



Spatial changes in labour market inequality



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ABSTRACT

We study spatial changes in labour market inequality for US states and MSAs using Census and American Community Survey data between 1980 and 2010. We report evidence of significant spatial variations in education employment shares and in the college wage premium for US states and MSAs, and show that the pattern of shifts through time has resulted in increased spatial inequality. Because relative supply of college versus high school educated workers has risen faster at the spatial level in places with higher initial supply levels, we also report a strong persistence and increased inequality of spatial relative demand. Bigger relative demand increases are observed in more technologically advanced states that have experienced faster increases in R&D and computer usage, and in states where union decline has been fastest. Finally, we show the increased concentration of more educated workers into particular spatial locations and rising spatial wage inequality are important features of labour market polarization, as they have resulted in faster employment growth in high skill occupations, but also in a higher demand for low wage workers in low skill occupations. Overall, our spatial analysis complements research findings from labour economics on wage inequality trends and from urban economics on agglomeration effects connected to education and technology.

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1. Introduction

Study of changing labour market inequality has become a major preoccupation of empirical economists. A widening of the wage distribution showing rising wage inequality in a number of countries has been very clearly documented in this work.¹ Empirical studies have highlighted the temporal evolution of particular wage differentials linked to, for example, education or experience emphasising increases in the college wage premium or the wage return to experience that have gone hand-in-hand with rising wage inequality. At the same time, the structure of employment has altered significantly, in particular with more educated and skilled workers doing better in relative terms than before.

Despite there being a big urban economics literature studying the urban wage premium², study of the spatial dimensions of rising

labour market inequality remains relatively sparse.³ In part, this is because within/between type decompositions show that a significant part of the increase in overall wage inequality, or in particular wage differentials, has been within, rather than between, spatial units of observation like regions, states, cities or local labour markets.

Nonetheless, at a given point in time, there are sizable spatial differences in wages and in wage differentials between different groups of workers. Given the relatively small body of work in this area, a notable exception is the analysis of Black et al.'s (2009) which reports sizable spatial disparities in education related wage differentials. In the past, these kinds of spatial earnings or income differences tended to show persistence through time, with if anything there being evidence of regional and spatial convergence.⁴

It is interesting to note that, in the period since wage inequality started to rise in the US (since the mid-to-late 1970s), this

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¹ See Katz and Autor (1999) or Acemoglu and Autor (2010) for reviews of the large literature in labour economics and Hornstein et al. (2005) for a review of the work in macroeconomics.

² See Puga (2010) or Rosenthal and Strange (2004) for discussions of the literature on urban wage premia and how they relate to agglomeration effects that raise productivity in cities.

³ Although less concerned with inequality rises over time, see the recent work on spatial wage differences and skill sorting (e.g. Combes et al., 2008 or Baum-Snow and Pavan, 2012) and on local wage and skill distributions (Combes et al., 2012). A handful of older papers in labour economics did also look at rising wage inequality in US regions (Topel, 1994) or in small numbers of metropolitan areas (Borjas and Ramey, 1995).

⁴ See, *inter alia*, Barro and Sala-i-Martin (1991) who show regional income convergence using data from the mid-1800s up to 1980.

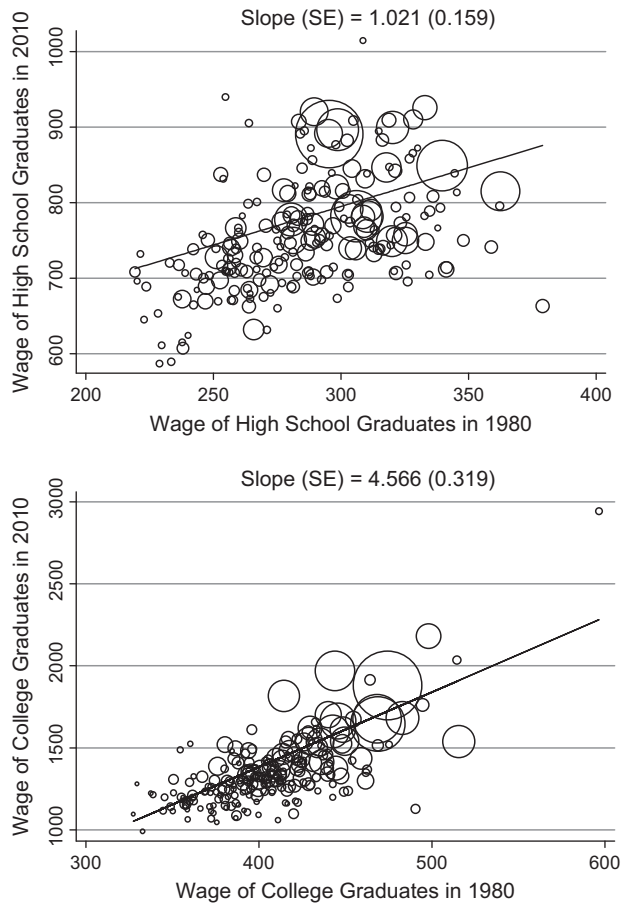


Fig. 1. Change over time in the average log weekly wage of high school and college graduates by metropolitan area. *Notes:* Based on data from the 1980 Census and the 2010 American Community Survey. Each figure plots the nominal wage in 1980 against the nominal wage in 2010 for 216 metropolitan statistical areas (MSA). The top Figure is for high school graduates and the bottom Figure is for college graduates. These are weighted using the number of workers in the relevant MSA and skill group in 1980. The regression line is the predicted log wage in 2010 from a weighted OLS regression. The slope is 1.021 (0.159) for high school graduates and 4.566 (0.319) for college graduates. The sample includes all full time US born workers age between 26 and 50 who worked at least 40 weeks in the previous year.

convergence pattern seems to have stalled. Since then mean reversion or convergence in spatial wage differences is less marked or absent as the spatial persistence of wages has strengthened and there is even some evidence of higher wage growth in places with higher initial wages. Moretti (2011), for example, shows plots of the wages of college graduates and high school graduates in 288 US Metropolitan Statistical Areas (MSAs) in 1980 and 2000 where wages grow faster in MSAs with higher wage levels in 1980 for both groups of workers. We find a similar pattern using data between 1980 and 2010 for 216 MSAs, as shown in Fig. 1.⁵ This shows either constant or faster increases, and no evidence of convergence, in wage levels in MSAs with higher wage levels in 1980. For college workers there is significantly higher wage growth in MSAs where their wages were already higher in 1980.

In this paper, our interest is in the spatial dimensions of labour market inequality and how they have altered through time. We study changing patterns of spatial college wage premia in the context of changing relative supply and demand of college educated

versus high school educated workers. In a similar vein to some of the aspects of earlier work by Berry and Glaeser (2005), Black et al. (2009) and Moretti (2013), we begin by documenting the nature of changes in education-specific employment shares and the college wage premium across different spatial units, looking at their evolution over time at state and MSA level. To do so, we use US Census and American Community Survey (ACS) data from 1980 through 2010 (2009 to 2011 pooled). We uncover an interesting spatial dimension where, despite very rapid increases in the supply of college workers, the college wage premia has risen almost everywhere, but to varying degrees as the spatial variation in the wage gap between college educated and high school educated workers has become more persistent over time.

In the wage inequality literature, rising wage gaps between college and high school workers have been connected to shifts in the relative demand and supply of these groups of workers. Indeed, aggregate evidence shows that a key aspect of rising wage college premia has been an increased relative demand for college educated workers (see Katz and Murphy, 1992; Katz and Autor, 1999; Acemoglu and Autor, 2010). The presence of rising spatial college wage premia at different rates in the face of rapidly rising supply also suggests there may be differential relative demand shifts occurring at the spatial level. We thus modify the commonly used relative demand and supply model to calculate the extent of spatial relative demand shifts and examine variations in their evolution through time. We also consider what factors may have been correlated with the observed spatial shifts in relative demand, exploring the extent to which technology measures (like R&D spending, patent intensity or computer usage) and the reduced importance of labour market institutions (through union decline) display spatial correlations with changes in relative demand.

Another key feature of labour market inequality that has featured prominently in more recent research is the polarization of work across more and less skilled occupations. Autor et al. (2008) and Autor and Dorn (2013) show that job growth in the period of rising wage inequality has been U-shaped across the skill distribution.⁶ Autor and Dorn (2013) study the way in which an increased demand for service occupations has underpinned labour market polarization at the commuting zone level, but this apart, the spatial dimensions of labour market polarization have to date not received much attention. In this paper, we therefore consider how spatial education sorting and rising spatial wage inequalities are connected to the polarization of the labour market.

Previewing our key results, we report evidence of significant spatial variations in education employment shares and the college wage premium for US states and MSAs, and show that the pattern of shifts through time has resulted in a strengthening of spatial persistence and increased spatial labour market inequalities. Because the relative supply of college versus high school educated has also risen faster at the spatial level in places with higher initial supply levels, we also report an increased inequality of spatial relative demand. These relative demand increases are bigger in more technologically advanced states that have experienced faster increases in R&D intensity and computer usage, and in states where union decline has been fastest. Finally, we report that the increased concentration of more educated workers into particular spatial locations and rising spatial wage inequality are important features of labour market polarization, as they have resulted in faster employment growth in high skill occupations, but also higher demand for low wage workers in low skill occupations.

The rest of the paper is structured as follows. Section 2 offers a descriptive analysis of changes in college shares in employment

⁵ The Figure is based on the 5% 1980, 1990 and 2000 Censuses and the 1% samples of the 2009, 2010 and 2011 ACS which we collapse to 216 consistently defined MSAs. The Figure replicates Moretti's (2011) Figure based on 1980 and 2000 Census data. Moretti (2011) reported slope coefficients (and associated standard errors) of 1.82 (0.89) for high school graduates and 3.54 (0.11) for college graduates.

⁶ U-shaped labour market polarization has also been identified in other countries where wage inequality has risen. See, among others, Goos and Manning (2007) for the UK, Spitz-Oener (2006) for Germany and Goos, Manning and Salomons (2009) for a comparison of European countries.

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