Measuring Labor Market Power Two Ways

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VERY PRELIMINARY

The growing literature on employer power in labor markets shows that monopsony is widespread (Webber (2015) and Dube et al. (2019), for example). That literature has generally treated firm-level wage-setting power as a unitary phenomenon, regardless of its causes, and contrasted it with the assumption of perfect competition, in which firms take market wages as given. Much of the literature uses the elasticity of labor supply to the individual firm as a key proxy for monopsony: an elasticity that is well below infinity is a sign that employers have wage-setting power (Manning, 2011). More recently, there has been a flurry of studies showing a negative relationship between labor market concentration of employers and wages (Rinz, 2018; Benmelech, Bergman and Kim, 2018; Azar, Marinescu and Steinbaum, 2017; Lipsius, 2018).

In this paper, we estimate a proxy for the elasticity of labor supply and investigate the relationship between this proxy and labor market concentration. We use data from the popular job posting website CareerBuilder.com to estimate firm-level wage-setting power directly based on the elasticity of job applications in response to variation in the posted wage. In order to deal with the endogeneity of wages, we instrument for local variation in posted wages with posted wages from the same firm in other occupations and other commuting zones. The elasticity we estimate is 0.42, a fairly low value.

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We then relate our estimated application elasticities by commuting zone and occupation to labor market concentration measured with the same job-posting data. We find that the application elasticity to the firm is negatively correlated with local labor market concentration, suggesting that concentration and the application elasticity are both measures of labor market power. We also find that commuting zones and occupations with higher concentration or lower application elasticity tend to have significantly lower wages. This correlation is consistent with higher concentration and lower application elasticity both contributing to wage suppression.

We expect the application elasticity to be higher in more densely populated areas: an abundance of both jobs and workers makes these labor markets closer to the ideal of perfect competition. To test this idea, we estimate the application elasticity as a function of the population density in a commuting zone. We show that while the application elasticity is indeed higher in denser commuting zones, it is still below 5, which is far below the "infinity" levels needed to approximate perfect competition (Naidu, Posner and Weyl, 2018). This implies that, even though labor market concentration is low in the most populous areas (Azar et al., n.d.), the application elasticity is still quite low, consistent with a non negligible degree of monopsony power.

These findings speak to two questions that have arisen in response to the research on employer power in labor markets. First, they are consistent with employer concentration being a measure of firm-level market power. Second, they show that while employers likely exercise significant market power in labor markets in general, their market power does vary significantly with concentration. These findings imply that antitrust policy is a promising, if not the only, policy tool available for mitigating the monopsony power of employers.

1 Data

The data we use for this paper are job postings from the online job board CareerBuilder.com, which accounts for approximately a third of all online job postings (Marinescu and Wolthoff, 2016). For each job posting, we observe its duration, the number of applications received, the employer, and the job title. Approximately 20% of the vacancies post wages. We also observe the occupation of the job posting according to the Standard Occupational Classification system and the zip code where the employer is located.

As in Azar, Marinescu and Steinbaum (2017), we define local labor markets at the Commuting Zone by SOC-6 occupation level. But for the purposes of estimating application elasticities, we make use of within-job-title, and even within-firm, variation in posted wages and applications.

2 Empirical Models

We start by estimating the following equation in order to recover application elasticities at the firm level:

$$y_{ijmt} = w_{ijmt} \sum_{n=0}^{5} \beta_n d_m^n + \gamma \cdot x_{ijmt} + \varepsilon_{ijmt}, \tag{1}$$

where y_{ijmt} is the log of the total number of applications to jobs by firm i with job title j in market m in year-quarter t and w_{ijmt} is the corresponding log average wage. The β_n coefficients estimate the firm-level application elasticity as a function of population density, allowing for a fifth order polynomial. The vector x_{ijmt} is a set of controls, which in the baseline specification includes the log of the total number of vacancy-days that the firm posted for that job title in that market and year-quarter, year-quarter fixed effects, and CZ $\times$SOC$\times$ job title fixed effects. It is important to control for job title fixed effects as failing to do so would typically yield a negative application elasticity (Marinescu and Wolthoff, 2016).

The log wage is an endogenous variable (analogous to the endogeneity of prices in a demand regression). For that reason, we instrument the log wage using the average log wage for the same firm in other CZ $\times$ SOC markets (in the spirit of Hausman, Leonard and Zona (1994)). This average excludes wages in the same CZ for other SOCs, or wages for the same SOC in other CZs. The idea that wages posted in other labor markets might be a good instrument rests on firm-level wage-setting policies that might hold across the labor markets out of which a given firm hires. This idea finds support in the large literature on firm-specific pay policies (Card et al., 2016). The assumption we make to motivate this instrument is that local job-posting and wages may be jointly determined by local labor supply and demand conditions (including shocks at both the geographic and occupational level), but national firm-level wage-setting in the excluded markets is unlikely to be caused by an omitted variable and can hence be used to trace out the application elasticity.

To allow for elasticities that can vary more flexibly than just as a function of CZ population density, we estimate separate regressions for each CZ $\times$ SOC market. We do this in two steps. First, we run a regression jointly for all markets of log applications on log days posted, CZ $\times$ 6-digit SOC $\times$ job title fixed effects, and year-quarter fixed effects. We do the same with log wage and our instrument as left-hand side variables. For each of these three regressions, we obtain residuals, and then run, separately for each CZ $\times$ SOC, a simple regression of residualized log applications on residualized log wage, instrumented by residualized average log wage for the same firm in other CZs and other SOCs. This gives us an estimate of the applications elasticty for each CZ and SOC.

We then use those elasticities as the dependent variable in a series of cross-sectional regressions.

$$\hat{e}_m = \beta_1 \cdot \log HHI_m + \beta_2 \log d_m + \varepsilon_m, \tag{2}$$

where $\hat{e}_m$ is the estimated commuting-zone-average firm-level application elasticity from equation 1, HHI_m is the concentration computed from each firm's share of posted vacancies in the market defined by commuting zone, SOC-6 occupation, and quarter (averaged by commuting zone), and d_m is the population density in that commuting zone.

Finally, we regress observed market-level wages (again averaged by commuting zone) on estimated application elasticities and concentration by labor market, according to the equation

$$w_m = \beta_1 \cdot \log HHI_m + \beta_2 \hat{e}_m + \varepsilon_m, \tag{3}$$

3 Results

Figure 1 depicts the relationship between firm-level application elasticity and population density graphically, as estimated in equation 1. In the 80% least densely populated commuting zones (weighted by employment levels), the application elasticity is not significantly different from zero. This is consistent with 80% of workers working in markets with substantial monopsony power. Above the 80th percentile of the population density, the application elasticity increases with population density, reaching about 5 for the most densely populated areas. Even the most densely populated areas have nowhere near an infinite elasticity of applications with respect to the posted wage.

Table 1 reports the results from the regression described in equation 2. A higher concentration of employers is negatively associated with the application elasticity, suggesting that concentration is a contributing factor to firm-level wage-setting power. Column 3 shows that the concentration-application elasticity relationship persists (and is not much diminished) when we include population density as an explanatory variable for the application elasticity. This suggests that concentration is a measure of labor market power that is not driven solely by population density.

Finally, Table 2 shows that the application elasticity and concentration are each, separately, correlated with posted wages, with the expected signs. Furthermore, when entered together the application elasticity and concentration both retain their significant effect on wages (column 3), with similar magnitudes. This is a somewhat surprising result, because oligopsony models in which concentration matters, such as Cournot, predict that concentration matters because of its effect on application elasticity, which should be a sufficient statistic for employer market power. In this case, though, we have at least prima facie evidence that the application elasticity is not a sufficient measure of employer market power. It could be that higher concentration permits collusion in wage-setting or other restrictions on labor market competition beyond the unilateral ability for profit-maximizing firms to exploit their market power by reducing the wage they pay.

Table 1. Application elasticity regressions.

	application Elasticity		
	(1)	(2)	(3)
Log Population Density	0.133**		0.0819
	(0.0542)		(0.0564)
Log HHI		-0.201***	-0.175***
		(0.0559)	(0.0586)
Observations	505	505	505
R-squared	0.012	0.025	0.029

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Data are for the period 2010Q1-2013Q4, aggregated by CZ-SOC. We restrict the sample to CZ-SOCs with at least 50 observations. Observations are weighted by the inverse variance of the estimated elasticities, and observations with elasticities above the 99th percentile and below the 1st percentile of the distribution are dropped from the sample.

4 Discussion

In this paper, we estimate the firm-level application elasticity from job-posting data, and we relate our estimates to concentration. We take the application elasticity and labor market concentration to be two measures of labor market power. The results indicate that labor market concentration is negatively correlated with the application elasticity, and the the application elasticity is close to zero in most markets but the most densely populated.

On the other hand, our results also suggest that while that power is likely to be pervasive in labor markets, it is plausibly responsive to competition policy. This is in contrast to the idea that the power imbalance between employers and workers is such that anti-concentration policy would be powerless against it, as is suggested by Naidu, Posner and Weyl (2018)'s view that all employers are monopsonists. The reality is more nuanced: employers do enjoy unilateral power to set wages, but that is reinforced by a lack of competition for labor in the markets where they hire.

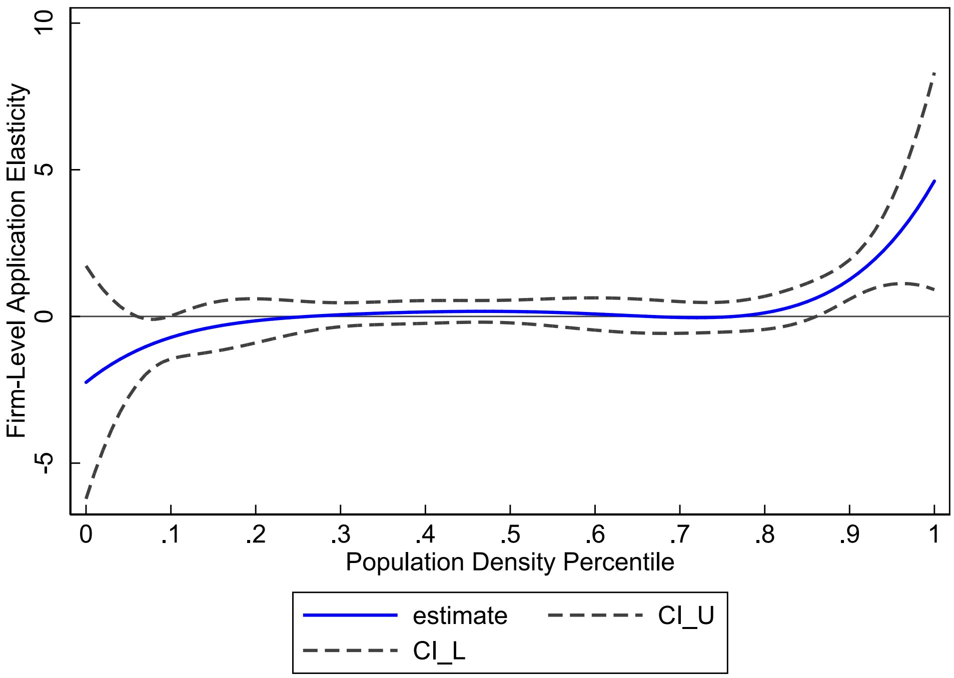

Figure 1. Firm-level application elasticity as a function of Commuting Zone population density.
Estimated effect from a panel IV regression of log EOI on the log real wage interacted with a 5th order polynomial in log population density. The wage is instrumented with the average log real wage in other commuting zones and other SOCs for the same firm interacted with a 5th order polynomial in log population density. We control for log days posted, CZ $\times$ 6-digit SOC $\times$ job title fixed effects and year-quarter fixed effects. Data are for the period 2010Q1-2013Q4. We cluster standard errors at the CZ$\times$ 6-digit SOC level.

Table 2. Wage regressions.

	Log Real Wage		
	(1)	(2)	(3)
η_m	0.122***		0.116***
	(0.0135)		(0.0136)
Log HHI		-0.0758***	-0.0525***
		(0.0182)	(0.0172)
Observations	505	505	505
R-squared	0.140	0.033	0.156

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Data are for the period 2010Q1-2013Q4, aggregated by CZ-SOC. We restrict the sample to CZ-SOCs with at least 50 observations. Observations are weighted by the inverse variance of the estimated elasticities, and observations with elasticities above the 99th percentile and below the 1st percentile of the distribution are dropped from the sample.

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