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ABSTRACT

Over the last thirty years, there has been a rise in several empirical measures of local labor market monopsony power. The monopsonist has a profit incentive to offer lower wages to local workers. Mobile high skill workers can avoid the lower monopsony wages by moving to other more competitive local labor markets featuring a higher skill price vector. We present a Roy Model of heterogeneous worker sorting across local labor markets that has several empirical implications. Monopsony markets are predicted to experience a "brain drain" over time. Using data over four decades we document this deskilling associated with local monopsony power. This means that observed cross-sectional wage gaps in monopsony markets partially reflect sorting on worker ability. Going forward the rise of work from home may act as a substitute for high-skill worker migration from monopsony markets.

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Introduction

Local labor markets experiencing a rise in monopsony power face the possibility that large local firms can benefit by paying workers lower wages. Labor economists have argued that rising monopsony power has contributed to earnings inequality and inflated firm profits (Manning 2003, 2006, 2009, 2011). Given finite commuting speeds, workers who are tied to a given geographic area cannot credibly search across a wide number of employers. Apart from moving, this limits their best response in the face of monopsony. Urban economic research demonstrates that home ownership is associated with lower migration rates (Oswald 2019). Those who have built up location-specific investments in social networks and have families who have matched with friends and good schools are more hesitant about moving away to another local labor market offering greater opportunities (Glaeser, Laibson and Sacerdote 2002, Deryugina, Kawano and Levitt 2018).

Workers also differ with respect to their gains from migrating. Going back to Sjaastad (1962), economists have understood that migration is an investment and those with a longer work horizon have a larger present discounted value of earnings gains from moving. The Roy Model (1950, 1951) of local labor markets offers an additional insight. As pointed out by Heckman and Scheinkman (1987), the fundamental role of bundling, that an individual must sell all of her attributes to a single local labor market, can mean that individual skill factor prices (i.e. for brains and muscle and personality) are not equalized across space.

This has an important implication for the role of monopsony at one's origin location as a migration push factor. If a worker with plenty of brain power faces "exploitation" at her origin location, then the opportunity cost of remaining there is high when she can move to another more competitive local labor market that may feature the urban agglomeration effects emphasized in the modern literature (Glaeser 2012, Moretti 2004a 2004b).

In this paper, we use the Roy Model to explore how different workers adapt when they face monopsony power in their origin's local labor market. In locations featuring high levels of local monopsony power, skilled individuals have an incentive to move away. As these workers depart, and other skilled workers do not move in (because they anticipate that they would be under-paid if they move there), the average skill level of the monopsony locations declines. We use a standard measure of monopsony in a county/decade panel data set covering the last 40 years to examine this hypothesis. We document two main results. First, counties facing greater monopsony power have

slower population growth. Second, such counties are "deskilling" by losing younger and more educated individuals.

We do not attempt to develop and estimate an equilibrium model that features both house price and skill price adjustments along with migration across local markets. There is an expanding literature estimating the impact of monopsony on worker wages and earnings. In Kahn and Tracy (2020), we document that, all else equal, home prices are lower in local labor markets featuring greater employer concentration. This adjustment in local house prices in the face of monopsony power would attenuate any demographic shifts induced by monopsony. In this paper, we study net migration rates from these areas. Documenting that both house prices and skill distributions adjust in the face of monopsony power indicates that both mechanisms are active as markets re-equilibrate to changes in local employment concentration.

Our study builds on the seminal Ehrlich and Becker (1972) study of self-protection. In their work, a decision maker faces a tradeoff between making a costly investment to offset risk ex-ante or to take the gamble and ex-post rely on market insurance to transfer resources. In our local monopsony setting, migration to another local labor market represents a type of self-protection. We argue that there is heterogeneity in the propensity to exercise this option because the expected present discounted value of this choice is an increasing function of one's general human capital. Below, we discuss the incentives of the monopsonist to invest in the worker's firm specific human capital highlighted in Becker (1962).

Our human capital hypothesis has implications for testing for the economic incidence of local monopsony power. This paper's reduced form aggregate migration evidence supports the claim that cross-sectional hedonic wage studies measuring the wage loss due to local monopsony power are subject to selection bias concerns. As we discuss below, these studies seek to instrument for local monopsony power. This approach aims to addresse concerns about firm locational choice, but these studies do not address the related point that worker wages are only observed in the markets where they choose to live. Our migration evidence suggests that areas featuring local monopsony power deskill over time. Additionally, the low rents, and the relatively low returns to skill attract less educated workers. Federal transfer programs that pay a fixed nominal amount offer greater purchasing power in places where rents are lower and local service prices are cheaper (Notowigigdo 2020).

In the final section of the paper, we introduce an emerging practice that could have important implications. Since the COVID crisis, the rise of work from home (WFH) has started to shift America's economic geography. An expansion of WFH would open up a new opportunity for skilled workers to live in a local monopsony area to order to consume its services and amenities, but not to work there and suffer from its lower wages due to monopsony power. This unbundling of place of work from place of residence would have implications going forward such that high amenity, monopsonized places would be less likely to "deskill". Furthermore, if marginal workers are WFH, then capitalization of amenities will occur only through land prices with wages no longer adjusting for amenity differences (Brueckner, Kahn and Lin 2023). This is a development of potential interest for future research.

Recent Empirical Research on Local Monopsony Power on Wages

There is a growing literature that examines the effect of monopsony on worker wages, earnings and skill mix. Qiu and Sojourner (2019) find that increasing concentration reduces the share of college-educated workers in the affected sector. They find that controlling the human capital characteristics of workers substantially reduces the conditional impact of concentration on wages. Similarly, Azar et al (2022) using job posting data from CareerBuilder.com find that increasing employment concentration from the 25th to the 75th percentile is associated with a 5 percent (OLS) and 17% (IV) decline in wages. They report that controlling for job titles (a proxy for worker quality) lowers the impact of concentration on wages. Finally, Rinz (2022) finds that the negative effect of local employment concentration on wages is concentrated on lower income workers. These findings indicate that the lower earnings induced associated with monopsony reflect both a wage effect and a skill mix effect. We incorporate this f into our Roy model.

The Model

We examine the effects of local labor market concentration using a Roy model (Roy 1950, 1951) in which each worker is treated as a bundle of sector-specific skills. A city where one or more firms are exercising monopsony power in one sector generates a different ratio of skill factor prices than in a perfect competition city. We use the Roy model to highlight the subset of workers who choose to remain after a monopsony employer enters the city and the resulting change in the

allocation of workers across sectors within the city as well as between cities. We document that when worker skills are positively correlated across sectors and labor markets, the "exploited sector" in a monopsony city will suffer a "brain drain" to other sectors in the city as well as due to migration out of the city. Thus, this formulation of the Roy model captures the finding in that literature that the lower average wages in the monopsony sector reflects both the downward pressure on wages due to monopsony power and a composition shift as the skill level of workers in this sector declines.

Economic Incidence of Monopsony in a Roy Model with Sectoral Choice

When workers differ with respect to their skills, the rise of monopsony power will induce behavioral change at the extensive margin and workers will re-sort across sectors and labor markets. The early Rosen/Roback (Rosen 1979, Roback 1982) literature on compensating differentials abstracted from explicitly considering the assignment of heterogeneous workers to sectors (based on skill) in local markets.[1]

Assume that workers in a local labor market are heterogeneous in their ability. The labor market consists of two sectors. Each worker's (indexed by *i*) ability is given by a pair of sector-specific abilities (a_{i1}, a_{i2}).[2] These abilities have a joint distribution in the local labor market. In a competitive local market each sector consists of many employers who pay a common sector specific ability wage, w_k. A worker is paid a wage equal to the ability wage in that sector times that worker's sector specific ability, $w_{ik} = w_k a_{ik}$.

Assume initially costless mobility between sectors within a local market, but that movement between local labor markets is prohibitively expensive. In this case, each worker will select the sector of employment that provides the higher wage. That is, worker *i* will select sector 1 if $w_1 a_{i1} > w_2 a_{i2}$ or $w_1 / w_2 > a_{i2} / a_{i1}$. As illustrated in Figure 1, self-selection implies that the skill price ray with slope w_1 / w_2 divides the joint distribution of skills in a local market such that workers with skill pairs

[1] The value of a statistical life literature (started by Thaler and Rosen 2004) is a first cousin of the Rosen/Roback model. In that literature, researchers seek to estimate the compensating differential for working in a riskier job (Viscusi 1993). Hwang, Reed and Hubbard's (1992) work investigates the assignment of heterogeneous workers to risky and safe jobs.

[2] We treat these skill vectors as exogenous. However, the structure of local labor markets may also influence the incentives for firms and workers to invest in human capital. Becker (1962) points out that a monopsonist may have a greater incentive to invest in firm- (sector-) specific human capital.

below the ray will select to work in sector 1, while workers with skill pairs above the ray will select to work in sector 2.

Positive correlation in skill attributes across sectors

For illustration, we will label sector 1 as "Retail" and sector 2 as "Mfg". Assume that the two skill abilities are positively correlated and that the variance of abilities in manufacturing is higher than in retail.[3] Let the ability wages w_1^c and w_2^c represent a competitive equilibrium where, given the selection of workers across the two sectors induced by these ability wages, firms make zero profits selling their output. With this joint distribution of abilities, self-selection leads the manufacturing sector to attract, on average, higher quality workers than in the retail sector. While high ability workers in manufacturing tend also to be high ability in retail, as shown in Figure 1, the larger variance of ability in manufacturing allows many of these high skilled workers to earn more in manufacturing.

Consider now the entry into the local labor market of a large retail employer that displaces the existing small retailers. Once the small retail employers have exited, the large retail employer acts as a monopsonist. The assignment of workers to sectors implies that the large retail employer faces an upward sloping supply curve of workers that is indexed to the ability wage paid in manufacturing. Acting as a monopsonist, the retail employer reduces the ability wage paid in retail, $w_1^m < w_1^c$, so that its marginal revenue product of labor equals its marginal factor cost.

Holding constant the ability wage in manufacturing, the lower ability wage in retail rotates the skill price ray downward as shown in Figure 1. With costless sectoral mobility, this induces workers with ability pairs between the two rays to reallocate from retail to manufacturing reducing total retail employment. Wages fall for those workers who remain in the retail sector. For a worker with retail skill a_{i1} who remains in the retail sector, the wage decline is proportional to the vertical distance between the two skill price rays at a_{i1}. In addition, the average ability of workers in retail is lower under the monopsony retailer than under the earlier competitive retail sector. So, consistent with the findings in the literature, the decline in average retail earnings reflects the combination of

[3] The Roy model can be analyzed using any assumption on the joint distribution of worker sector-specific skills. We explore the case of a positive correlation to align the Roy model to the empirical findings discussed earlier.

the lower skill wage paid by the monopsonist and the lower average ability of workers remaining in the retail sector.

The Roy model also provides insights for the relative wage effects of a monopsonist between workers who switch sectors and those who remain in retail. For a worker with retail skill a_{i1} who switches to manufacturing, the wage decline is proportional to the height of the original skill price ray at a_{i1} less the worker's skill level in manufacturing, a_{i2}. Workers with retail skill a_{i1} who remain in retail suffer a wage loss proportional to the vertical distance between the two skill price rays at a_{i1}. For a given skill level in retail, then, the wage loss for workers who remain in retail is greater than the wage loss for workers who switch to manufacturing.[4]

Whether this is the new equilibrium depends on if the manufacturing sector for this local market is a price taker in a broader manufacturing market. If this is the case, then the ability wage in manufacturing is not affected by the influx of additional workers. In this case, an implication is that for workers who were already working in manufacturing, the entry of the monopsonist in the retail sector does not affect their wages. In contrast, if the local manufacturing sector is not a price taker, then the expanded output due to the influx of workers from the retail sector will result in a lower skill wage in manufacturing. This shifts the supply curve facing the monopsonist and will reduce the overall movement of workers into manufacturing.

Our analysis ignores the housing market and assumes that rents and house prices remain unaffected by the exercise of monopsony power. With migration, monopsony power can be thought of as a location disamenity that must be compensated for to retain (or attract) workers in that local labor market. Capitalization of the monopsony effect into lower house prices affects all homeowners regardless of whether they experience a lower wage from the monopsonist. In Kahn and Tracy (2020), we study the real estate capitalization effect of local monopsony and document that home prices are lower in areas where local labor market concentration is higher. In that paper, we implicitly assume that all workers are homogeneous.

Mobility Across Labor Markets

[4] In contrast, Neal (1995) finds that industry switchers tend to suffer greater wage losses than industry stayers following a job displacement.

We now relax the assumption that movement between labor markets is prohibitively costly. We maintain our focus on the labor market and do not incorporate equilibrium effects from the housing market. For simplicity, assume that moving entails a fixed cost which we can represent as a flow cost to the worker. Now consider a Roy model where we have a "local" sector and an "other labor market" sector representing outside labor market opportunities. As before, we assume that worker skills are positively correlated across these two sectors with a higher variance in the other labor market sector.

A monopsonist enters the local sector driving down the skill price in that local labor market. This is illustrated in Figure 2. Again, the flow costs of moving represent the costs per period of moving that recoup the fixed moving costs over a specified number of years. Adding mobility costs strengthens the selection effect on skill relative to costless cross-sector migration within the local labor market. Individuals between the solid red and blue lines have an incentive to exercise the "outside" option of migrating to another labor market. Given the assumed fixed costs of moving, the associated flow costs will be lower for younger workers who have a longer career to amortize the mobility costs. This indicates that migration will also be skewed to younger as well as more skilled workers.

Location Amenities

We now consider the effects of allowing local markets to differ with respect to the amenities that they offer residents. The Rosen/Roback framework results in these amenities being capitalized into higher house prices and lower wages so that the marginal household is indifferent between staying or moving.

With heterogeneity in preferences for these amenities, some households will earn locational rents. That is, these households would have been willing to pay more for access to these amenities than the marginal household and therefore what is priced into houses and wages. The existence of locational rents generates additional friction to moving for some households.

In this case, the mobility response to monopsony power would vary across local markets depending on the degree to which these locational rents exist in these markets. Holding other factors constant, monopsonists in localities with relatively high amenities would face relatively more inelastic labor supply. This increases the incentive for the monopsonist to further lower the skill price to appropriate some of these locational rents. This moves our analysis back closer to our initial

assumption of no migration between local markets. This is similar to Brueckner and Neumark (2021) where local public sector unions may attempt to appropriate locational rents through collective bargaining.

The presence of amenities and locational rents adds another dimension to the selection effect associated with migration in response to a monopsonist. What is important is the nature of the correlation (if any) between worker skills and preferences for the amenities. If high skilled workers tend to have stronger (weaker) preferences for the amenities, then this will mitigate (exacerbate) the de-skilling associated with the exercise of monopsony power.

Data Sources

In this section, we construct a county/decade panel data set using standard measures of monopsony to present some reduced form regressions to examine whether counties featuring concentrated local employment experience slower population growth, a relative loss of young people, and a "brain drain".

Constructing County Level Employment Concentration

We use the public releases of County Business Patterns (CBP) data from 1980, 1990, 2000, and 2010.[5] The CBP data provides the total county employment and the number of establishments in each size category for the week of March 12th. The CBP covers roughly 6 million single-unit establishments and 1.8 million multi-unit establishments. The CBP data excludes most government employment.

The list of employee size categories provided are: 1-4, 5-9, 10-19, 20-49, 50-99, 100-249, 250-499, 500-999, 1,000-1,499, 1,500-2,499, 2,500-4,999, 5,000+. Table 1 provides the share of establishments in each size category when we pool across counties and years. The distribution of establishments and employment by size is extremely skewed. More than half of all establishments are less than 5 persons in size and nearly three quarters are less than 10 persons. The task is to use

[5] Starting in 2017 the CBP censors more of the data available in the public use files. Prior to 1976, the CBP did not break out the number of establishments with 1,000+ employees.

this information to allocate to establishments the county employment across these categories. We can then calculate for each county the standard measures of employment concentration.[6]

We start with the case of a county that has no establishments in the upper open size category (5,000 or more). We use annual data on the national number of establishments and total employment by size category to calculate the conditional mean number of workers per establishment in each size category.[7] We then proportionately scale these conditional mean number of workers for the county so that the sum the estimated employment levels across size categories equals the total county employment.

For counties that have one or more establishments in the upper open size category, we start by allocating county employment across the closed size categories using the annual conditional mean establishment size by category from the national data. We then check to see if the remaining number of employees for the county equals or exceeds 5,000 times the number of establishments that the county has in the open interval. If this is not the case, then we create a flag for that county. We then calculate the distribution of implied employment levels at the largest establishments for those counties where the flag is not turned on in that year. For counties where the flag is turned on, we assign to each of its large establishments an employment level indicated by the 10^{th} percentile of this distribution. We then proportionately scale the employment sizes for the closed size categories in that county so that the estimated total county employment equals the actual employment.

Returning to Table 1, as noted above, over the period from 1976 to 2016 establishments with less than 10 employees on average account for approximately 75 percent of total establishments, yet they represent just under 15 percent of total employment. Similarly, establishments of 1,000 or more employees account for less than a tenth of a percent of total establishments but contain slightly over 13 percent of total employment.

Using the county-level data on imputed establishment sizes we construct two standard measures of employment concentration. These are the Herfindahl index (HHI) (where the

[6] More precise measures of employment concentration using the actual number of employees in each establishment would require access to the confidential version of the CBP data through a Census Research Data Center.

[7] See: https://www.bls.gov/web/cewbd/table_f.txt

maximum value is 10,000) and the share of total county employment accounted for by the top 10 establishments.

Demographic Data

We use county level demographic data from 1980, 1990, 2000, 2010 and 2020. The U.S. Census Bureau annually releases unbridged population estimates for five-year age groups and race at the county level.[8] The Census Bureau does not release bridged race estimates by single year of age at the county level due to concerns about the reliability of these estimates. We collapse these age groups into four age categories: 26-35, 36-45, 46-55, 56-65. We omit the share of individuals 25 or younger and older than 65 from our analysis. We combine this with data on educational attainment by county for adults aged 25 and older.[9]

Estimation Results

Our empirical strategy describes the demographic dynamics of a county's population over time. We focus on the county's population, age structure and educational attainment and how these measures of human capital vary with 10-year lagged measures of local labor market monopsony power. Up front, we acknowledge that we do not attempt to estimate an equilibrium model that features price adjustment. If local wages and rents adjust in the face of monopsony power, then the observed demographic shifts we study will be attenuated because lower rents in monopsony areas will partially compensate "exploited" workers.

We estimate the following decade-based panel regression specifications for each of our two measures of County employment concentration. Let D_{ijt} be a demographic measure for County *i* in Commuting Zone *j* in year *t*. In addition, let $M_{it\text{-}10}$ denote the degree of local monopsony power and is the 10-year lag value of either the log of the County-level HHI or the Share Top 10 employment concentration.[10] We standardize both measures of employment concentration to have a zero mean and unit standard deviation to ease comparisons of results across the two monopsony measures. We include decade effects (τ_t) and Commuting Zone effects (α_j). Including Commuting Zone effects

[8] See https:/www.census.gov/programs-surveys/popest.html
[9] See USDA ERS - County-level Data Sets: Download Data
[10] Using a 10-year lag in employment concentration avoids any local cyclical effects that may impact employment concentration and contemporaneous employment and wages.

accounts for any amenity and other persistent differences across local markets and decade effects account for longer-term trends that may create mobility frictions.

$$D_{ijt} = \beta_0 + \beta_1 M_{it-10} + \alpha_j + \tau_t + \varepsilon_{ijt}$$

One concern with our empirical specification is that a secular decline in a local market may result in both a rise in employment concentration as firms go out of business and subsequent migration of talent due to diminished employment opportunities. For example, the opening of trade with China and its impact on the Rust belt, see Autor et al (2013). However, the timing of trade with China and the dynamics of employment concentration do not line up. In addition, in Kahn and Tracy (2020) we find no difference in the effects of employment concentration on house prices between "rust-belt" and "non-rust-belt" counties contrary to a secular decline hypothesis. As noted above, the decade time effects should also help control for secular trends affecting migration.

Table 2 presents results for county population growth as well as the age distribution within a county. We report results for four different age brackets. For each specification, we report the percentage point change in that age category in response to a one-standard deviation change in employment concentration. We also translate this into the corresponding percent change relative to the sample average employment share for that age category.

The first two specifications of Table 2 show that counties and time periods with higher levels of employment concentration experience slower population growth over the next 10 years. Both measures of employment concentration produce similar estimates indicating that a one-standard deviation increase in employment concentration is associated with around an 88-basis point slower population growth relative to other counties in the same commuting zone after controlling for the aggregate rate of population growth (the implied elasticity is –0.79).

Kahn and Tracy (2020) report that controlling for county employment and per capita income house prices decline with increases in current employment concentration. They also find that there is a positive elasticity between county employment and house prices. Table 2 shows that current employment concentration leads to lower population growth over the next 10 years. This indicates that there may be a feedback effect where the subsequent decline in county population leads to further declines in house prices. This could reflect the durability of housing which creates an inelastic supply of existing housing in a local market (see Glaeser and Gyourko 2005).

The remaining specifications of Table 2 examine the effects of higher levels of employment concentration on the age distribution in a county. Again, the results are very similar for both measures of employment concentration. The age distribution in Counties and time periods with higher levels of employment concentration shifts toward older workers over the next 10 years. For example, a one-standard deviation increase in employment concentration is associated with a 4 to 4.4 percent decline in the share of individuals 26 to 35, and a corresponding 4.5 percent increase in the share of individuals 56 to 65. This is consistent with the prediction from the Roy model with mobility frictions. Younger individuals have lower levels of location-specific investments and a longer working career to amortize the costs of moving in response to monopsony power in their current local market.

In Table 3 we examine how monopsony affects the skill distribution in a county as proxied by the educational attainment of individuals in the county. We focus on four educational categories: less than high school, high school graduate, some college, college graduate and higher. The table has a similar structure to Table 2 in that we present standardized effects both in percentage point and percent changes for each education category.

As we found in Table 2 for the age distribution, the results for the education distribution are very similar across both employment concentration measures. Looking at specifications (1) to (4) of Table 3, the data indicate that a County and time period with a higher level of employment concentration will experience an increase in its relative share of individuals with a high school degree or less over the next decade. A one-standard deviation increase in employment concentration is associated with a 9.2 to 9.7 percent increase in the share of individuals with less than a high school degree, and a 5.8 to 6.5 percent increase in the share with a high school degree. On the other end of the education spectrum, a one-standard deviation increase in employment concentration is associated with a 16.7 to 18.2 percent decline in the share of individuals with a college degree or more education. If we think of education as a proxy for the skill ability of individuals, then this is consistent with the deskilling prediction from our implementation of the Roy model where the lowering of skill prices by monopsonists incentivizes relatively high skilled workers to move out of that local labor market.

The panel data on county demographic characteristics and employment concentration shows that the demographic composition of a County adjusts over time to changes in the level of employment concentration in that market. Higher levels of employment concentration are

associated with a deskilling in the local labor market over time—younger and more educated individuals choose to move to alternative markets to sell their skills.

Implications for Estimating Monopsony Wage Effects

Our results establish that moving out of a local labor market is one of the adjustment mechanisms in response to an increase in monopsony power in a local market. The data also indicate that this mobility is not random, but rather is skills based. Controlling for this changing skill distribution is important for identifying the effect of monopsony on the skill prices. The overall wage effect associated with an increase in monopsony power will be a combination of the monopsony effect on the skill prices and the shift in the composition of skills. This is consistent with the empirical literature discussed earlier that finds controlling for observed skill attributes tends to attenuate the estimated monopsony "wage effect."

While our decade-based panel data focused on observed skill attributes, a similar logic applies to unobserved (to the researcher but not to the employer) skill attributes of workers. If we assume that, on average, the distribution of unobserved skill abilities in a local market is positively related to the distribution of observed skills, then a prediction from the Roy model would be that growing monopsony power in a local market would also lead to deskilling along unobserved skill attributes.

Understanding the effect of monopsony on wages is an important empirical question. This estimation is more complicated if monopsony induces self-selection of workers across sectors and labor markets. Our long-run regression findings support this claim. This implies that, in addition to controlling for workers' observed skills, researchers estimating the monopsony wage effects also likely need to control for endogenous sample selection on unobservable skills. A standard approach is the Heckman selection model (Heckman 1979). The challenge in implementing this approach is to model the distribution of skills in a county and identify one or more variables that shift this distribution but can be excluded from the wage specification. Controlling for shifts in both the observed and unobserved skill distribution in response to monopsony power is important for isolating the effect of monopsony on skill prices.

Conclusion

Using four decades of data on county demographics and employment concentration, we show that counties and time periods with higher levels of employment concentration suffer a brain drain over the next decade. This manifests itself in the loss of younger and more educated workers in the county. This deskilling of the county labor force induces a sample selection challenge for researchers attempting to measure the effect of monopsony on skill prices in local markets. Researchers need to account for the changes in observed and unobserved skills in the local market induced by the exercise of monopsony power.

The Rosen/Roback model along with the Roy model extension allowing for heterogenous skilled workers share a common bundling assumption that individuals live and work in the same local market. Improved transportation systems can relax this constraint to a degree, but commuting costs (money and time) still limit the practical distances between place of work and place of residence.

The rise of WFH has the potential to discipline monopsony power. By effectively unbundling place of work and place of residence, WFH can increase the effective labor supply elasticity facing a monopsonist, thereby limiting the ability of the monopsonist to generate economic profits by lowering the skill price. This would complement other mechanisms such as minimum wages and labor unions in terms of attenuating monopsony power (Kahn and Tracy 2020). Since our data sets ends in 2020, we cannot test this optimistic hypothesis. If WFH continues to expand, future research should explore how its rise affects the exercise of monopsony power.

References

Autor, David H., David Dorn, and Gordon H. Hanson. "The China Syndrome: Local Labor Market Effects of Import Competition in the United States." *American Economic Review* 103 (October 2013): 2121-2168.

Azar, Jose A., Ioana Marinescu, and Marshall I. Steinbaum. "Labor Market Concentration."*Journal of Human Resources* 57 (Apr 2022): S167-S199.

------, Ioana Marinescu, Marshall I. Steinbaum, and Bledi Taska. "Concentration in US Labor Markets: Evidence From Online Vacancy Data." Working Paper #24395. National Bureau of Economic Research, 2018. https://www.nber.org/papers/w24395.

Becker, Gary S. "Investment in Human Capital: A Theoretical Analysis." *Journal of Political Economy* 70 (Oct 1962): 9-49.

Brueckner, Jan, Matthew E. Kahn, and Gary C. Lin. "A New Spatial Hedonic Equilibrium in the Emerging Work-From-Home Economy?". *American Economic Journal: Applied Economics forthcoming.*

Brueckner, Jan K., and David Neumark. "Beaches, Sunshine, and Public Sector Pay: Theory and Evidence on Amenities and Rent Extraction by Government Workers." *American Economic Journal: Economic Policy* 6 (May 2014): 198-230.

Deryugina, Tatyana, Laura Kawano, and Steven Levitt. "The economic impact of Hurricane Katrina on its victims: Evidence from individual tax returns." *American Economic Journal: Applied Economics* 10, no. 2 (2018): 202-233.

Ehrlich, Isaac, and Gary S. Becker. "Market insurance, self-insurance, and self-protection." *Journal of political Economy* 80, no. 4 (1972): 623-648.

Glaeser, Edward L. (2012) *Triumph of the city: How our greatest invention makes us richer, smarter, greener, healthier, and happier*. Pengui.

Glaeser, Edward L., and Joseph Gyourko. "Urban decline and durable housing." *Journal of Political Economy* 113, no. 2 (2005): 345-375.

Glaeser, Edward L., David Laibson and Bruce Sacerdote. "An Economic Approach to Social Capital." *Economic Journal* 112 (November 2002): F437-F458.

Heckman, James. "Sample Selection Bias as a Specification Error." *Econometrica* 47(1979): 153-161.

Heckman, James, and Jose Scheinkman. "The Importance of Bundling in a Gorman-Lancaster Model of Earnings." *The Review of Economic Studies* 54, no. 2 (1987): 243-255.

Hwang, Hae-shin, W. Robert Reed, and Carlton Hubbard. "Compensating Wage Differentials and Unobserved Productivity." *Journal of Political Economy* 100 (August 1992): 835-858.

Kahn, Matthew E. and Joseph Tracy. "Monopsony in Spatial Equilibrium." NBER Working Paper No. 26295, June 2020.

Manning, Alan. *Monopsony in motion: Imperfect competition in labor markets*. Princeton and Oxford, Princeton University Press, 2003.

------. "A Generalised Model of Monopsony." *Economic Journal* 116 (January 2006): 84-100.

------. "The Plant Size-Place Effect: Agglomeration and Monopsony in Labour Markets." *Journal of Economic Geography* 10 (September 2009): 717-744.

------. "Imperfect Competition in the Labor Market." In *Handbook of Labor Economics*, 973-1041. Elsevier, 2011.

Moretti, Enrico. "Human Capital Externalities in Cities." In *Handbook of Regional and Urban Economics*, edited by J. Vernon Henderson and Jacques-Francois Thisse, vol. 4, pp. 2243-2291. Elsevier, 2004a.

------. "Workers' education, spillovers, and productivity: evidence from plant-level production functions." *American Economic Review* 94, no. 3 (2004b): 656-690.

Neal, Derek. "Industry-Specific Human Capital: Evidence from Displaced Workers." *Journal of Labor Economics* 13 (October 1995): 653-677.

Notowidigdo, Matthew J. "The incidence of local labor demand shocks." *Journal of Labor Economics* 38, no. 3 (2020): 687-725.

Oswald, Florian. "The effect of homeownership on the option value of regional migration." *Quantitative Economics* 10, no. 4 (2019): 1453-1493.

Qiu, Yue, and Aaron Sojourner. "Labor-Market Concentration and Labor Compensation." Working Paper. Temple University, Fox School of Business, October, 2019.

Rinz, Kevin. "Labor Market Concentration, Earnings, and Inequality." *Journal of Human Resources* 57 (Apr 2022): S251-S283.

Roback, Jennifer. "Wages, Rents, and the Quality of Life." *Journal of Political Economy* 90 (1982): 1257-1278.

Rosen, Sherwin. "Wage-based Indexes of Urban Quality of Life." In *Current Issues in Urban Economics*, edited by Peter Mieszkowski and Mahlon Straszheim. Baltimore, Johns Hopkins University Press, 1979.

Roy, Andrew D. "The Distribution of Earnings and of Individual Output." *Economic Journal* 125 (March 1950): 386-402.

------. "Some Thoughts on the Distribution of Earnings." *Oxford Economic Papers* 3 (June 1951): 135-146.

Sjaastad, Larry A. "The Costs and Returns of Human Migration." *Journal of Political Economy* 70, no 5 Part 2 (October 1962): 80-92.

Thaler, Richard, and Sherwin Rosen. "The Value of Saving a Life: Evidence from the Labor Market." In *Markets and Diversity*, 91-127. Cambridge and London, Harvard University Press, 2004.

Viscusi, W. Kip. "The Value of Risks to Life and Health." *Journal of Economic Literature* 31 (December 1993): 1912-1946.

Table 1. Establishment Size Distribution

Employment Size Category	Percent of Total Establishments	Percent of Total Employment
1 – 4	54.85	6.21
5 – 9	19.29	8.34
10 – 19	12.43	10.92
20 – 49	8.33	16.39
50 – 99	2.84	12.69
100 – 249	1.59	15.53
250 – 499	0.41	9.21
500 – 999	0.16	7.02
1,000 – 1,499	0.04	3.38
1,500 – 2,499	0.03	3.54
2,500 – 4,999	0.015	3.37
5,000+	0.006	3.39

Notes: County Business Pattern data, 1976 – 2016.

Table 2. Effects of Employment Concentration on Population and Age Distribution of Counties

	Log(Pop)		% Age 26-35		% Age 36-45		% Age 46-55		% Age 56-65	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
10-year lag log(HHI)	–0.88		–0.56		–0.10		0.26		0.52	
(1-sd change)	(0.01)		(0.03)		(0.02)		(0.02)		(0.03)	
			[–4.42]		[–0.72]		[2.03]		[4.53]	
10-year lag Top 10		–0.87		–0.51		–0.08		0.27		0.53
Share (1-sd change)		(0.01)		(0.003		(0.02)		(0.02)		(0.03)
				[–3.98]		[–0.64]		[2.16]		[4.54]
R-square	0.81	0.81	0.59	0.58	0.68	0.68	0.75	0.75	0.74	0.74

Notes: Standardized coefficient for percentage point change of education group within a County with standard errors in parentheses. Percent of group mean change in square brackets. Standard errors are calculated clustering on Counties. Decade and Commuting Zone fixed effects are included. Sample size 12,421
Standard deviation of 10-year lag log(HHI) = 1.11
Standard deviation of 10-year lag Top 10 Share = 0.17

Table 3. Effects of Employment Concentration on Education Makeup of Counties

	% < HS		%HS		% Some College		% College+	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
10-year lag log(HHI)	1.89		2.25		–0.87		–3.27	
(1-sd change)	(0.10)		(0.09)		(0.06)		(0.14)	
	[9.23]		[6.52]		[-3.00]		[-18.19]	
10-year lag Top 10 Share		1.99		2.00		–0.98		–3.00
(1-sd change)		(0.11)		(0.09)		(0.06)		(0.13)
		[9.74]		[5.79]		[–3.63]		[–16.68]
R-square	0.80	0.80	0.57	0.56	0.74	0.74	0.62	0.61

Notes: Standardized coefficient for percentage point change of education group within a County with standard errors in parentheses. Percent of group mean change in square brackets. Standard errors are calculated clustering on Counties. Decade and Commuting Zone fixed effects are included. Sample size 12,433
Standard deviation of 10-year lag log(HHI) = 1.11
Standard deviation of 10-year lag Top 10 Share = 0.17

Figure 1. Impact of Monopsony on Worker Assignment Across Sectors– positive correlation in skills

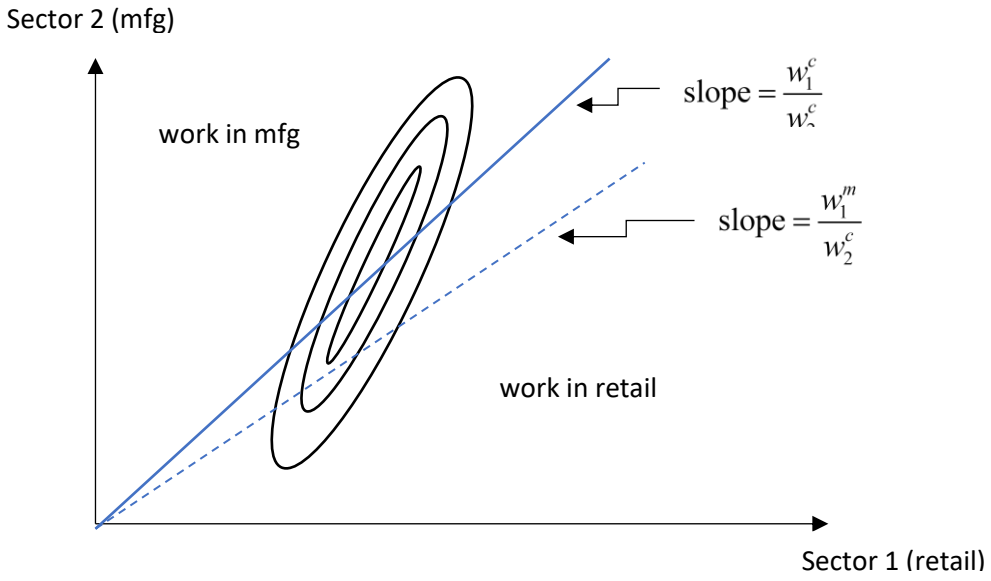

Figure 2. Impact of Monopsony on Worker Migration Across Labor Markets