

Spatial wage disparities: Sorting matters!

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Abstract

Spatial wage disparities can result from spatial differences in the skill composition of the workforce, in non-human endowments, and in local interactions. To distinguish between these explanations, we estimate a model of wage determination across local labour markets using a very large panel of French workers. We control for worker characteristics, worker fixed effects, industry fixed effects, and the characteristics of the local labour market. Our findings suggest that individual skills account for a large fraction of existing spatial wage disparities with strong evidence of spatial sorting by skills. Interaction effects are mostly driven by the local density of employment. Not controlling for worker heterogeneity leads to very biased estimates of interaction effects. Endowments only appear to play a small role.

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1. Introduction

In many countries, spatial disparities are large and a source of considerable policy concern. In this paper we propose a new approach to account for spatial wage

disparities. We implement it on a large panel of French workers.

To explain large spatial wage disparities, three broad sets of explanations can be proposed. First, differences in wages across areas could *directly* reflect spatial differences in the skill composition of the workforce. There are good reasons to suspect that workers may sort across employment areas so that the measured and unmeasured productive abilities of the local labour force vary. For instance, industries are not evenly distributed across areas and require different labour mixes so that we expect a higher mean wage in areas specialised in more skill-intensive industries. Such skills-based explanations essentially assume that the wage of worker i is given by $w_i = As_i$, where s_i denotes individual skills and A , the productivity of labour, is independent of location.

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Consequently, the average wage in area a is the product of average skills, \bar{s}_a , by the productivity of labour: $w_a = A\bar{s}_a$.²

The second strand of explanations contends that wage differences across areas are caused by differences in local non-human endowments (hereafter endowments). For instance, workers in some areas may have a higher marginal product than in others because of geographical features such as a favourable location (like a port or a bridge on a river), a climate more suited to economic activity, or some natural resources. Arguably, local endowments cannot be restricted to natural features and should also encompass factors of production such as public or private capital, local institutions, and technology. More formally, this type of argument implies that in area a with endowments E_a affecting positively the productivity of labour, the wage is given by $w_a = A(E_a)$.³

The third family of explanations argues that some interactions between workers or between firms take place locally and lead to productivity gains. Interactions-based explanations have a wealth of theoretical justifications. Following Marshall (1890), denser input–output linkages between buyers and suppliers, better matching of workers' skills with firms' needs in thicker labour markets, and technological externalities resulting from more intense direct interactions are frequently mentioned (see Duranton and Puga, 2004 for a review).⁴ A key issue is whether these benefits stem from the size of the overall market (*urbanisation economies*) or from geographic concentration at the industry level (*localisation economies*). Stated formally, these arguments imply that the mean wage in area a and industry k is given by

$w_{a,k} = A(I_a, I_{a,k})$, where I_a and $I_{a,k}$ are two vectors of interaction variables to capture urbanisation and localisation economies.⁵

We are not aware of any work using individual data considering these three strands in a unified framework. This is the main purpose of this paper. In our specification, we allow skills, endowments, and interactions to determine local wages. More formally, our model implies that in equilibrium the wage of worker i in area $a(i)$ and industry $k(i)$ is given by $w_i = A(E_{a(i)}, I_{a(i)}, I_{a(i),k(i)})s_i$.

A unified framework encompassing skills-, endowments-, and interactions-based explanations should provide us with a sense of magnitudes about the importance of these three types of explanations in determining wage disparities across areas. These magnitudes are crucial to inform policy and to guide future theoretical work. Unfortunately, a unified framework also imposes formidable data requirements. More specifically, to deal properly with skills-based explanations we must control for unobserved worker heterogeneity, which requires a panel of workers. In our empirical analysis, we use a large panel of French workers.

We develop a two-stage approach. The first stage of the regression allows us to assess the importance of skills-based explanations against those highlighting true productivity differences across areas (i.e., between-industry interactions and endowments-based explanations). Formally, we regress individual wages on time-varying worker characteristics, a worker fixed effect, an area-year fixed effect, an industry fixed effect, and a set of variables relating to the local characteristics of the industry (to capture local interactions within industries). The area-year fixed effects can be interpreted as local wage indices after controlling for observed and unobserved worker characteristics and industry effects. Our main result is that differences in the skill composition of the labour force account for 40 to 50% of aggregate spatial wage disparities. This occurs because workers sort across locations according to their measured and unmeasured characteristics: The correlation between the local mean of worker fixed effects and de-trended area fixed effects (which are computed controlling for worker fixed effects) is large at 0.29. This

² That sorting could be at the root of systematic wage differences between groups of workers is a long-standing concern of labour economists. They researched this question intensively in the case of wage differences across industries (Krueger and Summers, 1988; Gibbons and Katz, 1992; Abowd et al., 1999) but they have mostly left aside the geographic dimension. On the other hand, scholars interested in regional issues have paid remarkably little attention to this type of explanation. Glaeser and Maré (2001) on the urban wage premium in US cities and Duranton and Monastiriotis (2002) on UK regional convergence stand out as early exceptions.

³ This (very) broad group of explanations is often at the heart of the work done by growth economists. The literature on this topic is extremely voluminous (see Durlauf and Quah, 1999 and Temple, 1999, for surveys).

⁴ The theories relying on input–output linkages and more generally on market access differ starkly with respect to the spatial scale they consider. The traditional focus of urban economics is the city whereas that of the 'New Economic Geography' (Fujita et al., 1999) is more regional and even inter-regional. We pay attention to these issues below.

⁵ Interaction-based explanations have received a lot of attention from urban and regional economists. Work on agglomeration economies is usually done at the aggregate level by regressing a measure of local productivity on a set of variables relating to the extent and local composition of economic activity. Results are generally supportive of the existence of both localisation and urbanisation economies. See Rosenthal and Strange (2004) for a review.

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