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Abstract

In this paper, I examine whether higher product market power can affect labor earnings through its effect on overall labor demand in distinct markets, as a set of dominant firms replaces employment by competitors. To identify relative labor demand shifts, I focus on variations in the spatial concentration within an industry following increases in market power.

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1 Introduction

The increase in sales concentration across most of the industries in the US has received a considerable attention recently and has stimulated research into a variety of areas where it can have a significant impact, most notably the labor share and local labor market power. The evidence based on local market outcomes has shown that higher product market power and increasing share of aggregate employment by top firms does not necessarily translate into higher monopsony power at the local level. In fact, a growing number of papers show that firms with significant share of aggregate employment operate in increasingly competitive local markets. This highlights that product and labor market concentrations follow distinct trends and may not provide the most useful avenue for the exploring the consequences of increasing product market concentration of labor market outcomes.

In this paper, I examine whether higher product market power can affect labor earnings through its effect on overall labor demand in distinct markets, as a set of dominant firms replaces employment by competitors. To identify labor demand shifts, I focus on variations in the spatial concentration within an industry following increases in market power. I confirm a finding by Autor et al (2017) that dominant firms generally increase their share of sales by scaling up own employment and reducing employment by competitors. I show that as competitors with reduced sales share decrease employment where the industry is over-represented and dominant firms do not offset this, the spatial concentration decreases. On the other hand, concentration increases when dominant firms replace employment by competitors more than one-to-one. More generally, changes in spatial concentration can identify industries with positive and negative shifts in local labor demand following the "creative destruction" by dominant firms which increase share of sales. Changes in labor demand can have a first-order effect on industry earnings separately from variations in local competitiveness of the market and total industry employment, providing a complementary channel through which product market power translates to local labor outcomes.

The first set of evidence I present establishes that increases in product market power

allows dominant firms to replace existing employment by competitors and change the spatial concentration of labor. First, I show that between 1997 and 2012, the top 4 firms increased both their share of total sales and employment in 50% of non-manufacturing industries with non-contracting revenue (measured by employment), while 7% increased their share by simultaneously decreasing employment. In the case of the top 20 firms, the numbers are 34% and 4%, respectively. This shows that in the majority of cases firms serve a higher share of the product market by scaling up. Comparing the fraction of expanding firms among the top 4 and top 20 suggests that the gains in the share of the former is much more significant, requiring increased hiring in more cases. Second, in most of these industries the four dominant firms replace employment of competitors, making up a bigger share of total industry employment: in 82% of the industries where top 4 firms expanded employment and share of sales, industry-wide employment remained unchanged or declined. Third, hiring decisions by the top 4 firms reshape the spatial concentration of employment and impose shifts in local demand for labor: in 32% of the cases when top 4 firms expand hiring and sales share, spatial concentration increases, while in 11% of industries concentration decreases. For industries in the former group, a higher fraction of total employment becomes concentrated in a small set of states and/or counties. Industries in the latter group see a significant reduction in employment in states/counties where they were overrepresented.

The main evidence in this paper is related to the impact of the shifts in local labor demand caused by the rise is the share of sales and employment of the top 4 firms. I focus on the industries where the growth in product market power is associated with an increased in hiring by the dominant firms. I have four main findings. First, while hiring by the top 4 firms increased similarly in the cases when employment becomes more and less spatially concentrated, labor earnings diverge considerably. Wages increase in industries where employment becomes more geographically concentrated within a set of state or counties. In contrast, wages decline with the reduction in the geographic concentration of employment. Restricting industries to those with stable or declining total employment makes the results

more significant and shows that the variation in wages is related to the increasing share of employment by dominant firms and the change in its distribution across markets associated with their hiring decisions. Second, I show that state-industry wages respond in a similar way to variation in concentration. Using only variation in state wages over time, I find that higher concentration leads to increased wages, while reductions in concentration reduces wages. This suggests that the effect of concentration on national industry wages is not explained by changes in the fraction of employment in states with different levels of productivity. The change in state wages after the adjustments in geographic concentration suggests that local labor demand affects earnings. Third, I find that the effect of concentration is persistent: state wages continue to decline following their initial drop. This is an important result because it shows that even with more competitive local labor markets, as argued by the existing literature, wages can still decline if overall demand is lower. Fourth, using individual wage and education data from the Census, I find that wages changes for employees with bachelors degree or some college can explain the evidence in the main results. This confirms a classic finding about the incidence of local demand shocks on less-mobile workers. Interestingly, wages decline regardless of the changes in geographic concentration in the case of employees with professional degrees. Since the market for higher-skill workers is likely national the increased hiring by top firms will impact their wages regardless of concentration. The observed decrease in their earning suggests that top firms reduce overall demand for higher-skill workers, likely by reducing the employment at competitors.

Throughout the paper I provide complementary evidence using focusing on the top 20 firms. I further provide a set of additional robustness and extensions results: i) I investigate the difference in the effect of changes in geographic concentration based on states and counties, showing that variation in both is important in explaining changes in wages; ii) I examine whether permanent differences in industry concentration can explain how adjustments in share of sales affect wages; iii) I explore the effect of product market concentration on wage inequality in order to identify if wages decline more in previously higher-paid markets.

The main contribution of the paper is in providing an alternative channel through which the increase in the product market concentration across US industries can affect local labor market outcomes. The existing literature has primarily highlighted the disconnect between the national product/labor markets and the local labor markets – sales and hiring are dominated by a small set of firm at the national level but within the average metropolitan area/county/zip-code they face significantly higher competition both in sales and in employment. I show that the increase in local competition is only one aspect of the way in which dominant firms can affect local labor outcomes. These firms can also affect the total demand for labor in each market by replacing local competitors in a non-one-to-one fashion. Industries which become less spatially concentrated and where labor demand decreases in markets where it was over-represented experience a decline in wages even if the local labor markets become more competitive. The fact that this effect is persistent shows that the increase in local competition is not sufficient to stabilize or increase wages after the initial decline. My results also show that earning increase with spatial concentration as dominant firms increase hiring in a smaller set of markets. While data limitations prevent me from ruling out the possibility that this is driven by local markets becoming more competitive, the evidence in this paper suggests that overall local demand increases, which is also likely to contribute to the observed increase in wages.

The paper also provides a data contribution by presenting an approach to estimating detailed information on employment at a granular level without access to administrative data. The evidence in this study is based on variation in spatial concentration of employment at the county and state level for industries at the six-digit NAICS level. Differently from the papers in literature on local labor market competitiveness or employment concentration, I use publicly available data from the Census's County Business Patterns, rather than administrative data. The public data censors employment information for areas with less than three establishments but still reports the number and employment size of the existing establishments. I fill in the missing information by estimating the average employment for

establishments in each size group for each six-digit industry based on data from areas with more than three establishments. The resulting estimates of the spatial concentration for each industry is based on variation in employment for areas with more than three establishments and on changes in establishment size category for places with less establishments.

The main results in the paper examine the effect of product market concentration on industry earnings for two industry cases : i) where top-four-firms employment and geographic labor concentration both increase with the share of sales; ii) where top-four-employment increases with the share of sales but the geographic labor concentration decreases. In both cases employment at top 4 firms increases as they gain a higher share of sales. In the first case total employment becomes more concentrated and labor demand increases in a limited set of markets, pushed by increased hiring by top 4 firms. In the second case, labor demand decreases as competitors reduce hiring and dominant firms do not offset this one-to-one. I identify industries for each of the two cases by estimating an industry-fixed-effect regression of top-four employment and geographic concentration on sales share of top four firms, including an year-3-digit-industry fixed effects, and selecting only industries with significant effects. Using the average sale-share increase of 2.3%, I find that top four employment increases by close to 10% regardless of how spatial concentration evolves and that total industry employment is not affected. Increased hiring by dominant firms increases state/county spatial concentration by 0.3%/0.1% for the first industry case and decreases state/county concentration by 2.2%/0.1% in the second case. I show that the average wage increases for the group of industries for which top firm hiring concentrates into a smaller set of markets: using the average increase in sales share across this group of 2% implies a 0.95% increase in wages relative to the rest of the industries in the 3-digit group in a particular year. A 2% increase in sales share which reduces spatial concentration implies a 1.1% decreases in wages. Estimates based on state-industry wages show that the main results are only partially explained by compositional differences: 2% higher sales share reduces/increases state wages in each industry group by 0.6%/0.7% for those with decreasing/increasing concentration.

The rest of the paper is as follows: section 2 discusses the relevant literature and contributions; section 3 describes data sources; section 4 explains how I compose the two main groups of industries; section 5 examines the wage effects of changes in product market concentration; section 6 includes extensions.

2 Literature Review

This paper is related to two separate strands of literature. First, there is rapidly growing effort to investigate whether industries, in the US and more broadly, are becoming more concentrated, with a few firms dominating both the product and the labor markets. Papers by CEA (2016) and Grullon et al (2016) present evidence of the increasing industry concentration. Autor et al (2017) also document this increase and further examine its effect on the labor share. Decker et al (2015) highlight the decline in the importance of high-growth young firms and the convergence of the level of dynamism across sectors in the post-2000 period. I provide new evidence in support by showing that the increase in the share of sales for the top 4/20 firms is accompanied by a shift in employment from smaller to dominant firms. I document that in only 18% of industries (measured by employment) both total and top 4/20 firm employment increase together as the dominant firms increase share of sales. This shows that in the majority of industries dominant firms shift employment away from smaller firms.

Second, the evidence in this paper is related to a set of recent papers which investigate the relationship between growing concentration in the product market and the competitiveness of local labor markets. Rinz (2018) shows that the trends in the two are diverging, with local labor markets becoming more competitive over time. This finding is echoed by Rossi-Hansberg (2018) and Lipsius (2018). Each of these papers documents a decreasing concentration in local labor markets, which can be explained by dominant firms competing for workers across a bigger set of markets. Hershbein (2019), Rinz (2018) and Lupsius (2018)

examine how wages respond to changes in local concentration. Each finds that wages decrease with local concentration but point out that lower wages at the national level cannot be explained by changes in local concentrations since the latter has decreased over time. I contribute to this literature by documenting an alternative channel through which increasing product market power can affect local labor market outcomes. I show that dominant firms shift employment away from smaller employers and that this can both lead to lower or higher overall demand for labor in markets with previously higher concentration of industry employment. Changes in local labor market competitiveness and overall size are not mutually exclusive, since, for example, decreases in overall demand can occur in markets which become more competitive. I show that changes in overall labor demand are positively related to industry wages and in particular that lower demand is associated with lower wages. This highlights that wages can decrease as local labor markets become more competitive due to the decrease in the overall market size.

Third, this paper is related to the literature on geographic concentration. Kim (1995) shows that the spatial concentration is particularly stable in the U.S. over the 20th century. Dumas et al (2002) provide further evidence for this stability by focusing on manufacturing industries. The evidence here is the first to show that the increased dominance of a few firms is associated with shifts in the geographic concentration of employment across a wide set of industries. Dumas et al (2002) emphasize that closures of establishments can explain why geographic concentration can decline. This provides the intuition for some of the main results in my paper, which relate changes in geographic concentration to shift in the local demand for labor.

3 Data

Sales and Employment Concentration: The information about concentration of sales at the industry level are sourced from the US Economic Census. The Census reports total

sales for industries at the most disaggregated, 6-digit NAICS level, for all firms, as well as the share of sales for the top 4/8/20/50 firms. The information also lists the total number of employees and sales overall and for each of the top firm categories. While sale shares are available for all industries, employment by firm category is not available for the manufacturing sector. Additionally, the Economic Census does not report information about agriculture, construction, and utilities. As a result, this paper excludes these industries. Furthermore, I exclude industries which change NAICS classification in a way that does not preserve a consistent definition over time. After eliminating these industries, the sample captures close to 76% of total private employment or 366 industries. I use the data compiled and made available online by Keil (2017) since it combines the distinct releases by the Economic Census for the years of 1997, 2002, 2007, and 2012.

Employment and Wages: Data about national employment, as distinct from employment by top firms by sales, and wages comes from the BLS. In particular, I use the annual releases at the 6-digit level for the nation and at the state level, matching the employment information from the Economic Census for each of the four years described above plus 2017. Combining the two allows me to identify changes in industry-level employment as well as employment by the top firms based on sales. In the main results, I use wage information at the industry-level and at the state level. After eliminating the wholesale, manufacturing, construction, and agriculture sectors as well as industries which change definition over time and industries which experience declines in sales between 1997-2012, the sample accounts for In the extensions of the paper, I also utilize wage information from the ACS. I compute average wage at the 4-digit level by pooling data for the five annual census waves centered at 2002, 2007, and 2012.

Geographic Concentration: Geographic concentration is based on the public releases by the County Business Patterns (CBP) data at the state and county level. The CBP lists the total number of establishments and total employment for each state or county at the six-digit industry level. It also breaks down the number of establishments in each of nine

employment-size categories. In areas with less than three establishments CBP suppresses total employment but still list total number of establishments at the size-category breakdown. I estimate total employment by taking advantage of the information about total establishments by size. In particular, using the full annual panel of observations available from the CBP from 1998 to 2017 for each state or county, I estimate the average number of employees for each establishment-size category by regressing total employment on the number of establishments in each category where data is available. The dataset is an unbalanced panel and in some cases employment information is missing just in a select number of years. To rule out average-size estimates which are negative, I restrict estimates to be positive. The estimated employment closely matches actual employment in the cases when the latter is available. I also verify that the estimated state total employment numbers closely matches the national total. The median of the average percentage deviation at the 4-digit NAICS level of the national BLS data from the estimated employment data is 0.01. For the sample of 239 4-digit industries, the 10th percentile is -0.308 and then 90th percentile is 0.285. I apply the same procedure for the county employment from CBP.

The detailed employment information at the state and county levels for each 6-digit industry allows me to calculate measures of geographic concentration of employment based on the Hoover's coefficient of localization. Kim et al (2000) refer to this measure as the locational Gini coefficient as it is a summary measure of the spatial dispersion when using a spatial Lorenz curve. In particular, I calculate:

$$Gini_m = \frac{\Delta}{4u}$$

where

$$\Delta = \frac{1}{n(n-1)} \sum_{i=1}^{n} \sum_{j=1}^{n} |x_i - x_j|$$

with i,j being distinct geographic areas and x_i is the share of industry m employed in i divided by the share of total national employment in i. u is the mean of x_i and n is the total

number of areas. As discussed in Kim (2000), this measure identifies the extent to which employment of a given industry is concentrated in a limited set of locations. A value of 0.5 indicates that the industry is concentrated in one region only, while 0 indicates that industry employment is equally distributed. A drawback of this measure is that it does not distinguish between random changes in the distribution of employment owing to the difference in the size of individual establishments. Dumais et al (2002) suggest that this distinction is of minimal importance when examining the evolution of concentration over time for the same industry, particularly over a shorter period of time. The reason for this is that the distribution of establishment size within an industry is fairly constant within shorter periods of time. In fact, Dumais et al (2002), which uses a measure which account for random variations in the distribution of employment, decompose their measure into a part due to establishment-size change and dispersion with constant establishment-size, and show that the former changes little of time.

4 Employment Effects of Sales Concentration

In this section, I describe how I identify industries in which changes in product market concentration were associated with changes in hiring. I further examine how these changes in employment affected the geographical distribution of employment for each industry. Finally, I provide evidence for the average effects on employment and geographic concentration for the groups of industries which: i) experience higher employment by top 4 firms with increases in sales concentration AND this employment shifted industry employment into a smaller set of location (higher geographic concentration); ii) experience higher employment by top 4 firms with higher sales share AND employment was shifted away from areas with higher previous employment. I also show evidence using the top 20 firms.

Concentration in product markets need not have an impact on employment by dominant firms or the rest of the competitors. Since this paper examines how shifts in labor demand

across different markets affect earnings, I focus on industries where changes in share of sales by dominant firms are associated with changes in hiring. In order to eliminate cases of obsolete industries which have declining sales over time, I restrict industries to those with increasing sales between 1997 and 2012 using the sales data from the Census. Additionally, since the Economic Census does not include employment by top firms for manufacturing, this sector is excluded from the estimation. I estimate:

$$Y_{i,g,t} = \alpha_i + \gamma_{g,t} + \beta_i CR4_i + \epsilon_{i,g,t} \tag{1}$$

where $Y_{i,g,t}$ is either log of employment by the top 4 firms in industry i, industry group g, year t, or log of total total industry employment, or state/county-based geographic concentration. $CR4$ is the share of sales by the top 4 firms, α_i is an 6-digit industry fixed-effect, and $\gamma_{g,t}$ is a 2-digit-industry-year fixed effect. β_i is an industry-specific effect which identifies whether changes in sales concentration are associated with changes in employment by dominant firms. The inclusion α_i and $\gamma_{g,t}$ implies that this effect is identified relative to the industry's long-term average and the rest of the industries in the same 2-digit group in a given year. More specifically, $\gamma_{g,t}$ insures that the β_i's do not just capture trend increases in employment and concentration.

Estimating equation 1 with log employment by top 4 firms shows that in 161 industries or 56% of total employment changes in sales concentration are associated with adjustment in employment by these firms. In the case of the top 20 firms 152 industries or 38% of total employment are affected. The smaller number in the case of the top 20 firms shows that top 4 firms have experience a substantial increase in the share of sales. This is supported by Rossi-Hansberg et all (2019) and Autor (2017) who point out that most of the variation in product concentration comes from a small number of top firms. Figure 1 present the results visually in the case of employment (top panel) and establishments (bottom panel). The industries close to the axes will be excluded based on model 1 as their β_i will not be significant. For

the rest, both panels show a positive relationship with the majority of industries increasing top 4 employment/establishments with the increase in the share of sales. This holds for 139 industries or 49% of total employment. In the case of 22 industries or 7% total employment employment/establishments decrease with the increase in the share of sales. Figure 2 breaks this down by 2-digit industry groups. We can see that the positive association between sales and hiring is prevalent across industry groups.

Estimating equation 1 using total industry employment allows me to examine whether the increasing dominance by the top 4 firms is reflected not only in their hiring but also in the size of the entire industry. In other words, we can see if the increase in employment by the top firms simply replaces employment by competitors, which keep total employment constant, or if hiring by competitors remains unchanged, which increases total employment. I find that in 118 industries or 82% of employment total employment does not increase. This confirms that top firms replace existing employment by competitors. This is an important results, indicating that top firms can potentially reduce local demand for labor, particularly in markets with a significant presence of competitors as long as they can achieve a certain amount of economies of scale. Similarly, top firms can increase local demand for labor if they scale up in a select number of markets.

Is geographic concentration affected when top 4 firms replace employment by competing firms? I estimate equation 1 using state/county geographic concentration and present the results visually in Figure 3. There is a substantial variation in the case of state concentration and somewhat less of it in the county case. In both cases, changes in product concentration is associated with both increases and decreases in geographic concentration. When I restrict these to only industries where top 4 employment is also affected, I find that geographic concentration increases for 37 (32% of employment) of industries where sales concentration and top 4 hiring increase. For 20 (11% of employment) industries geographic concentration decreases. Table 1 lists these industries and provides some summary statistics.

In order to provide a summary of the average effect for the groups of industries of interest

I estimate:

$$Y_{i,g,t} = \alpha_i + \gamma_{g,t} + \beta_1 CR4_i \mathbb{1}(Emp_i^+)\mathbb{1}(Con_i^+) + \beta_2 CR4_i \mathbb{1}(Emp_i^+)\mathbb{1}(Con_i^-) + \epsilon_{i,g,t} \qquad (2)$$

where $Y_{i,g,t}$, α_i, and $\gamma_{g,t}$ is defined as above. $\mathbb{1}(Emp_i^+)$ is an indicator for industries for which top 4 employment is positively related to their sales share. $\mathbb{1}(Con_i^+)/\mathbb{1}(Con_i^-)$ is an indicator for industries for which the total state or county geographic concentration is positively/negatively related to changes in the sales share of the top 4 firms. β_1 and β_2 quantify the average effect on the set of dependent variables for the two groups of industries of main interest. The first group is the set of industries for which the increase in the product concentration of the top 4 firms is associated with an increased hiring by these firms and an increase in the geographic concentration at the state or county level. In the second group this leads to a decrease in geographic concentration. The reported results below a based on a variation of the model which also includes the two other groups of industries: for which top 4 employment is negatively related to the sales share and geographic concentration increases or decreases, respectively.

The results from estimating model 2 are provided in Table 2. The first four columns focus on top 4 firms, while the second four are based on top 20 firms. Here, I focus on the two groups which see increases in top firm employment and highlight the differences for the which see increased and reduced geographic concentration. Column (1) shows that the difference in the response of geographic concentration does not affect the average increase in top 4 employment. Using the average increase in CR4 of 0.023 from industries in Table 1 shows that top 4 employment increases by 9.9%/9% for each group respectively. Column (2) shows that in each case total industry employment is not affected, suggesting that hiring by top 4 firms replaces existing employment by competitors. Columns (3) and (4) show that each group experiences changes in geographic concentration in line their type. State/county concentration increases by 0.3%/0.1% in the first group and they decrease by 2.2%/0.1%

in the second group. The results using top 20 firms closely match those with top 4. Altogether, they suggest that increasing sales concentration, while increasing employment by the expanding firms, can shift local labor demand across different markets. The first group increases geographic concentration implying that demand increases in a limited set of market and the second group reduces geographic concentration, which leads to a reduction in demand in locations where the industry is over-represented. In the following section, I explore the impact of these shift on wages.

5 The Effect on Wages

The literature studying how product concentration translates to local labor market outcomes emphasizes the fact that dominant firms are more likely to co-locate in the same markets and increase competition of employment. Here, I explore the extent to which the overall demand for labor can decrease or increase as a result of more hiring by top firms which eliminates competitors in a classic process of "creative destruction". The evidence so far suggests that top 4 firms increase hiring in industries with constant overall employment and either reduce or improve labor demand in markets where the industry is over-represented.

I provide a visual example of the shifts in local labor demand in Figure 4. In each panel, I compare the distribution of the industrial employment share in a state (scaled by the state's share of total employment) in 2002 and 2007 for industries with increasing share of sales by top 4 firms. The top panel shows the change in the distribution for the group of industries with increasing geographic concentration and the bottom one for the group with decreasing concentration. In the first case, we can see a shift in the 2007 density relative to the 2002 one. The area under 0.3 to 0.6 range has clearly declined while that under the 0.6 to 1.9 has clearly increased relative to the 2002 density. This shows that top 4 firms increase hiring in a limited set of local markets, as they scale up with the increase in share of sales. In the second case, the 2007 density is lower in the 0.5 to 1 range relative to the 2002 distribution

and is higher in the 0 to 0.3 range. This suggests that while top firms increase hiring, they do not do this in a small set of markets and increase concentration. Instead, they replace local employment by competitors in a non-one-to-one fashion, reducing the overall demand for labor in a wider set of markets.

Methodology: I examine the effect of the changes in local labor demand caused by the top 4 firms by estimating a set of different models using three distinct datasets. I start by estimating:

$$Wage_{i,t} = \alpha_i + \gamma_{g,t} + \beta_1 CR4_i \mathbb{1}(Emp_i^+)\mathbb{1}(Con_i^+) + \beta_2 CR4_i \mathbb{1}(Emp_i^+)\mathbb{1}(Con_i^-) + \epsilon_{i,t} \quad (3)$$

where $Wage_{i,t}$ is the log of industry-level average wage reported by BLS. α_i is a 6-digit industry fixed effect and $\gamma_{g,t}$ is a 3-digit-industry-year fixed effect. β_1 and β_2 are coefficients of interest, which identify the effect of local demand shifts caused by changes in the geographical concentration as top 4 firms increase hiring. The effects are identified relative to the 3-digit industry trends to rule out cases where both wages and concentration are changing over time for an entire group of industries.

I first estimate the above model using all of the industries for which top 4 employment increases with sales concentration. An increase in employment by the rest of the competitors at the same time will increase total employment and will complicate the interpretation of β_2 since the effect on wages of lower geographic concentration is driven by overall expansion in the industry as opposed to a replacement of competitors in over-represented markets. I eliminate this case by further restricting to industries for which total employment does not increase with changes in the share of sales. I keep this restriction for the rest of the specifications.

The changes in the average national wage in model (3) can be due to compositional changes, with industries expanding or contracting employment in states with different wage

levels. I examine the importance of this type of reallocation by estimating:

$$Wage_{i,st,t} = \alpha_{i,st} + \gamma_{st,g,t} + \beta_3 CR4_i \mathbb{1}(Emp_i^+)\mathbb{1}(Con_i^+) + \beta_4 CR4_i \mathbb{1}(Emp_i^+)\mathbb{1}(Con_i^-) + \epsilon_{i,st,t} \quad (4)$$

where $Wage_{i,st,t}$ is the log of industry i wage in state st in year t. The information at the state level from BLS allows me to saturate the model with state-6-digit-industry fixed effects to control for level differences in wages across states and with 3-digit-industry-state-year to control for divergence in state wages by industry groups over time. β_3 and β_4 identify the change in the state wage for a given industry associated with demand shifts following the expansions by top 4 firms. Lower magnitudes compared to β_1 and β_2 will indicate that at least a part of the national wage changes are a result of reallocation of employment across areas with different wage levels.

The amount of variation in the state-wage data allows me to estimate model (4) by adding lagged terms for $CR4_i \mathbb{1}(Emp_i^+)\mathbb{1}(Con_i^+)$ and $CR4_i \mathbb{1}(Emp_i^+)\mathbb{1}(Con_i^-)$. The increasing evidence that local labor market are becoming more competitive over time suggests an upward wage pressure over times. The inclusion of lagged terms helps explore whether the initial wage effects are diminished or amplified over time.

Finally, I utilize data from ACS to estimate a version of the above models based on individual wage data. I estimate:

$$\begin{aligned} Wage_{p,i,st,t} = \alpha_{i,st} + \gamma_{st,g,t} + \beta_5 CR4_i \mathbb{1}(Emp_i^+)\mathbb{1}(Con_i^+) + \\ + \beta_6 CR4_i \mathbb{1}(Emp_i^+)\mathbb{1}(Con_i^-) + \sigma X_{p,i,st,t} + \epsilon_{p,i,st,t} \end{aligned} \quad (5)$$

where $Wage_{p,i,st,t}$ is the log wage of ACS respondent p, employed in industry i, living in state st, in year t. ACS allows me to match industries only at the 4-digit level. As a results each of the industry-related variables in the model represent averages at the 4-digit group. $\alpha_{i,st}$ is the 4-digit-industry-state fixed effect, $\gamma_{st,g,t}$ is the 2-digit-industry-state-year fixed effect. $X_{p,i,st,t}$ includes individual controls: age, age^2, part-time indicator, and education indicators.

Based on the omitted indicators and centering the age variables, the main effects represent those for full-time employees, aged 25, with college education.

The information in the ACS allows me to examine whether employees of different skill, captured by education, are affected differentially. The existing labor literature emphasizes that higher skill workers are more mobile and suffer significantly lower wage incidence from demand shocks. I pursue this by interacting the main effects in model (5) by the level of employee's education. Importantly, the context of the current study differs from existing labor studies since in this paper a small set of top firms expand hiring while total industry employment is constant, implying that top firms replace employment by competitors. As a result, even for highly mobile high-skill workers the total number of employers can decrease, reducing the overall industry demand. In this way, the current study can provide evidence for the limits of low incidence of demand shocks for high-skill labor.

Results: The main results are listed in Table (3). The first six columns examine the effect of top 4 firms and the last six do so for the top 20 firms. I focus on the evidence based on top 4 firms but discuss some important differences, when those exist. Columns (1) and (7) group industries by the response of top-firm employment and geographic concentration to share of sales, while the rest further restrict the set of industries to those for which total employment is not affected.

Column (1) shows results based on model (3) using industry-level wages. We see that the average wage increases for the group of industries for which top firm hiring concentrates into a smaller set of markets. Using the average increase in $CR4$ across this group of 0.02 implies a 0.8% increase in wages relative to the rest of the industries in the 3-digit group in a particular year. The effect of a reduction in geographic concentration, stemming from the incomplete replacement of employment by competitors in over-represented markets, decreases average wages with a similar magnitude: 0.02 increase in $CR4$ reduces wages by 0.7%. The results show that the shifts in local demand for labor, which can be traced to sale-share hiring, have a significant effect on industry wages. In both cases demand changes are positively related

to wages.

In column (2), I further restrict the group of industries included in $\mathbb{1}(Emp_i^+)$ by removing those for which total employment increases with the hiring by top 4 firms. This eliminates the cases where geographic concentration decreases as a result of expansion by smaller firms and implies that the reduction is driven by top firms reducing employment of competitors in over-represented markets. In line with this, we see that the restrictions increases the effect for the group with lower concentration: average wages fall by 1.1% after 0.02 increase in $CR4$. The effect of higher concentration increases to 0.95%. Comparing results in (1) and (2) shows that focusing on industries with non-growing total employment strengthens the results since they are driven by demand shift cause by the hiring by the top firms.

Industry-level change in average can be driven by compositional changes as companies expand of contract operations in states with permanently different wage levels or diverging wage trends in different states. I examine the extent to which this can explain the main results by estimating model (5) with state-industry wages. Column (3) lists the results. The increase in concentration leads to higher state wages but the increase is lower than in the national case. The same is true for reductions in concentration. The estimates imply that the impact on wages in only partially explained by compositional differences. Lower/higher labor demand in a market where an industry is over-represented reduces/increases wages within the state of the market: 0.02 higher $CR4$ reduces/increases wages by 0.6%/0.7% for industries with decreasing/increasing concentration.

In column (4), I further break down the source of variation by examining wages of respondents of the ACS. This set of results control for changes in the education level of employee, age, as well as part-time status. The magnitude of the estimates will vary from the previous samples since the ACS only allows me to match 4-digit level industries and $\mathbb{1}(Emp_i)/\mathbb{1}(Con_i)$ represent an industry-group fraction. The effect of an increase in concentration is positive by not significant, while the effect of lower concentration remains negative and significant (with a higher magnitude). Comparing the results with column (10), shows that there is

evidence of the impact of geographic concentration on wages in the ACS sample but only for the top 20 firms. This suggests that the ACS may have lower coverage of employees in markets where top 4 firms are expanding.

Column (5) lists the results from estimating model (4) with lags for the main effects. The persistence of the wage effects is of particular interest given the increasing evidence that local labor market are becoming more competitive. Higher competition puts upward pressure on local wages and is expected to reduce the persistence of the negative effect and increase the persistence of the positive effect. Interestingly, the results show the opposite. State wages do not continue to increase after the initial impact of higher geographic concentration, while they decline further with the reduction in concentration. This evidence suggests that the shifts in the overall labor demand can dominate the effects of the increase in local employment competition. The results using top 20 firms are more mixed since only the lagged terms are significant. Increased local competition cannot explain why wages decline over time with lower geographic concentration but are compatible with the wage increases following higher geographic concentration.

Finally, column (6) examine whether workers of different education are impacted differentially by the identifies labor demand shifts. I find that employees with bachelors degree or some college experience changes in wages in line with the baseline results. This confirms a classic result about the incidence of local demand shocks on less-mobile workers. Interestingly, wages decline regardless of the changes in geographic concentration in the case of employees with professional degrees. The results are also consistent using top 20 firms but wages of higher-skilled employees fall less with decreases in concentration. The evidence suggests that the as top firms increase share of sales and hire more, they replace employment by competitors and reduce the overall demand for higher-skill workers for a given industry. If lower-skill workers are less mobile, the shifts in local demand for labor will increase wages where demand is higher and decrease them with lower demand. Since the market for higher-skill workers is likely national the increased hiring by top firms will impact their

wages regardless of concentration. The observed decrease in their earning suggests that top firms reduce overall demand for higher-skill workers, likely by reducing the employment at competitors.

Overall, the results suggest that the overall demand for labor across different markets is an important determinant of wages. Even with the increase in the local competition for workers, documented by the literature, I find that these shifts can have a first-order effect on wages. I show that the results are not driven by compositional effect from companies expanding or contracting in different states and that eduction or part-time status are also not responsible for this. The wage effects are persistent and generally change in a way that is not consistent with increasing competition for employees at the local level. I show that workers with some college or bachelor's degrees are mainly impacted by the identified baseline shifts in labor demand. Higher-skilled employees appear to be affected regardless of the direction of the local demand shifts, confirming that the market for such workers is national and depends on the overall demand for them.

6 Robustness and Extensions

In this section I examine the sensitivity of the results when separating the changes in concentration into those by state and county. I test whether the main results are comparable those with different groups of industries. Namely, sort industries with expanding top firms into those that are generally more or less concentrated rather than those that change geographic concentration. I also explore the impact on wage inequality across states.

State vs County Geographic Concentration: The main results compare the employment and wage responses in industries which become more or less geographically concentrated with the increase in sales share by top firms. In this extension, I explicitly break down the concentration changes into those based on county and state concentration. Since the two measures are not mutually exclusive, i.e. state concentration can increase with a

decrease or an increase in county concentration, this set of results allow for a more detailed characterization of the wage effects.

The evidence for top 4 and top 20 firm is listed in columns (1) and (4) of Table 4. In the case of top 4 firms, we see that higher geographic concentration of state and county increases wages. The effect of lower concentration is negative for both state and county but significant only for county. In the case of top 20 firms, all but increases in county concentration are consistent with the main findings. The evidence provides a richer interpretation of the main results. An increase in state concentration will increase overall labor demand in a limited number of state but this can be tempered if this increase is not concentrated on a limited set of counties and, instead, employment increases in counties where the industry is under-represented. If both county and state concentration increases, the increase in wages is higher since labor demand rises in a limited set of counties within a limited set of states. Finally, an increase in state concentration and a decrease in county concentration has a smaller effect on wages. This is due to the fact that the higher labor demand in a set of states is spread over a bigger set of counties, which decreases county concentration. The impact of the interactions between both types of geographic concentration further confirms that the main results are driven by changes in overall labor demand across a set of markets.

The Level of Agglomerations: A huge literature in Urban Economics investigates why some industries are more likely to co-locate in the same areas and identifies geographic advantages as well as agglomeration economies as the main factors. According to this literature the level of geographic concentration is an industry characteristic which likely changes little over time (Kim 1995, Dumais et al 2002). In this part, I separate industries for which the sales share by top firms increases hiring by their overall geographic concentration. I use the lowest level of state and county geographic concentration and bin industries relative to the median value. This allows me to examine the wage effect of changes in sales-share-driven employment by top firms for industries that a relatively more or less concentrated.

The results are listed in columns (2) and (5) of Table 4. They show that increased hiring

by top 4/20 firms increases wages for industries which are generally more concentrated. The effects are smaller in magnitude compared to the baseline results. For less concentrated industries, higher employment by top firms has a slightly negative wage impact only for the top 4 firms, with a similarly smaller magnitude. The evidence suggests that the main results cannot be explained by generally more concentrated industries that become more concentrated with an increase in hiring by top firms. Less concentrated industries also appear to be subject to an increase in geographic concentration. Similarly, more concentrated industries do experience reductions in concentration as top firms increase hiring.

Wage Inequality: In this part, I extend the main results to inequality of wages by examining how state-wage dispersion is affected by changes in hiring by top firms. This helps identify if, for example, wages are more likely to decrease in locations where they relatively higher, which decreases wage dispersion, or where they are lower, further increasing dispersion. Similarly, we can see if higher geographic concentration increases wages in areas with relatively lower wages. Furthermore, an alternative interpretation of the main results is that when top 4 firms expand in areas with already higher industry employment, they are guided by relatively lower wages.

The results are listed in columns (3) and (6) of Table 4. They show that wage increases do not affect dispersion across states, while reductions decrease wage inequality. The latter implies that the replacement of employment by top firms primarily occurs in locations with relatively higher wages. This suggests that the increase in sales shares by top firms and the corresponding reduction in revenue by competitors most strongly affects those firms with relatively higher wages. The decline in overall employment in areas where these are located not only reduces industry wages but also makes them more equal since higher-wage-paying companies reduce employment.

7 Conclusion

In this paper, I show that changes in product market concentration have important effect on the total employment demand in local labor markets. In industries where the increase in the share of sales by top firms is related to an increase in hiring by these firms and the overall industry size is constant, the local demand for labor can both increase or decrease. I show that when top firms increasingly hire in the a select number of markets, identified by an increase in geographic concentration, overall demand for labor and wages can increase. Conversely, when top firms increase hiring but do not replace employment by existing competitors one-to-one, geographic concentration decreases, leading to lower overall demand for labor and a decrease in wages.

Tables and Figures

Table 1: Summary Statistics

Industry	Tot Emp	Tol Est	CR4	CR20	ΔCR4	ΔCR20	Gini^{State}	Gini^{Cnty}	Δ Gini^{State}	Δ Gini^{Cnty}
Increase in Geographic Concentration										
All Other Legal Services	18.3	3.4	0.257	0.444	0.012	-0.003	0.357	0.496	0.015	-0.002
All Other Miscellaneous Ambulatory Health Care Services	31.9	3.3	0.231	0.447	-0.05	-0.028	0.283	0.495	0.009	-0.002
All Other Nondepository Credit Intermediation	60.6	8.2	0.293	0.696	-0.03	-0.005	0.317	0.471	0	-0.002
Amusement Arcades	19.5	2	0.191	0.342	-0.074	-0.095	0.263	0.491	-0.017	0
Car Washes	142.7	14.3	0.063	0.118	0.014	0.026	0.271	0.473	-0.009	0.01
Charter Bus Industry	32.1	1.5	0.139	0.256	0.026	0.021	0.314	0.495	0.01	0.001
Collection Agencies	139.6	6.2	0.158	0.317	0.004	0.026	0.302	0.487	-0.005	0.002
Computer Systems Design Services	618.9	79.5	0.221	0.414	0.047	0.076	0.271	0.482	0.001	0.001
Couriers and Express Delivery Services	521.1	9.5	0.905	0.947	0.027	0	0.278	0.488	0.025	-0.001
Custom Computer Programming Services	603.9	75.1	0.072	0.171	0.017	0.003	0.256	0.476	0.003	0.003
Family Clothing Stores	451	20.7	0.465	0.747	0.021	0.024	0.259	0.486	-0.008	0.004
General Freight Trucking, Long-Distance, Less Than Truckload	220.1	7.3	0.412	0.737	0.008	0.012	0.265	0.48	-0.001	0
General Warehousing and Storage	523.3	10.2	0.197	0.351	0.03	0.041	0.241	0.49	0.013	-0.003
Home Centers	590.3	11	0.863	0.929	0.088	0.007	0.265	0.467	0.013	-0.015
Limited-Service Restaurants	3412.7	195.6	0.083	0.159	-0.02	-0.024	0.265	0.389	-0.008	-0.015
Media Buying Agencies	10.4	1	0.318	0.55	0.036	0.074	0.282	0.499	0.031	0
Musical Groups and Artists	39.5	5.4	0.066	0.197	0.007	0.02	0.281	0.498	0.009	0
Nature Parks and Other Similar Institutions	7.6	0.6	0.252	0.516	0.009	-0.006	0.351	0.498	0.001	0
News Dealers and Newsstands	8.3	1.5	0.337	0.433	0.158	0.148	0.345	0.498	0.004	0.001
Nursery, Garden Center, and Farm Supply Stores	116.2	12.6	0.152	0.242	0.031	0.017	0.329	0.474	-0.001	0.002
Offices of Mental Health Practitioners (except Physicians)	59.8	14.3	0.042	0.094	-0.015	-0.016	0.315	0.485	0.004	-0.003
Offices of Physical, Occupational and Speech Therapists, and Audiologists	237.8	24.4	0.142	0.226	-0.026	-0.034	0.272	0.465	0.001	-0.006
Offices of Real Estate Agents and Brokers	299.9	92.3	0.105	0.173	0.021	0.027	0.279	0.463	-0.001	0.003
Other Gasoline Stations	121.7	15.5	0.239	0.338	0.105	0.099	0.361	0.481	0.008	0.003
Other Management Consulting Services	90.3	20.5	0.127	0.224	-0.034	-0.034	0.334	0.494	-0.007	-0.001
Other Scientific and Technical Consulting Services	116	29	0.081	0.186	0.016	0.02	0.343	0.491	0.007	0.004
Other Social Advocacy Organizations	86.1	8.5	0.14	0.285	0.028	0.049	0.386	0.493	0.003	0
Other Sound Recording Industries	3.9	0.6	0.443	0.679	-0.023	-0.021	0.393	0.498	-0.014	0
Other Spectator Sports	22.3	3.4	0.135	0.33	0.033	0.041	0.312	0.496	0.015	0
Pharmacies and Drug Stores	693.9	48.5	0.58	0.675	0.076	0.031	0.257	0.41	0.002	0.006
Pipeline Transportation of Crude Oil	8.6	0.5	0.532	0.961	-0.009	0	0.479	0.498	-0.006	-0.001
Radio Stations	80.9	4.5	0.397	0.61	0.077	0.083	0.324	0.462	-0.006	0.005
Residential Property Managers	315.8	39.7	0.069	0.152	-0.02	-0.02	0.252	0.481	-0.005	-0.008
Services for the Elderly and Persons with Disabilities	663.1	145.3	0.044	0.151	-0.01	-0.023	0.322	0.471	-0.008	-0.009
Software Publishers	264.2	11.8	0.37	0.552	0.044	0.047	0.299	0.493	0.008	0.003
Teleproduction and Other Postproduction Services	16.2	1.7	0.214	0.389	0.05	0.061	0.328	0.497	0.006	0.001
Veterinary Services	275	27	0.081	0.132	-0.01	-0.043	0.289	0.47	-0.007	0.003
Decrease in Geographic Concentration										
All Other Outpatient Care Centers	89.6	4.1	0.161	0.345	-0.072	-0.075	0.346	0.486	0.026	0.001
Amusement Arcades	19.5	2	0.191	0.342	-0.074	-0.095	0.263	0.491	-0.017	0
Automotive Body, Paint, and Interior Repair and Maintenance	218.8	36.2	0.027	0.055	0.012	0.018	0.286	0.435	-0.004	-0.005
Beauty Salons	417.6	70.9	0.108	0.135	0.017	0.012	0.271	0.465	-0.009	-0.01
Consumer Electronics and Appliances Rental	29.1	3.9	0.643	0.748	0.179	0.129	0.282	0.469	-0.002	-0.007
Cosmetics, Beauty Supplies, and Perfume Stores	105.4	12.4	0.541	0.706	0.023	0.023	0.235	0.463	-0.006	-0.008
Court Reporting and Stenotype Services	11.9	3.1	0.145	0.259	0.064	0.077	0.304	0.493	-0.019	0.001
General Warehousing and Storage	523.3	10.2	0.197	0.351	0.03	0.041	0.241	0.49	0.013	-0.003
Marketing Consulting Services	134.2	27.8	0.072	0.158	0.003	0.011	0.259	0.492	-0.008	-0.002
Nonscheduled Chartered Passenger Air Transportation	30.8	2.1	0.325	0.534	0.065	0.071	0.42	0.499	-0.016	0
Offices of All Other Miscellaneous Health Practitioners	54.9	11.2	0.08	0.136	0.015	0.009	0.299	0.493	-0.003	-0.001
Other Clothing Stores	115.8	13.8	0.448	0.557	0.037	0.038	0.277	0.482	-0.008	-0.005
Other Nonscheduled Air Transportation	3.2	0.5	0.372	0.662	-0.014	-0.035	0.455	0.498	-0.012	0
Pet and Pet Supplies Stores	91.9	8.4	0.574	0.622	0.087	0.081	0.268	0.484	-0.01	-0.003
Septic Tank and Related Services	20.2	3.3	0.141	0.234	-0.015	-0.016	0.338	0.487	0.017	0
Snack and Nonalcoholic Beverage Bars	428.2	41	0.316	0.396	0.057	0.05	0.294	0.459	-0.007	0.002
Sporting Goods Stores	236.5	24	0.234	0.447	0.063	0.079	0.328	0.475	-0.008	0.003
Title Abstract and Settlement Offices	56.7	8.5	0.184	0.299	0.058	0.061	0.305	0.482	-0.006	-0.002
Translation and Interpretation Services	16.4	2.3	0.254	0.449	0.09	0.112	0.375	0.498	-0.018	-0.001
Warehouse Clubs and Supercenters	1034.5	4.8	0.923	1	0.013	0	0.309	0.443	-0.007	-0.02

Table lists the industries for which higher share of sales by top4 firms is related to an increase in their hiring. The top set of industries experience an increase in geographic concentration and the bottom see a decrease.

Table 2: Employment and Geographic Concentration Impact by Industry Groups

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	X =Top 4 Firms				X =Top 20 Firms			
VARIABLES	log Emp^{top4}	log TotEmp	Gini^{State}	Gini^{Cnty}	log Emp^{top20}	log TotEmp	Gini^{State}	Gini^{Cnty}
$CRX_i\mathbb{1}(Emp^+)\mathbb{1}(Con^+)$	4.330***	0.245	0.123***	0.0232**	3.153***	-0.0764	0.102***	0.0312**
	(0.548)	(0.222)	(0.0251)	(0.0102)	(0.782)	(0.244)	(0.0295)	(0.0126)
$CRX_i\mathbb{1}(Emp^+)\mathbb{1}(Con^-)$	3.906***	0.683	-0.0936***	-0.0286***	3.961***	0.419	-0.120***	-0.0247***
	(0.745)	(0.453)	(0.0287)	(0.00684)	(0.778)	(0.298)	(0.0249)	(0.00819)
$CRX_i\mathbb{1}(Emp^-)\mathbb{1}(Con^+)$	-17.84***	-2.103***	-0.107	0.0760*	-3.082***	-1.348***	0.256***	0.0241**
	(4.319)	(0.756)	(0.234)	(0.0457)	(0.613)	(0.347)	(0.0604)	(0.00965)
$CRX_i\mathbb{1}(Emp^-)\mathbb{1}(Con^-)$	-1.572	0.151	-0.148***	-0.00730*	-0.201	-0.365	-0.0436	-0.000873
	(1.808)	(0.282)	(0.0371)	(0.00423)	(0.872)	(0.373)	(0.0599)	(0.00489)
Constant	8.806***	11.06***	0.324***	0.484***	9.436***	11.08***	0.322***	0.484***
	(0.0256)	(0.00993)	(0.00117)	(0.000327)	(0.0440)	(0.0139)	(0.00160)	(0.000519)
Observations	1,414	1,404	1,398	1,388	1,418	1,408	1,402	1,392
R-squared	0.958	0.991	0.930	0.936	0.968	0.992	0.933	0.936
6-Digit NAICS FE	X	X	X	X	X	X	X	X
2-Digit NAICS × Year FE	X	X	X	X	X	X	X	X

Table lists the industries for which higher share of sales by top4 firms is related to an increase in their hiring. The top set of industries experience an increase in geographic concentration and the bottom see a decrease.

Table 3: Employment and Geographic Concentration Impact by Industry Groups

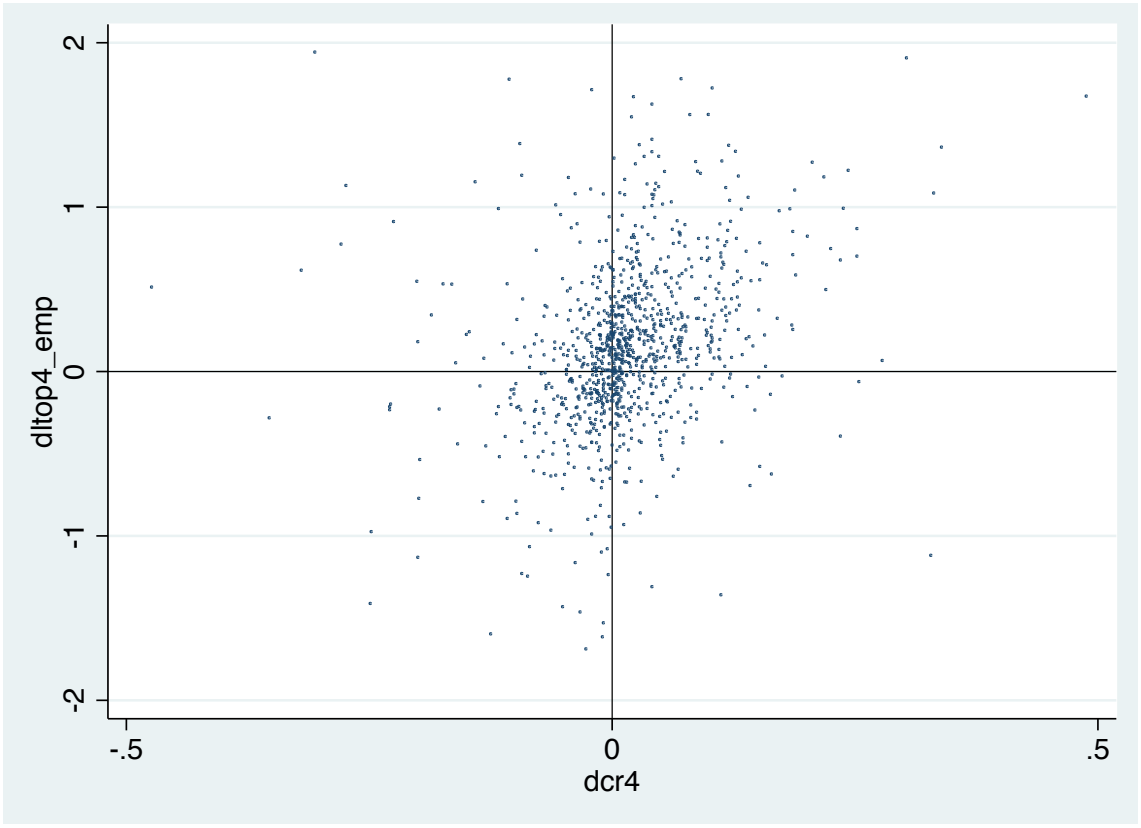
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	X =Top 4 Firms						X =Top 20 Firms					
VARIABLES	$\ln Wage_i$	$\ln Wage_i$	$\ln Wage_{i,st}$	$\ln Wage_{i,st,p}$	$\ln Wage_{i,st}$	$\ln Wage_{i,st,p}$	$\ln Wage_i$	$\ln Wage_i$	$\ln Wage_{i,st}$	$\ln Wage_{i,st,p}$	$\ln Wage_{i,st}$	$\ln Wage_{i,st,p}$
$CRX_i\mathbb{1}(Emp^+)\mathbb{1}(Con^+)$	0.387***	0.477***	0.341***	0.0182	0.400***		0.448***	0.428***	0.260***	0.399***	0.0831	
	(0.139)	(0.0973)	(0.0382)	(0.134)	(0.0605)		(0.145)	(0.128)	(0.0467)	(0.151)	(0.0822)	
$CRX_i\mathbb{1}(Emp^+)\mathbb{1}(Con^-)$	-0.345**	-0.552***	-0.293***	-1.948***	-0.214**		-0.638***	-0.600***	-0.259***	-0.328**	-0.0912	
	(0.174)	(0.137)	(0.0853)	(0.505)	(0.105)		(0.147)	(0.162)	(0.0650)	(0.138)	(0.0782)	
$Lag\ CRX_i\mathbb{1}(Emp^+)\mathbb{1}(Con^+)$					0.0275						0.151***	
					(0.0459)						(0.0502)	
$Lag\ CRX_i\mathbb{1}(Emp^+)\mathbb{1}(Con^-)$					-0.263***						-0.260***	
					(0.0498)						(0.0542)	
$CRX_i\mathbb{1}(Emp^+)\mathbb{1}(Con^+) \times \mathbb{1}(HSchool)$						-0.107						0.980***
						(0.140)						(0.152)
$CRX_i\mathbb{1}(Emp^+)\mathbb{1}(Con^+) \times \mathbb{1}(College)$						0.954***						0.443***
						(0.134)						(0.150)
$CRX_i\mathbb{1}(Emp^+)\mathbb{1}(Con^+) \times \mathbb{1}(ProfDeg)$						-3.743***						-2.529***
						(0.140)						(0.176)
$CRX_i\mathbb{1}(Emp^+)\mathbb{1}(Con^-) \times \mathbb{1}(HSchool)$						0.668						0.000412
						(0.516)						(0.138)
$CRX_i\mathbb{1}(Emp^+)\mathbb{1}(Con^-) \times \mathbb{1}(College)$						-1.994***						-0.347**
						(0.506)						(0.138)
$CRX_i\mathbb{1}(Emp^+)\mathbb{1}(Con^-) \times \mathbb{1}(ProfDeg)$						-3.540***						-0.738***
						(0.538)						(0.146)
$CRX_i\mathbb{1}(Emp^-)\mathbb{1}(Con^+)$	0.687	0.723	0.205	-1.767***	0.245	-1.727***	0.456*	0.542**	0.442***	6.821***	1.657***	2.271
	(0.595)	(0.609)	(0.270)	(0.276)	(0.655)	(0.275)	(0.259)	(0.256)	(0.0670)	(0.525)	(0.162)	(2.553)
$CRX_i\mathbb{1}(Emp^-)\mathbb{1}(Con^-)$	0.0371	0.0112	0.338*	-5.773	3.477	-1.281	0.168*	0.154	0.250**	-0.797	0.556	4.281
	(0.186)	(0.191)	(0.198)	(13.19)	(2.274)	(13.21)	(0.0974)	(0.118)	(0.103)	(2.226)	(0.506)	(5.418)
Observations	2,344	2,344	72,960	4,206,372	55,518	4,206,372	2,346	2,346	73,060	4,206,372	55,618	26,129
R-squared	0.990	0.990	0.966	0.558	0.966	0.559	0.990	0.990	0.966	0.558	0.966	0.803
Sample	Ind BLS	Ind BLS	St-Ind BLS	ACS	St-Ind BLS	ACS	Ind BLS	Ind BLS	St-Ind BLS	ACS	St-Ind BLS	ACS
6-Digit NAICS FE	X	X	X		X		X	X	X		X	
4-Digit NAICS FE				X		X				X		X
3-Digit NAICS FE × Year	X	X					X	X				
3-Digit NAICS FE × State × Year			X		X				X		X	
2-Digit NAICS FE × State × Year				X		X				X		X

Table lists the industries for which higher share of sales by top4 firms is related to an increase in their hiring. The top set of industries experience an increase in geographic concentration and the bottom see a decrease.

Table 4: Robustness and Extensions

	(1)	(2)	(3)		(4)	(5)	(6)
	X =Top 4 Firms				X =Top 20 Firms		
VARIABLES	$\ln Wage_i$	$\ln Wage_i$	$WageGini^{state}$		$\ln Wage_i$	$\ln Wage_i$	$WageGini^{state}$
$CRX_i \mathbb{1}(Emp^+)\mathbb{1}(StateCon^+)$	0.500***				0.716***		
	(0.0998)				(0.108)		
$CRX_i \mathbb{1}(Emp^+)\mathbb{1}(StateCon^-)$	-0.0762				-0.481**		
	(0.235)				(0.239)		
$CRX_i \mathbb{1}(Emp^+)\mathbb{1}(CntyCon^+)$	0.387*				-0.0170		
	(0.210)				(0.222)		
$CRX_i \mathbb{1}(Emp^+)\mathbb{1}(CntyCon^-)$	-0.730***				-0.717***		
	(0.112)				(0.183)		
$CRX_i \mathbb{1}(Emp^+)\mathbb{1}(MoreCon)$		0.0912**				0.0697**	
		(0.0410)				(0.0328)	
$CRX_i \mathbb{1}(Emp^+)\mathbb{1}(LessCon)$		-0.0936*				-0.0734	
		(0.0534)				(0.0449)	
$CRX_i \mathbb{1}(Emp^+)\mathbb{1}(Con^+)$			0.00343				0.0132
			(0.0133)				(0.0250)
$CRX_i \mathbb{1}(Emp^+)\mathbb{1}(Con^-)$			-0.210***				-0.147*
			(0.0589)				(0.0852)
Observations	2,346	2,344	1,745		2,344	2,346	1,747
R-squared	0.990	0.990	0.885		0.990	0.990	0.881
6-Digit NAICS FE	X	X	X	X	X	X	X
3-Digit NAICS FE × Year	X	X	X	X	X	X	X

Table lists the industries for which higher share of sales by top4 firms is related to an increase in their hiring. The top set of industries experience an increase in geographic concentration and the bottom see a decrease.



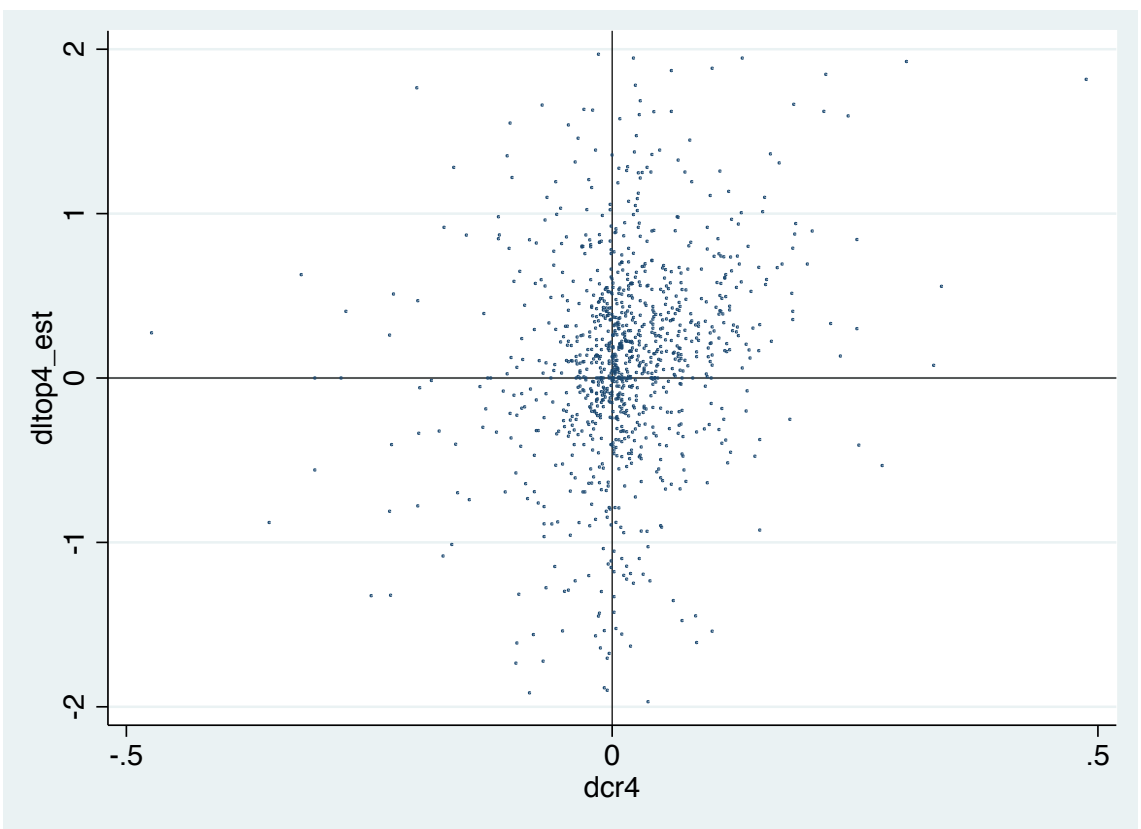


Figure 1: Change in Share of Sales vs Employment/Establishments for Top 4 Firms

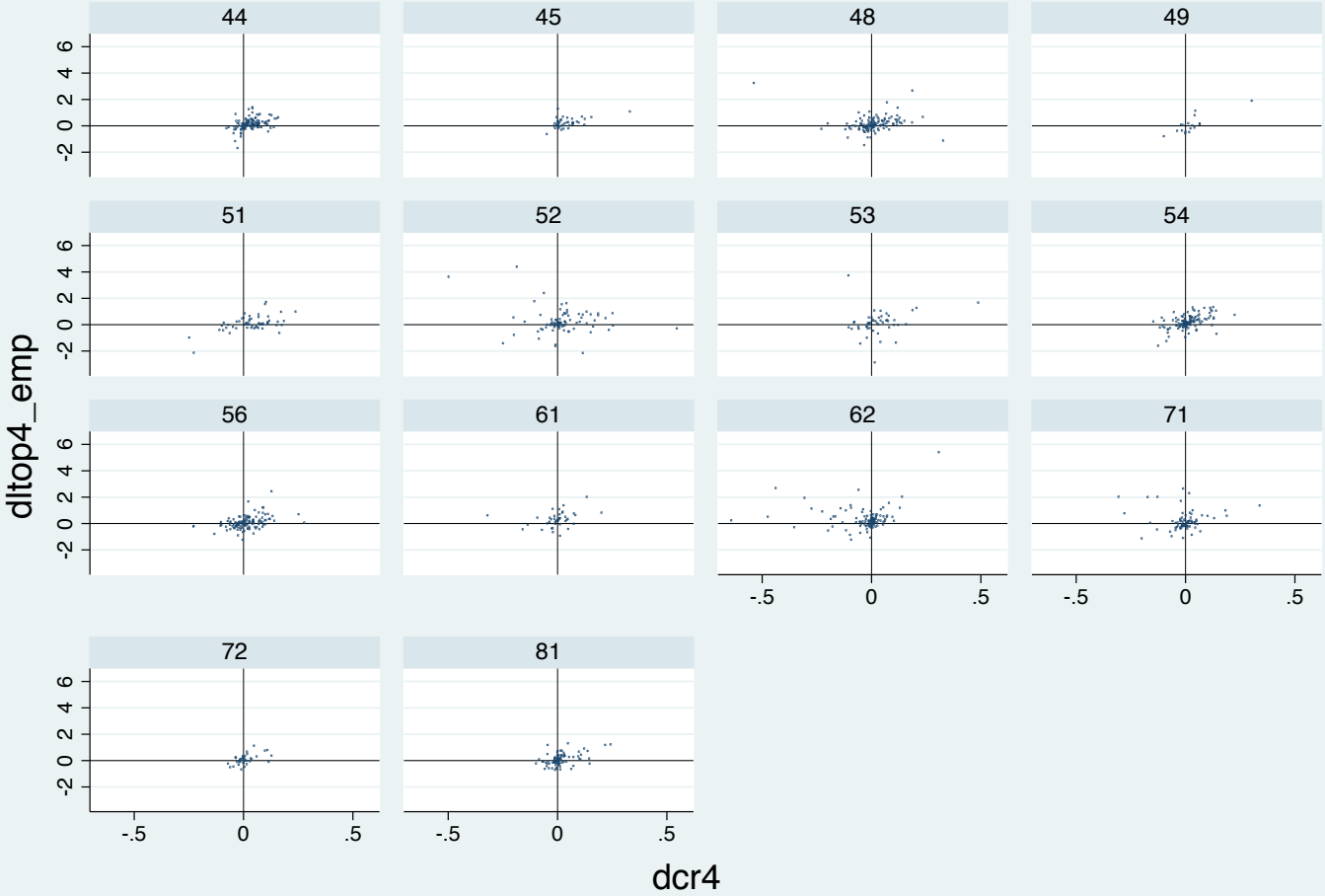


Figure 2: Industry Groups: Change in Share of Sales vs Employment/Establishments for Top 4 Firms

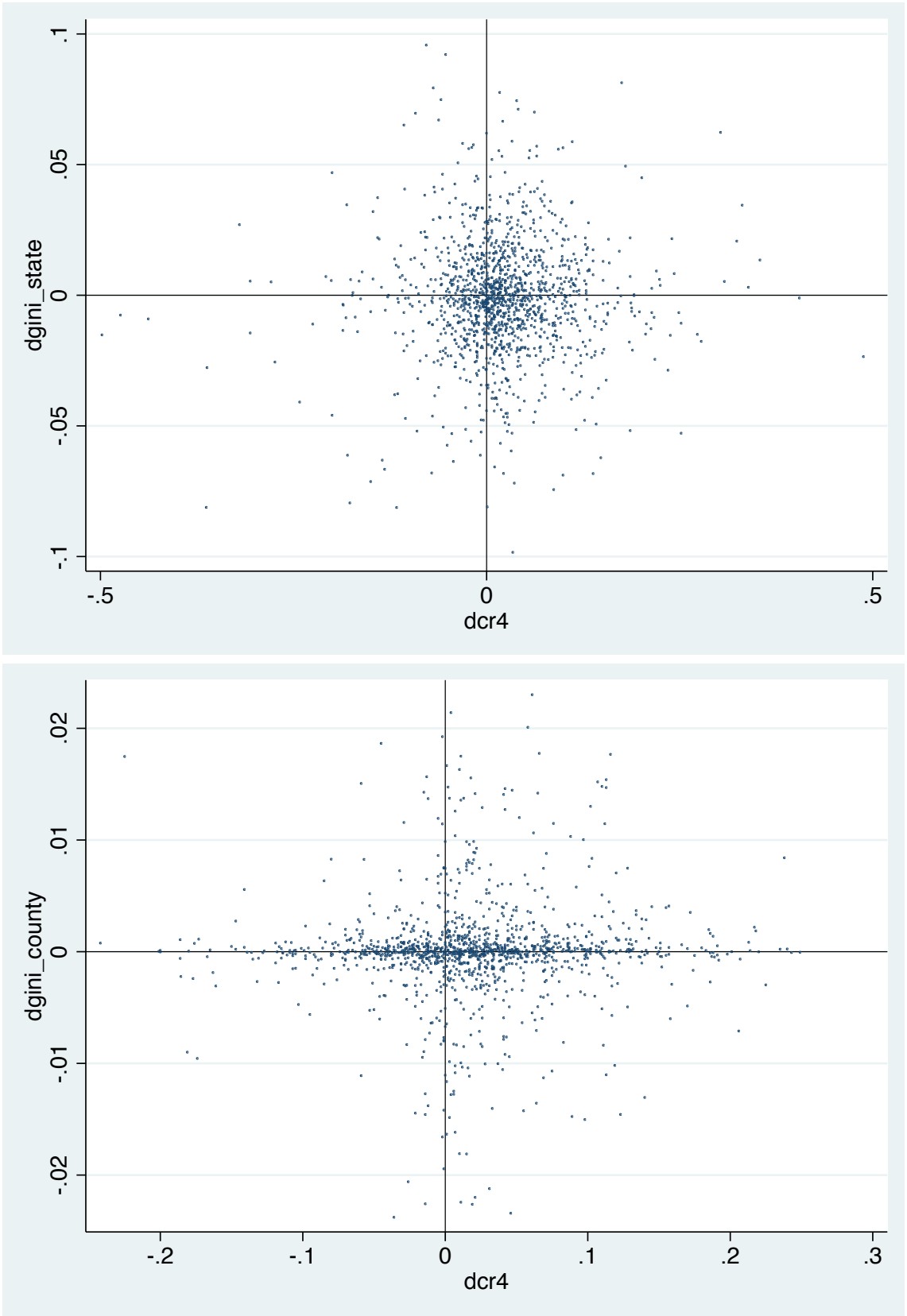


Figure 3: Changes in Share of Sales for Top 4 Firms vs State/County Geographic Concentration

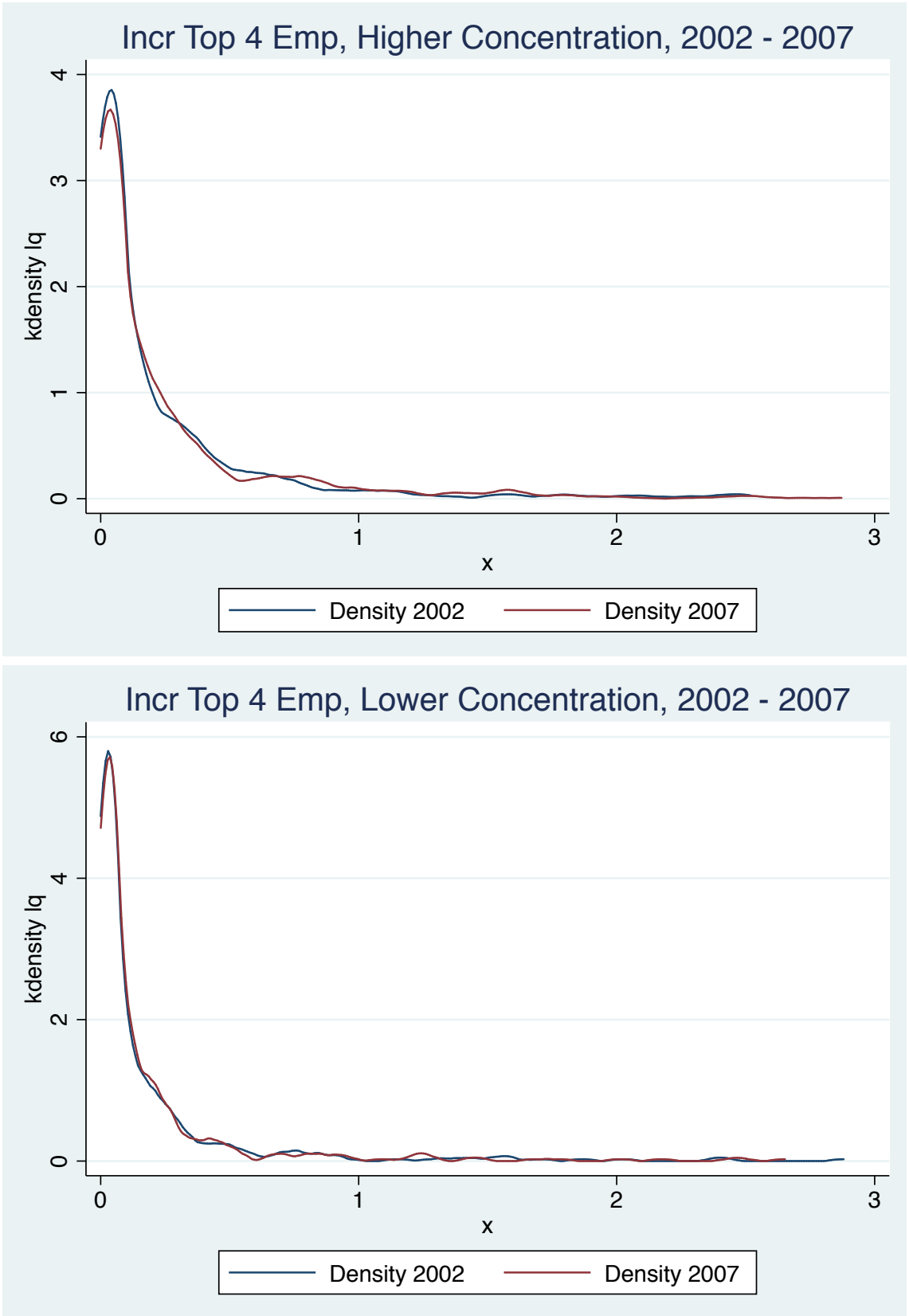


Figure 4: Changes in Geographic Concentration with Higher Top 4 Employment: Higher vs Lower Concentration