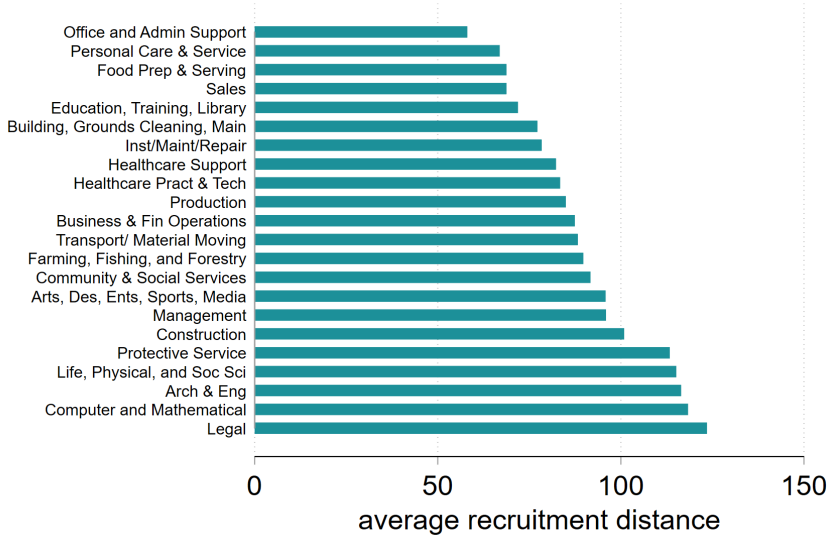
employers have to make a conscious choice which newspaper to place the advert at, this data provides a unique insight into how firms decide where to search for workers. I automate the process of identifying the occupation and location of each vacancy, and link this information to the newspaper location. The sample consists of more than 19,500 newspaper pages from over 200 newspapers covering most of the US. This dataset can be then matched with other variables, such as occupation- and region-specific wages and education levels, and the size and characteristics of the towns and cities, to allow me to identify the drivers of recruitment behaviour.

The preliminary results show that the size of local labour markets varies significantly across workers. While hiring is almost exclusively local for some occupations, other jobs are advertised beyond commuting distance, city and state boundaries. Moreover, this variation follows a systematic pattern across wages, education, and the size of the local labour market.

Even more importantly, I show that the patterns in the geography of recruitment in 1990 predict online hiring behaviour today. Despite the long-standing decline of newspaper readership and the Internet revolution, employers' decisions about how to fill their job openings follow the same fundamentals as 30 years ago.

The first finding of the paper is that most – but not all – vacancies are advertised locally. 89% of vacancies are advertised in newspaper in the town/city of the job itself, but the remaining 11% may be posted relatively far. The distribution of *positive* recruitment

Figure 2: Average positive recruitment distance, by occupation



*Note:* Occupation average of the positive ( $> 0$ ) distance between the location of the job and the location of the newspaper, in km.

distance is plotted in Figure 1. The distribution is heavily left-skewed, with a long right tail: while a large share of these non-local vacancies are still posted close to home, a lot of them are not. 26% of non-local vacancies are posted beyond the limit for an “extreme commute”<sup>4</sup> and only 39% of non-local vacancies are posted in their local county.

However, these patterns vary considerably across occupations. While the variation in the share of vacancies posted locally is relatively small (between 80 and 90%), there is a lot of differences in the average positive recruitment distance (the intensive margin). Figure 2 shows that non-local jobs in Office and Admin, Personal Care and Services, and Food Prep are advertised on average less than 70km away from the job location, this is more than 115km for jobs in Sciences, Architecture and Engineering, Computer and Legal occupations. In fact, not only is the variation in positive recruitment distance larger than for the share of local hiring, Figure 3 suggests that these two margins are only weakly related. In other words, the decision whether to post locally or not is separate from deciding how far to post the vacancy conditional on non-local posting.

Some of this occupational variation can be explained by the average wage and education attainment in the different occupations. I plot the correlations between occupation-specific wage and education (as measured in the 1990 Census) and hiring across space in Figures 4 and 5. Local hiring falls with wages and education, while average recruitment distance increases in both.

<sup>4</sup>See the note to Figure 1.

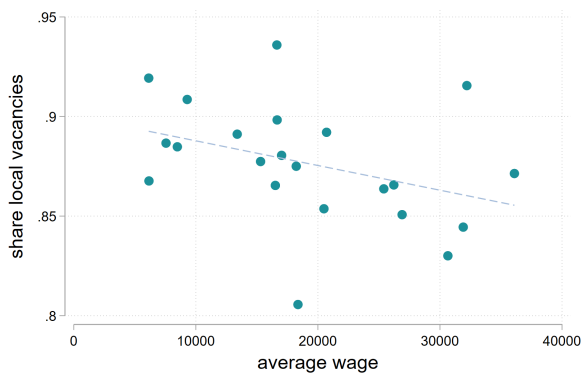
Figure 3: Average positive recruitment distance against the share of vacancies posted locally, by occupation



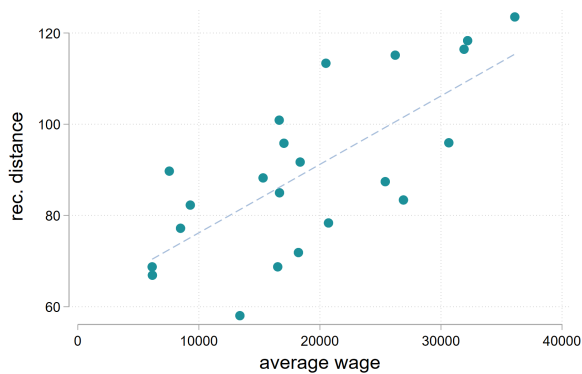
*Note:* Occupation average of the positive ( $> 0$ ) distance between the location of the job and the location of the newspaper, in km.

Figure 4: Wages and the spatial pattern of recruitment

(a) The share of vacancies posted locally



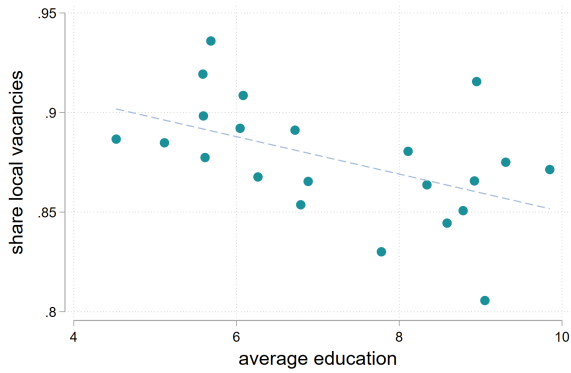
(b) Positive recruitment distance



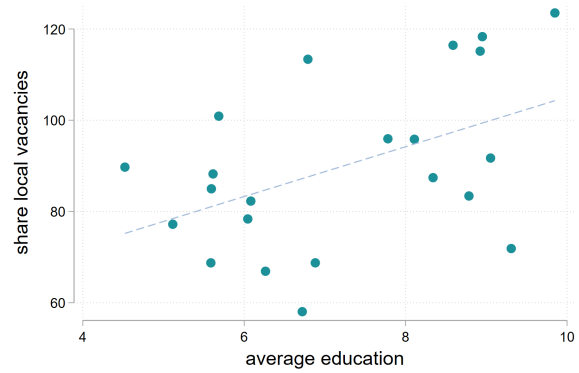
*Note:* The wage data is taken from 1990 Census. Each observation corresponds to one major occupation group.

Figure 5: Education and the spatial pattern of recruitment

(a) The share of vacancies posted locally

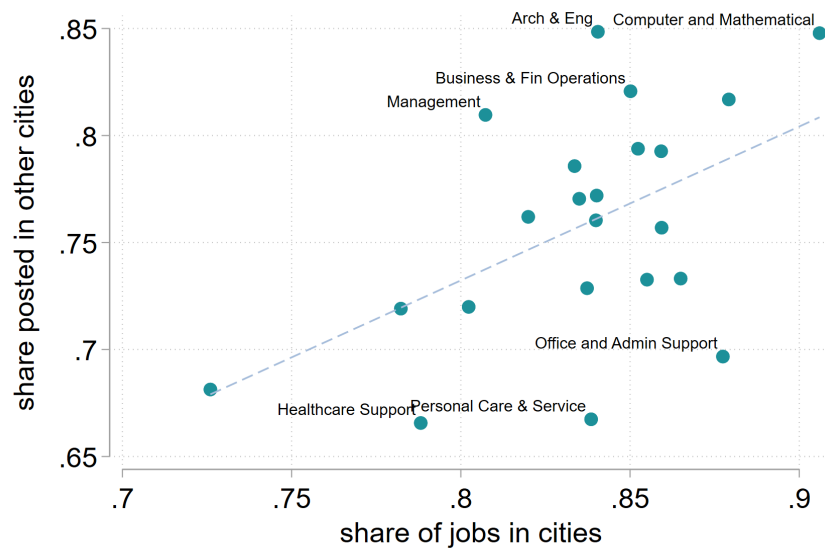


(b) Positive recruitment distance



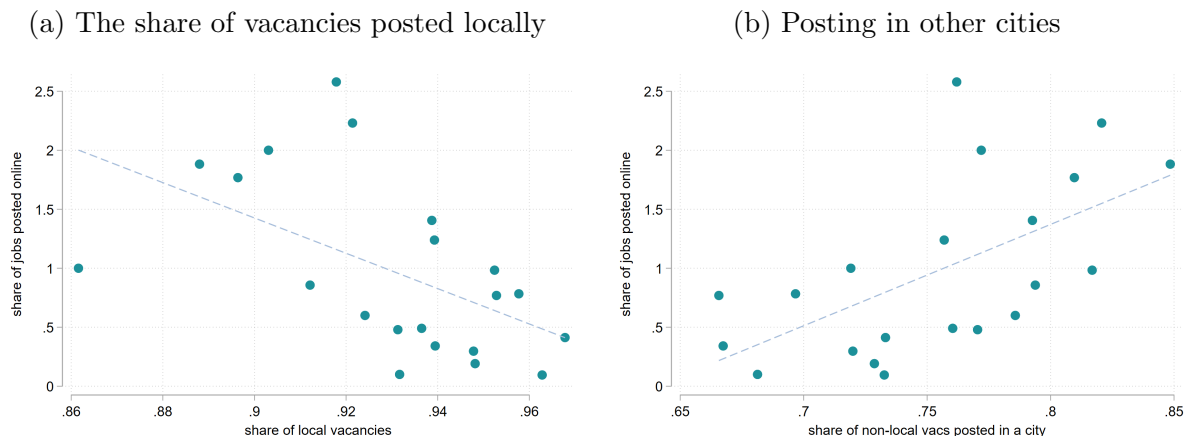
*Note:* The education data is taken from 1990 Census. Each observation corresponds to one major occupation group.

Figure 6: The patterns of recruitment in urban vacancies



*Note:* Share of jobs in cities corresponds to the fraction of vacancies located in (any) city. Share posted in other cities corresponds to the fraction of all non-local vacancies posted in other cities (as opposed to small towns). Numbers are for occupation averages.

Figure 7: Spatial patterns in recruitment in 1990 and online vacancy posting in 2010-2015



*Note:* Each observation corresponds to one major occupation group. The data on online job posting is taken from the comparison of JOLS and Burning Glass (online vacancy) data for 2010-2015 in Hershbein and Kahn (2018).

However, where the jobs are located matters too. In general, small-town jobs are both more likely to be posted outside of the local labour market, and more likely to be posted in other small-town jobs. City jobs, on the other hand, are more likely to be posted locally, or in other large cities. This pattern can be seen at the level of occupations in Figure 6. Jobs that are less concentrated in cities (Healthcare, Personal Care) are more than proportionately likely to be advertised in other small towns, whereas some occupations (such as Management, Architecture and Engineering, Computer) are disproportionately advertised in big cities. This translates into a relative inequality of job opportunities: an architect in small town is less likely to learn about an architect vacancy in a large city than his administrative assistant.

Finally, Figure 7 shows that these recruitment patterns are closely related to patterns in online vacancy posting today. The two panels of the Figure focus on the share of jobs posted locally and the share of non-local jobs posted in other cities (as opposed to other small towns), and show that both of these measures are strongly correlated with the share of vacancies posted online more than 20 years later. The occupations which were advertised relatively locally are less likely to be advertised online, while the likelihood of posting in another city (as opposed to a small town) predicts positively online hiring. This suggests two things: the decision to hire online is similar to the decision to hire outside of the firm’s local labour market; and recruiting online is more similar to advertising in an urban labour market rather than a rural one. In theory, a firm has two main reasons to recruit outside of its local labour market: to reach more workers, or to reach more specific workers. While advertising in a city probably does both, advertising in a smaller town is more plausibly driven by the search for specific workers, rather than quantity. Panel (b) in Figure 7 tells

us that the latter group of firms are less likely to advertise online today, implying that the Internet made a bigger impact on the size of candidate pool rather than its specificity.

I am exploring this question and similar ones in my ongoing work on this project. In its current form, the paper will present some of the main empirical patterns in the geography of recruitment, and how they related to vacancy posting today. The next steps include building a model to rationalise the spatial patterns in early 1990s, and testing whether a sharp drop in the cost of vacancy posting – but not a drop in the cost of selection and matching – can explain the incomplete takeup of online hiring today.

The main contribution of this paper lies in measuring and documenting the variation in the size of the local labour market across workers. Manning and Petrongolo (2017) show that workers’ search is very local; this paper completes the picture by analysing the recruitment behaviour of firms across space. In this respect, it contributes to the growing set of papers analysing the process of hiring at firm level (Wolthoff, 2018; Carrillo-Tudela, Hermann, and Kaas, 2020).

The question motivating this paper relates to the relatively small number of papers estimating the impact of the Internet on the labour market. Kroft and Pope (2014); Kuhn and Mansour (2014) analyse whether the introduction of online job posting made the matching process more efficient on local level, but the evidence on this is so far mixed. This paper is based on the observation that the Internet not only helps us search through a large amount of data faster (which has been examined in the existing literature), but it also connects distant labour markets and thus drives the hypothetical “death of distance”.

Finally, this paper is related to the booming literature using textual analysis of job vacancies as a source of data on the labour market. The overwhelming majority of these papers make use of online vacancy data, which is relatively more easily available and in a more readily-analysed format (Hershbein and Kahn, 2018; Marinescu and Wolthoff, 2020; Adams-Prassl, Balgova, Waters, and Qian, 2020; Clemens, Kahn, and Meer, 2021). To the best of my knowledge, there are only two papers analysing the text of help-wanted ads: Atalay, Phongthientham, Sotelo, and Tannenbaum (2020); Anastasopoulos, Borjas, Cook, and Lachanski (2018). The first paper uses help-wanted ads to analyse the evolution of task content of jobs; the second uses similar data to measure the labour demand response to the Mariel Boatlift. Compared to this work, beside the methodological differences in the text analysis itself, I rely on a larger sample of newspapers and exploit previously unused data on the spatial dimension of recruitment.

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