Ownership Network and Job Mobility

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Abstract

Using a large collection of résumé data from U.S. college graduates, this paper investigates how overlapping ownership among employers affects employees' job mobility. By exploiting the merger of two major institutional investors, which significantly changed the overlapping ownership among S&P 500 companies, I find that a 1% increase in ownership similarity between two firms reduces job mobility between them by 4.3%.

JEL Classifications: G34, J42, K21, M50
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1 Introduction

Job mobility across firms is a key source of career development and wage growth, especially for young and highly skilled employees (Topel and Ward, 1992; Wachter and Bender, 2006; Starr et al., 2021; He and Wintoki, 2023; Deming, 2023). At the same time, high levels of talent turnover can result in substantial costs for employers (Oi, 1996; Haslag et al., 2022; Carvalho, 2023). These costs may lead firms to engage in collusive practices, such as avoiding competition for each other's employees to restrict employees' outside options and lower their chances of departure (Ashenfelter et al., 2022; Gibson, 2024; Callaci et al., 2024; Ferrés et al., 2022; Begley et al., 2024; Herrera-Caicedo et al., 2024; Sharma, 2024).

Although such anticompetitive behavior by firms is illegal under Section 1 of the Sherman Act, antitrust efforts have historically focused on product markets. While there is growing attention toward potential antitrust issues in labor markets (DOJ and FTC, 2016; CEA, 2016; DOJ and FTC, 2023), the underlying factors and conditions that enable firms to coordinate in the labor market remain largely understudied.

In this paper, I examine how ownership similarity among employers influences the job mobility of their college-educated employees. Over the past few decades, the ownership structure of publicly traded firms in the U.S. has undergone a dramatic transformation, shifting from small retail investors to dominant financial institutions. Institutional ownership has risen from less than 10% in the 1950s to around 70% in 2010s (Blume and Keim, 2012; Azar et al., 2018; Ben-David et al., 2021) with the three largest asset managers – BlackRock, Vanguard, and State Street – collectively serving as the largest shareholders in nine out of ten S&P 500 firms, which together employ nearly one-third of the U.S. workforce(Goshen and Levit, 2022; Fichtner et al., 2017). That raises concerns about the potential impact of growing overlapping ownership among major U.S. corporations on employers' labor market power and employees' labor market outcomes (Bivens and Mishel, 2015; Steinbaum, 2021; Azar and Vives, 2021; Goshen and Levit, 2022).

This paper attempts to provide empirical evidence on the potential negative impact of employers' overlapping ownership on employees, through reducing job mobility among highly skilled workers. I begin by developing a simple model that demonstrates how increased overlapping ownership reduces firms' incentives to hire employees from one another, consequently restricting workers' outside options and their ability to transition between firms. I then test this hypothesis empirically by analyzing the job mobility of highly skilled workers in the U.S. using a dataset of résumés from 21 million college graduates spanning 1995 to

2019. This dataset allows me to track their career movements across S&P 500 firms, which are the primary focus of my study.

To draw a casual link, I exploit the plausibly exogenous variation in ownership similarity of S&P 500 caused by BlackRock's acquisition of Barclays Global Investors (BGI) in 2009. The merger led BlackRock to become the largest shareholder in 34.8% of S&P 500 companies and increased their average ownership similarity by 4.4%.[1]

I employ a difference-in-differences identification strategy, using only variation in ownership similarity implied by the hypothetical combination of the two companies' portfolios at the end of 2008 prior to the merger announcement. Leveraging this approach, I show that firm-pairs in the top tertile of predicted increases in ownership similarity experienced, on average, 11% lower employee flows between them after the merger compared to other firms.

Additionally, I use the implied impact of the merger as an instrument for the change in ownership similarity between firm-pairs before and after the merger. This approach enables me to quantitatively estimate the effect of employers' ownership similarity on employees' job mobility. My estimates indicate that 1% increase in ownership similarity between two firms reduces job mobility between them by 4.3%.

This paper builds on two key strands of literature. First, it contributes to the growing body of research on the real effects of overlapping ownership. Prior studies have primarily focused on how common ownership influences product markets Azar et al., 2018; Newham et al., 2018; Backus et al., 2021; Ederer and Pellegrino, 2021, corporate investment (Gutiérrez and Philippon, 2016, 2018), innovation (López and Vives, 2019; Antón et al., 2024), and managerial compensation (Antón et al., 2023). The most closely related work to my paper is Azar et al. (2021), which uses administrative data from the U.S. Census Bureau to examine the impact of common ownership on employee wages. They exploit changes in overlapping ownership driven by firms' additions to the S&P 500 index as a shock to local competitors' ownership structures. They attribute the observed wage effects to increased employer market power and wage markdowns. In contrast, my paper employs a different identification strategy based on the merger of two large institutional investors. I also leverage a unique dataset of employee résumés, which enables me to precisely track changes in ownership similarity and

[1]The change in average ownership similarity is computed by dividing the predicted change in ownership similarity induced by the merger by the initial ownership similarity in the last quarter of 2008. For more details on predicted change in ownership similarity, see $\Delta\chi_{fg}$ in Equation 8.

job transitions between firms. The primary contribution of this paper is to provide evidence that employers' overlapping ownership can facilitate anti-competitive behavior, specifically by restricting employees' outside options and reducing labor mobility.

In this regard, my paper also contributes to the second strand of literature, which includes recent studies providing empirical evidence on the causes and consequences of anti-poaching agreements between firms. Notably, Gibson (2024) and Ferrés et al. (2022) examine anti-poaching agreements in Silicon Valley during the mid-2000s, finding that such collusion reduces wages and non-wage benefits. Meanwhile, Begley et al. (2024) and Herrera-Caicedo et al. (2024) investigate how firms with shared board directors or executives are more likely to engage in these forms of collusive behavior.

The rest of the paper is organized as follows: Section 2 introduces a simple model of labor market collusion in infinitely repeated games. Section 3 describes the data, Section 4 outlines the estimation strategy, Section 5 presents the results, and Section 6 concludes.

2 A Model of labor market collusion in Infinitely Repeated Games

In this section, I examine how overlapping ownership among employers influences their strategic behavior when competing to attract employees from other firms. That, in turn, can impact employees' outside options and their job mobility. To analyze this, I model an infinitely repeated prisoner's dilemma game in which firms decide whether to cooperate or defect in poaching employees from one another. The analysis begins with the following monetary payoff matrix for a symmetric stage game of the prisoner's dilemma.

	$NottoPoach$	$Poach$
$NottoPoach$	$\pi_f\ ,\ \pi_g$	$\pi_f - \nu\ ,\ \pi_g + \alpha\nu$
$Poach$	$\pi_f + \alpha\nu\ ,\ \pi_g - \nu$	$\pi_f - (1-\alpha)\nu\ ,\ \pi_g - (1-\alpha)\nu$

At the beginning of each period $t = 0, 1, \ldots$, firms decide whether to engage in poaching. If our two representative public firms f and g both cooperate by refraining from poaching each other's employees, their profits remain unaffected, and they earn π_f and π_g, respectively. However, if firm f defects and poaches employees from firm g, firm g's profit decreases by ν, representing the value added by the lost human capital. We assume that a portion of this human capital is firm-specific and non-transferable to other firms. As a result, firm f

captures only part of the value added from the acquired human capital, represented by $\alpha\nu$. Consequently, the total profit gain for firm f after poaching is $\pi_g + \alpha\nu$. These monetary payoffs follow the structure of the stage game in a standard prisoner's dilemma, such that for firm i:

$$\pi_i - \nu < \pi_i - (1-\alpha)\nu < \pi_i < \pi_i + \alpha\nu$$

To simplify the analysis, we adopt a conventional approach by focusing on equilibrium where firms employ one of two strategies. The first is a conditionally cooperative strategy, often referred to as the grim strategy, where firms refrain from poaching employees unless the other firm defects, at which point all cooperation ceases permanently. This implies that the penalty for defection is perpetual. The second strategy is to always defect by continuously poaching employees. While the equilibrium is defined by these two strategies, the model yields interesting predictions about how common ownership among employers influences their strategic behavior. Assuming firm g plays x^G an does not poach any employees. The net payoff for firm f to also play x^G and not x^{AD} given by

$$\Pi_f(\delta, \alpha, \nu) = \underbrace{\sum_{t=1}^{\infty} \delta^{t-1}\pi_f}_{x^G} - \underbrace{[\pi_f + \alpha\nu + \delta \sum_{t=1}^{\infty} \delta^{t-1}(\pi_f - (1-\alpha)\nu)]}_{x^{AD}} = \frac{\nu}{1-\delta}(\delta - \alpha)$$

Where δ denotes the discount factor. The higher δ impliers fimrs perceve their interaction is less likely to end and it will continue longer. firm f will cooperate when $\delta > \alpha$ since the perceived strategic risk of poachin in long term outweigth the short-run value added from poached employee. Since the game is symetric, the same holds for firm g

Overlapping Ownership I follow Backus et al. (2021) to model the objective function of the firms when there is a overlapping ownership between firms f and g. In the standard framework, the objective function of the firm often modeled by its profit function. This has been motiveted bt the fact that the firm's main objective is to satisfy the investors, and thus maximizing its profit reflects maximizing shareholder value (Friedman, 1953). Nevertheless, when there is overlapping ownership between firms, and firms' strategic choice affect each other' profit, maximizing shareholder value yields a different objective function (O'brien and Salop, 1999; Rotemberg, 1984).

I consider a finite number of shareholders, where each shareholder s holds cash flow rights β_f^s in firm f and β_g^s in firm g. Consequently, the profit of shareholder s is given by:

$$\pi_s(x_f, x_g) = \beta_f^s \pi_f(x_f, x_g) + \beta_g^s \pi_g(x_f, x_g) \tag{1}$$

which represents the sum of profits across their portfolio of investments, weighted by their respective cash flow rights. Equation (1) underscores a critical insight about overlapping ownership: the strategic actions of firm f influence the profit of shareholder s not only through their effect on firm f's profit but also indirectly through their impact on firm g's profit.

To obtain the objective functions of firms f and g in the presence of overlapping ownership (π'_f and π'_g), I assume that firms maximize the profits of shareholders, as in Rotemberg (1984). Furthermore, following Backus et al. (2021), I assume that each firm assigns a weight γ_{fs} to the profits of investor s and maximizes the weighted sum of their investors' profits. These weights allow the firm to resolve conflicts of interest among shareholders holding different portfolios. This implies that the objective function of firm f, denoted by φ_f, can be expressed as:

$$\varphi_f(x_f, x_g) = \sum_s \gamma_{fs} \pi_s(x_f, x_g).$$

Substituting π_s from Equation (1), the objective function π'_f can be rewritten as:

$$\begin{aligned} \varphi_f(x_f, x_g) &= \pi_f(x_f, x_g) \sum_s \gamma_{fs} \beta_f^s + \pi_g(x_f, x_g) \sum_s \gamma_{fs} \beta_g^s \\ &\propto \pi_f(x_f, x_g) + \pi_g(x_f, x_g) \underbrace{\frac{\sum_s \gamma_{fs} \beta_g^s}{\sum_s \gamma_{fs} \beta_f^s}}_{\kappa_{fg}} \end{aligned} \tag{2}$$

Please note that we normalize the objective function of firm f by $\sum_s \gamma_{fs} \beta_f^s$.[2] This normalization allows us to more clearly interpret the objective function of firm f. Equation (2) indicates that the firm's objective, in the presence of overlapping ownership, not only includes its own profit but also incorporates the profit of other firms where κ_{fg} represents the relative importance of the other firm's profit compared to the firm's own profit. As in Antón et al. (2023), we assume that $0 \leq \kappa_{ij} \leq 1$. That implies controlling owners in firm f has higher stake in firm f than g which is aligned with legal restrictions in practice that aim to

[2] We assume there is no short position, and thus $\sum_s \gamma_{fs} > 0$.

prevent tunneling behavior. Furthermore κ is closely related to the similarity of ownership between two firms. Backus et al. (2021) shows that under proportional control, "one share, one vote", that is common among US public company, κ_{fg} can further be decomposed into:

$$\kappa_{fg} = \underbrace{\cos(\beta_g, \beta_f)}_{\text{overlapping ownership}} \times \underbrace{\sqrt{\frac{\text{IHHI}_g}{\text{IHHI}_f}}}_{\text{relative IHHI}} \tag{3}$$

The first term is the cosine of the angle between β_f that is vector of the shares for all shareholders in firm f and the corresponding vector β_g for firm g. The cosine similarity indicates the overlap in ownership. It varies from zero to one where zero indicates no common ownership between two firms and one shows the perfect similarity. Overlapping ownership is what, in general, the literature refer to as "common ownership hypohthesis" that is the origin of the incentive to internalize the profits of another firm (Boller and Morton, 2020; Backus et al., 2021; Antón et al., 2023). Ownership similarity is appears in both κ_{fg} and κ_{fg} and symmetrically increases the value of other firm's profit in both firms' objective functions.

Nevertheless, the existence of second term cause the two firms internalize the other firm's profit differently. The second term is the ratio of the shareholders' concentration for firm f and g ($\text{IHHI}_f = \sum_s \beta_f^{s2}$ and $\text{IHHI}_g = \sum_s \beta_g^{s2}$) It indicates that the firm with relatively more concentrated investors place more weight on their own profits and less weight on competitor profits. To simplify our notation we denote $\omega = \sqrt{\frac{\text{IHHI}_g}{\text{IHHI}_f}}$, $\chi = \cos(\beta_g, \beta_f)$ Thus we can represent $\kappa_{fg} = \chi \cdot \omega$ and $\kappa_{gf} = \chi \cdot \omega^{-1}$

Equpied with this formula, now we can rewrite the payoffs in the stage games when there is overlapping ownership χ between firm f and g. We also assume the concentration of sharholder is higher in firm g meaning $\omega > 1$ Let us denote the $\pi'_f = \pi_f + \kappa_{fg}\pi_g$ and $\pi'_g = \pi_g + \kappa_{gf}\pi_f$ as the initial profit of firms when they both cooperate and do not poach from each other's employees, and thus their profits remain unaffected. if firm f defects and poaches employees from firm g, firm g's profit decreases only by $\nu - \kappa_{gf}\alpha\nu$, internalizing part of gained profit by firm f. Similarly firm f only gains $\alpha\nu - \kappa_{fg}\nu$ internalizing part of lost profit from firm g.

	NP	P
NP	$\pi'_f\ ,\ \pi'_g$	$\pi'_f - (1-\chi\omega\alpha)\nu\ ,\ \pi'_g + (\alpha - \chi\omega^{-1})\nu$
P	$\pi'_f + (\alpha - \chi\omega)\nu\ ,\ \pi'_g - (1-\chi\omega^{-1}\alpha)\nu$	$\pi'_f - (1-\alpha)(1+\chi\omega)\nu\ ,\ \pi'_g - (1-\alpha)(1+\chi\omega^{-1}))\nu$

The pay-off matrix in this stage game, allow us to find a t net payoff for firm f for chosing x^G over x^{AD} and extend equation (1) to the cases that there is overlaping ownerrhsip between two firms.

$$\Pi_f(\delta, \alpha, \nu) = \frac{\nu}{1-\delta}(\delta - \alpha + \chi\omega(1 - \delta\alpha)) \tag{4}$$

Equation (4) highlights two important points. The first pertains to a link between discount factor and overlapping ownership. Higher discount factor, which can be interpreted as a longer expected duration of interaction between two firms, serves as a key driver of coordination in a repeated game. Equation (4) shows that overlapping ownership, χ, is most effective in enhancing the net benefit of coordination when the discount factor is low—that is, when firms operate with a relatively shorter horizon and face strategic risks of defection. That implies overlapping ownership acts as a substitute for prolonged interaction. In the extreme case where δ approaches zero, the scenario simplifies to a stage game. At this point, $\frac{\partial \Pi_f}{\partial \chi}$ reaches its maximum value, and a cooperative equilibrium can still be sustained if $\chi\omega > \alpha$.

Second, the ability of overlapping ownership to incentivize coordination diminishes when the two firms have different levels of shareholder concentration. In such cases, the firm with relatively higher shareholder concentration is less responsive to overlapping ownership, making it more challenging to achieve coordination between the two firms.

3 Data

In previous section, I show how overlapping ownership can reduce firms incentive to offer jobs to employees from other companies. That in turn can have important implication on employees' outside option and job transition. To test this hypothesis I combine two main source of data on public companies ownership structure and job transition between these firms.

First, I construct the data on overlapping ownership among all U.S.-listed firms that were included in the S&P 500 by the last quarter of 2008, prior to the merger taking place. I calculate the measures of ownership overlap, profit weights, and shareholder concentration as defined in Equations (2) and (3) for each pair of these firms in each quarter between 2006 and 2015. To achieve this, I use information on the cash flow rights of institutional investors in these firms. The data is sourced from the quarterly 13F filings, which have been collected and digitized by Backus et al. (2021) from the Securities and Exchange Commission (SEC)

website. Additionally, I complement this dataset with information on prices and shares outstanding obtained from the Center for Research in Security Prices (CRSP).

My second dataset on job transitions is based on a large collection of resume data from lightcast database. The data is derived from cv postings on online job search platforms and other professional platforms. Matching the employers information between two dataset, I obtain the educational and career history of almost 5 million skilled workers that obtain a bachelor degree from a US college between 1995 and 2019 and has worked once in a S&P500 company listed in my sample. The number account for 24% all college graduates in my dataset. Comparing those number with the total bachelor graduates in united states during the same period it shows data on average account for approximately 55% of total US college graduates that are estimated to be around 38 million graduates [3].

Using this data, I construct a panel of annual job transitions and ownership similarities between S&P 500 companies. The former represents the total number of job transitions in each year, while the latter is the average ownership similarity for the given year.. Note that for any pair of firms (i,j) there are two observations each year. One shows the job transitions from firm i to firm j and the other indicates the job transitions from firm j to firm i. That allow me to distinguish between inflows and outflows for firms within each company pairs.

4 Empirical strategy

Empirically testing whether overlapping ownership affects firm behavior is challenging, as it is often closely related to firm-specific and aggregate economic conditions, such as changes in industry concentration (Doidge et al., 2017; Lewellen and Lowry, 2021). To address this issue, I exploit the plausibly exogenous variation in ownership structure caused by the merger between two large institutional investors, BlackRock and Barclays Global Investors (BGI). This approach is inspired by He and Huang (2017) and has been utilized by Azar et al. (2018) to examine the anti-competitive effects of common ownership on airline ticket prices.

BlackRock-BGI Merger

The merger was first announced on June 11, 2009, when BlackRock submitted a $13.5 billion bid to acquire Barclays Global Investors (BGI). The bid was successful and the deal was formally completed on 1 December 2009. As a result, BlackRock more than doubled its

[3] See National Center for Education Statistics: https://nces.ed.gov/programs/digest/d23/tables/dt23_318.10.asp

assets under management, growing from $1.44 trillion to approximately $3.29 trillion, and became the world's largest investment management company.

The merger had a substantial impact on the ownership structure of the companies. Prior to the merger, in the first quarter of 2009, BlackRock and BGI were the top investors in approximately 17.8% of S&P 500 companies. After the merger, in the first quarter of 2010, the combined assets positioned BlackRock as the top investor in 34.8% of S&P 500 firms and increased the average ownership similarity across the firms by 4.4%. Importantly, Barclays' earlier attempt to sell part of the division to investors other than BlackRock indicates that the move was not originally driven by considerations about the potential effects of combining the two companies' portfolios(Azar et al., 2018).

Identification

To study the relation between job mobility and ownership similarity I apply the following benchmark model at the company pair-year level:

$$y_{fgt} = \beta\, \chi_{fgt} + \lambda_{fg} + s^{j}_{ft} + s^{d}_{gt} + \epsilon_{fgt} \tag{5}$$

Where χ refers to the average cosine similarity between the ownership structure of two firms during year t, λ_{fg} indicates the firm-pair fixed effects; s^{j}_{ft} and s^{d}_{gt} denote the 2-digit sector-quarter fixed effects for firms f and g; andy_{fgt} indicates the measure of job transitions between two firms.

In equation (5), y_{fgt} includes the intensive and extensive margins of job transitions between firms f and g during year t. The intensive margin of job flows is represented by the logarithm of the number of job transitions, while the extensive margin is defined by a dummy variable that takes the value of zero if no job transition occurs between the two companies during year t and one otherwise. Furthermore, I examine the joint effect of these two margins using the following quasi-maximum likelihood (QML) Poisson setup.

$$y_{fgt} = exp\left(\beta'\, \chi_{fgt} + \lambda_{fg} + s^{j}_{ft} + s^{d}_{gt}\right)\epsilon'_{fgt} \tag{6}$$

where y_{fgt} represents the number of job transitions. This specification is well-suited to capture the count nature of job flows and accounts for variations arising from both intensive and extensive margins.

To obtain an unbiased estimate of β and β' in equations (5) and (6), it is essential to ensure that ownership similarity is not correlated with the error terms ϵ_{fgt} and ϵ'_{fgt}. Several potential confounding factors could violate this condition, as job mobility and ownership similarity are both strongly correlated with firm characteristics and broader macroeconomic conditions.

To overcome this identification problem, we exploit the exogenous variation in overlapping ownership among firms that is caused by BlackRock-BGI merger. To this end we use the following first stage IV estimation:

$$\chi_{fgt} = \beta'' \; MergerImpact_{fg} \times Post\text{-}merger_t + \lambda_{fg} + s^j_{ft} + s^d_{gt} + \varepsilon_{fgt} \tag{7}$$

Where *Post-merger* is a dummy variable equal to one for years after 2008 ($t > 2008$), and $MergerImpact$ is a firm-pair level measure according to hypothetical effect of merger before the BlackRock-BGI deal announced. To construct this measure, I begin by calculating the ownership similarity for all firm-pairs in the last quarter of 2008, prior to the merger. To achieve this, I use the overlapping ownership index, $\chi_{fg}^{2008Q4} = \cos(\beta_f^{2008Q4}, \beta_g^{2008Q4})$, , which I derive in equation (3) in section (2). That measures the cosine of the angle between the ownership share vectors of all shareholders in firms f and g. calculate ownership similarities under a hypothetical scenario where the BlackRock-BGI merger occurs in the end of 2008. To do this, I consolidate the assets of the two companies and recalculate their joint ownership share across all S&P 500 companies. I define this counterfactual ownership similarity as $\bar{\chi}_{fg}^{2008Q4} = \cos(\bar{\beta}_f^{2008Q4}, \bar{\beta}_g^{2008Q4})$. Finally, I construct a variable to capture the implied change in ownership similarity caused by the merger for each firm pair (f, g) as follows:

$$\Delta\chi_{fg} = \bar{\chi}_{fg}^{2008Q4} - \chi_{fg}^{2008Q4} \tag{8}$$

The Figure (1) shows the distribution of $\Delta\chi_{fg}$. The distribution is right-skewed, indicating that company pairs in the right tail experience a significantly larger increase in ownership similarity compared to the average pair. While those in the top tertile would see a 4.6 percentage point rise, the rest of the company pairs experience only a 1.1 percentage point increase on average. This motivates me to define the $MergerImpact_{fg}$ in equation (7) as a dummy variable equal to 1 if the company pairs fall within the top tertile of $\Delta\chi_{fg}$ and 0 otherwise. As a robustness check, I also use $\Delta\chi_{fg}$ directly to instrument ownership similarity in equation (7).

Lastly, since the merger impact varies at the firm-pair level, we cluster standard errors at the firm-pair level in all estimations to account for potential serial correlation and heteroskedasticity (Bertrand et al., 2004).

5 Results

This section presents the results of our main regressions examining the impact of the BlackRock-BGI merger on firms' ownership similarity and job mobility. I discuss the main difference-in-differences results and the associated event studies. Additionally, I also describe the IV-DID setup that I use to quantify the causal effect of employers' overlapping ownership on employees' job mobility.

5.1 Reduced form results: The impacts of BlackRock-BGI merger

We start by presenting the results of the reduced-form estimations, directly examining the relationship between job transitions and our instrument, which captures exogenous variations in ownership similarity caused by the merger. Table (2) presents the results. Column 1 indicates that firm pairs in the top tertile of predicted increases in ownership similarity experienced, on average, a 2.8% greater rise in ownership similarity compared to the rest of the S&P 500 companies in my sample.

Column 2 examines the impact on the volume of job mobility using a linear regression, where the dependent variable is the logarithm of job transitions for each company pair in each year. The results indicate that, conditional on having job transitions, the number of employees moving from one firm to another decreased by 8.6% for firm-pairs with high increases in overlapping ownership after the merger. This result suggests that talent turnover between the two firms substantially decreased, consistent with the model's prediction that higher ownership similarity reduces firms' incentives to acquire employees from each other.

While Column 2 reports results on the intensive margin of job transitions between firms, Table (1) shows that approximately 25% of company pairs do not exchange any employees in a given year during my sample period between 2006 and 2015. Column 3 focuses on the extensive margin of job mobility by running a linear regression where the dependent variable is a dummy that takes the value of one if there is any job transition between two firms, and zero otherwise. The estimate in Column 2 suggests that firm-pairs in the top tertiles of predicted increases in ownership similarity are 1.2% less likely to poach any employees from each other after the merger. However, this effect is not statistically significant.

Column 3 presents the results for the reduced-form estimation of equation (6), examining the impact on job mobility counts, which capture both the intensive and extensive margins of job transitions between firms. Considering both margins, I find that firm pairs in the top tertile of predicted increases in ownership similarity experienced an 11% ($e^{-0.116} - 1$) lower employee flows between them after the merger compared to other company pairs.

Figure (2) shows the dynamics of the BlackRock-BGI merger's impact on ownership similarity. The event study is conducted at the quarterly level, allowing us to closely track changes in ownership similarity among S&P 500 companies before and after the deal's announcement in June 2009 and its completion in December 2009. The figure shows that overlapping ownership among firm pairs in the top tertile of predicted increases in ownership similarity rose sharply and significantly compared to other firms following the merger's completion in December 2009.

Next, I examine the dynamics of the relationship between changes in the ownership similarity induced by the merger and job transitions among affected firms.To do so, I estimate the year-by-year gap in job mobility between firm pairs in the top tertile of predicted increases in ownership similarity and other firm pairs. Figure 3 presents these estimated effects, highlighting two key insights. First, the impact of the merger does not predate the merger, confirming the validity of our strategy to use the merger as a source of exogenous variation in ownership similarity. Second while the impact on extensive margin of job tranistion is short term and transitory the impact on extensive margin persist over time. Second, while the effect on the extensive margin of job transitions is short-term and transitory, the impact on the intensive margin persists over time. Similarly, the dynamics of job transition counts, which account for both margins, reveal that the immediate post-merger effect is primarily driven by the intensive margin, whereas over time, the extensive margin becomes the dominant driver as the intensive margin effect fades.

For my main analysis, I restrict the sample to firm-pairs with at least three job transitions between the two firms prior to the merger. This restriction is motivated by the desire to exclude firms that do not compete for a common pool of talent. Table (3) demonstrates that the results get stronger when we use alternative samples that include firms with a higher number of prior job transitions.

5.2 IV estimation: Quantifying the impact of ownership similarity on job transition

In this section, I use the predicted exposure to the merger's impact as an instrument for changes in ownership similarity between firm pairs before and after the merger. This approach allows me to quantitatively estimate the causal effect of employers' ownership similarity on employees' job mobility. Columns (1) to (3) in Table 4 present the results of our baseline instrumental variable regression, that I explained in section 4, where I use a binary variable to capture the cross-sectional variation in exposure to the merger's impact.

Panel A of Table 4 reports the second-stage estimation results. The findings indicate that a 1% increase in ownership similarity reduces job mobility by -4.31% ($e^{-.04403} - 1$). Of this decline, 2.95% is driven by the intensive margin, which persists over time, while the 0.54% comes from the extensive margin, which is statistically insignificant and fades over time.

Panel B reports the first-stage estimation, showing that our instrument, *Merger Impact* $\times$ *Post-merger* ($year > 2008$), has a positive and statistically significant effect on ownership similarity. This confirms that the merger triggered changes in the ownership similarity in the post-merger period and thus satisfies the relevance condition. A key concern with the relevance condition is the potential weak instrument problem. To address this, I report the Kleibergen-Paap F-test, which ranges between 37.50 and 42.15 in our baseline regressions, mitigating concerns about instrument weakness.

Columns 4-6 present the results using an alternative approach to capture the impact of the merger, where I replace the binary measure with the continuous measure of predicted increases in ownership similarity, $\Delta\chi$, that is derived in Equation (8). The second-stage results in Panel A of Table 4 show qualitatively similar patterns, with a smaller estimated impact on the count of job transitions and the intensive margin, but a stronger effect on the extensive margin. Moreover, the first-stage results in Panel B indicate that $\Delta\chi$ exhibits approximately a one-to-one correlation with ownership similarity, suggesting that the predicted changes were accurately realized after the merger. The Kleibergen-Paap F-test for the continuous measure ranges between 108.19 and 120.18, confirming the strength of the instrument.

6 Conclusion

This paper provide empirical evidence on the link between employes' overlapping ownership and employees' job mobility. Exploring the quasi experiment based on the merger of two large institutinal investor I find that increase in overlapping ownership between firms reduce the flow of employees between them. Overall, the papers highlight the role of overlapping ownership as an important channel that can facilitate the firms coordination in labor market to restrict employees outside iption and reduce labor mobility that has an implications for regulators and policy makers

This paper provides empirical evidence on the link between employers' overlapping ownership and employees' job mobility. Leveraging a quasi-experimental setting based on the 2009 merger of two large institutional investors, BlackRock and Barclays Global Investors (BGI), I document that increases in overlapping ownership between firms lead to significant reductions in employee flows. This study highlights the role of overlapping ownership as a critical mechanism that facilitates coordination among firms in the labor market. By reducing firms' incentives to compete for each other's employees, overlapping ownership restricts workers' outside options and diminishes their job mobility. These findings highlights the implications of rising employees' overlapping ownership for labor mobility and offer important insights for regulators and policymakers.

Figure 1

The implied effect of BlackRock-BGI merger on ownership similarity of S&P 500 companies

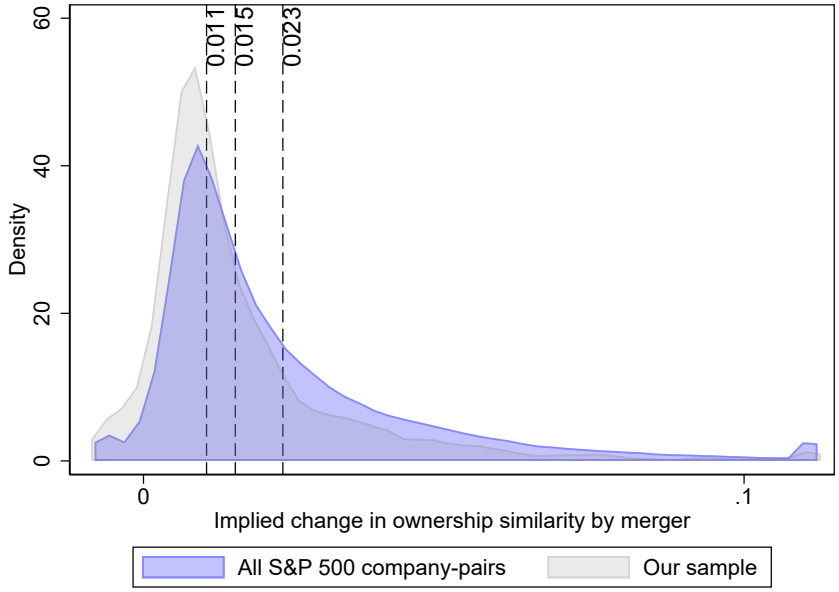
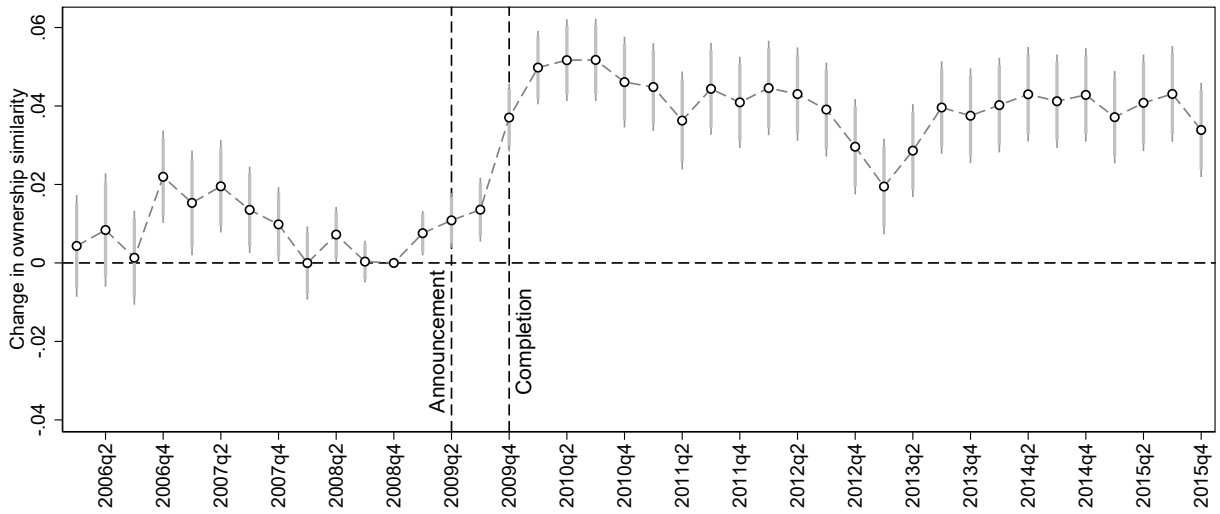


Figure shows the distribution of the implied change in ownership similarity ($\Delta\chi_{fg}$), , that is calculated in equation (8), based on the hypothetical BlackRock-BGI merger at the end of 2008. The distributions are color-coded to distinguish different samples. Blue represents all the S&P 500 company-pairs, while gray denotes the distribution for the S&P 500 company-pairs included in our analysis. The dashed lines represent the change in ownership similarity for the bottom tertile, median, and top tertile of all S&P 500 company pairs. Note that the average

Figure 2

The effect of BlackRock-BGI merger on ownership similarity of S&P 500 companies



The figure shows the quarter-by-quarter effect of BlackRock-BGI merger on ownership similarity of S&P 500 companies before and after the announcement and completion of the deal in June and December 2009. The impact is captured by the coefficients $\beta_{t'}$ in following regression

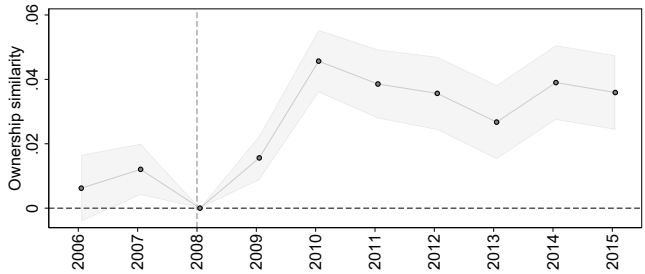
$$\chi_{fgt} = \beta\ MergerImpact_{fg} \times \sum_{t'=2006Q1}^{2015Q4} \beta_{t'} \times \mathbb{1}(t = t') + \lambda_{fg} + s^{j}_{ft} + s^{d}_{gt} + \varepsilon'_{fgt}$$

Where $MergerImpact_{fg}$ is a dummy variable that takes the value of 1 if the firm pairs are in the top tertile of the implied increase in ownership similarity after the BlackRock-BGI merger. The implied increase in ownership similarity ($\Delta\chi_{fg}$) calculated in equation (8) using the hypothetical BlackRock-BGI merger at the end of 2008; λ_{fg} indicates the firm-pair fixed effects; s^{j}_{ft} and s^{d}_{gt} denotes the 2-digit sector-quarter fixed effects for the firms f and g. χ refers to the cosin similarity between the ownership structure of two firms in quarter t. Note that the gray lines plot the 95% confidence interval.

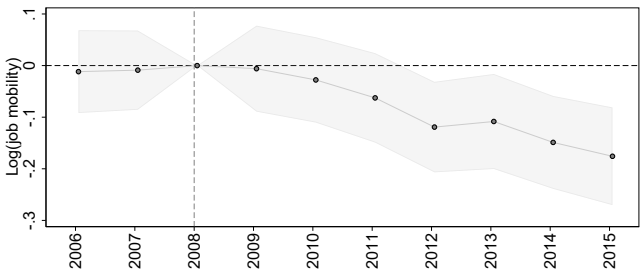
Figure 3

The effect of higher ownership similarity on job trnasitions

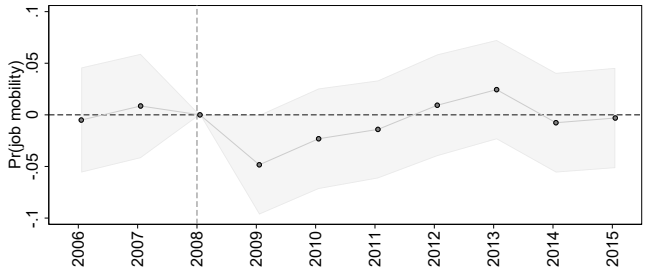
(a) Ownership similarity



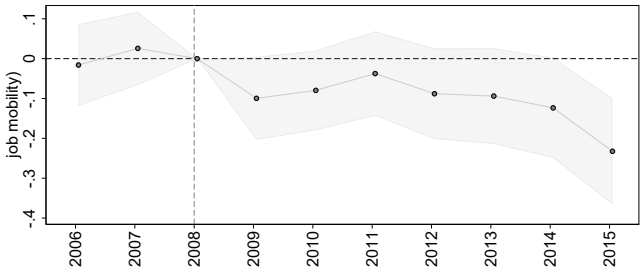
(b) Log(job transition)



(c) Pr(job transition)



(d) Number of job transitions



The figure shows the year-by-year effect of higher ownership similarity induce by the merger between 2006 and 2015. The impact is captured by the coefficients $\beta_{t'}$ in following regression

$$y_{fgt} = \beta\ MergerImpact_{fg} \times \sum_{t'=2006}^{2015} \beta_{t'} \times \mathbb{1}(t = t') + \lambda_{fg} + s^{j}_{ft} + s^{d}_{gt} + \varepsilon'_{fgt}$$

Where y_{fgt} is the average ownership similarity among firm-pairs f and g during year t in panel(a) , the logarithm of job transitions from origin firm f to destiation firm g during year t in panel(b), a dummy variable that takes the value of 1 if there is a job trnasition from firm f to firm g during year t in panel(c), and number of job trnasitions from origin firm f to destiation firm g during year t. $MergerImpact_{fg}$ is a dummy variable that takes the value of 1 if the firm pairs are in the top quartile of the implied increase in ownership similarity after the BlackRock-BGI merger. The implied increase in ownership similarity ($\Delta\chi_{fg}$) calculated in equation (8) using the hypothetical BlackRock-BGI merger at the end of 2008; λ_{fg} indicates the firm-pair fixed effects; s^{j}_{ft} and s^{d}_{gt} denotes the 2-digit sector-quarter fixed effects for the firms f and g. Note that the gray shade plot the 95% confidence interval.

Table 1

Summary statistics

	Obs	Mean	Median	Std.Dev.	Min	Max
Pr(Job transition)	36782	0.754	1.000	0.431	0.000	1.000
log(Job transition)	27740	1.135	1.099	1.020	0.000	8.103
χ	36782	0.689	0.711	0.148	0.083	0.900
$\Delta\chi$	36646	0.016	0.011	0.018	-0.006	0.105

Note: Pr(Job transition) is a dummy variable that takes the value of 1 if there is any transition from firm i to firm j in year t, and zero otherwise. log(Job transition) is the logarithm of the number of job transitions from firm i to firm j in year t. χ is a ownership similarity between firm i and firm j in year t. $\Delta\chi$, the "Impact of Merger" is a continuous variable measuring the predicted increase in ownership similarity after the merger. The predicted change in ownership similarity is calculated in the last quarter of 2008, prior to the merger. Implied changes reflect the difference between counterfactual ownership similarities when consolidating BlackRock and BGI ownership stakes in 2008Q4 and the actual ownership similarities in 2008Q4.

Table 2

Baseline regressions: Effect of ownership similarity on job mobility

	(1) Ownership similarity b/se	(2) Log(Job transitions) b/se	(3) Pr(Job transitions) b/se	(4) Number of Job transitions b/se
Merger Impact×				
Post merger (year≻ 2008)	0.028***	-0.086***	-0.012	-0.116***
	(0.004)	(0.026)	(0.013)	(0.044)
Company pairs FE	Yes	Yes	Yes	Yes
Origin sector × year FE	Yes	Yes	Yes	Yes
Destiniation sector × year FE	Yes	Yes	Yes	Yes
Observations	36588	27549	36588	36524

Note: The dependent variables in columns (1) is the average cosine similarity between the ownership structure of two firms during the year t. The dependent variable in columns (2) is the logarithm of the number of job transitions from origin firm i to destination firm j in year t. The dependent variable in columns (3) is a dummy variable that takes the value of 1 if there is any transition from origin firm i to destination firm j, and zero otherwise. The dependent variable in columns (4) is the number of job transitions from origin firm i to destination firm j. "Impact of Merger" is a dummy variable that takes the value of 1 if the firm pairs are in the top tertile of predicted increase in ownership similarity after the BlackRock-BGI merger, and zero otherwise. The predicted change in ownership similarity is calculated at the end of 2008, prior to the merger. Predicted changes reflect the difference between counterfactual ownership similarities when consolidating BlackRock and BGI ownership stakes and the actual ownership similarities. The coefficients in columns (1), (2), and (3) are estimated using OLS regressions. The reported coefficients in column (4) is estimated using Poisson QMLE. . The The coefficients in columns (2), (3), (5), and (6) are estimated using OLS regressions.To facilitate interpretation, I normalized the continuous variable for the "Impact of Merger" in the second row by its standard deviation. The standard errors are clustered at the firm-pairs. *** and ** denote statistical significance at the 1, 5 percent levels respectively.

Table 3

Alternative sample: Effect of ownership similarity on job mobility

	Number of job transitions prior to merger				
	≥ 0	≥ 2	≥ 3	≥ 4	≥ 6
			baseline		
Dependent variable: Log(job transitions)	(1) b/se	(2) b/se	(3) b/se	(4) b/se	(5) b/se
Merger Impact×					
Post merger (year$\succ$ 2008)	-0.042***	-0.066***	-0.086***	-0.103***	-0.123***
	(0.016)	(0.021)	(0.026)	(0.031)	(0.040)
Company pairs FE	Yes	Yes	Yes	Yes	Yes
Origin sector × Year FE	Yes	Yes	Yes	Yes	Yes
Destiniation sector × Year FE	Yes	Yes	Yes	Yes	Yes
Observations	60908	36034	27549	21883	14945

Note: The dependent variable in all columns is the logarithm of job transitions from firm i to firm j in quarter t. The "Impact of Merger" variable is a dummy variable that takes the value of 1 if the firm pairs are in the top tertile of predicted increase in ownership similarity after the BlackRock-BGI merger, and zero otherwise. The predicted change in ownership similarity is calculated in the last quarter of 2008, prior to the merger. Implied changes reflect the difference between counterfactual ownership similarities when consolidating BlackRock and BGI ownership stakes in 2008Q4 and the actual ownership similarities in 2008Q4. The standard errors are clustered at the firm-pairs. *** and ** denote statistical significance at the 1, 5 percent levels respectively.

Table 4: IV regressions

	(1) Log(Job transitions)	(2) Pr(Job transitions)	(3) Number of Job transitions	Log(Job transitions)	Pr(Job transitions)	Number of Job transitions
	b/se	b/se	b/se	b/se	b/se	b/se
Panel A : Second-stage estimation						
Ownership similarity	-2.945***	-0.542	-4.403***	-1.991***	-0.710***	-3.341***
	(1.006)	(0.443)	(1.360)	(0.555)	(0.268)	(0.829)
Panel B: First-stage estimation, Dependent variable: Ownership similarity						
Merger Impact: Top tertile of $\Delta\chi$						
Merger Impact×Post merger	0.030***	0.029***	0.029***			
	(0.005)	(0.004)	(0.004)			
Merger Impact: $\Delta\chi$						
Merger Impact×Post merger				1.102***	0.986***	0.986***
				(0.100)	(0.095)	(0.095)
Company pairs FE	Yes	Yes	Yes	Yes	Yes	Yes
Origin sector × Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Destiniation sector × Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	27704	36765	36765	27704	36765	36765
F-test	37.50	42.15	42.15	120.18	108.19	108.19

Note: The dependent variable in columns (1) and (4) is the logarithm of the number of job transitions from firm i to firm j in quarter t. The dependent variable in columns (2) and (5) is a dummy variable that takes the value of 1 if there is any transition from firm i to firm j in quarter t, and zero otherwise. The dependent variable in columns (3) and (6) is the number of job transitions from firm i to firm j in quarter t. The reported coefficients in columns (3) and (6) are estimated using Poisson QMLE and standard errors are bootstrapped using 500 replications.In In columns (4) to (6), The "Impact of Merger" variable a dummy variable that takes the value of 1 if the firm pairs are in the top tertile of predicted increase in ownership similarity after the BlackRock-BGI merger, and zero otherwise. In columns (4) to (6), The "Impact of Merger" variable is a continuous variable measuring the predicted increase in ownership similarity after the merger. The predicted change in ownership similarity is calculated in the last quarter of 2008, prior to the merger. Implied changes reflect the difference between counterfactual ownership similarities when consolidating BlackRock and BGI ownership stakes in 2008Q4 and the actual ownership similarities in 2008Q4. The standard errors are clustered at the firm-pairs. *** and ** denote statistical significance at the 1, 5 percent levels respectively.

References

Antón, M., Ederer, F., Giné, M., and Schmalz, M. (2023). Common ownership, competition, and top management incentives. *Journal of Political Economy*, 131(5):1294–1355.

Antón, M., Ederer, F., Giné, M., and Schmalz, M. (2024). Innovation: the bright side of common ownership? *Management Science*.

Ashenfelter, O., Card, D., Farber, H., and Ransom, M. R. (2022). Monopsony in the labor market. *THE JOURNAL OF HUMAN RESOURCES*, 5:7.

Azar, J., Qiu, Y., and Sojourner, A. (2021). Common ownership reduces wages and employment. Technical report, Working paper, University of Navarra, Temple University, and University of ....

Azar, J., Schmalz, M. C., and Tecu, I. (2018). Anticompetitive effects of common ownership. *The Journal of Finance*, 73(4):1513–1565.

Azar, J. and Vives, X. (2021). General equilibrium oligopoly and ownership structure. *Econometrica*, 89(3):999–1048.

Backus, M., Conlon, C., and Sinkinson, M. (2021). Common ownership in america: 1980–2017. *American Economic Journal: Microeconomics*, 13(3):273–308.

Begley, T. A., Haslag, P. H., and Weagley, D. (2024). Directing the labor market: The impact of shared board members on employee flows. *Available at SSRN 4530518*.

Ben-David, I., Franzoni, F., Moussawi, R., and Sedunov, J. (2021). The granular nature of large institutional investors. *Management Science*, 67(11):6629–6659.

Bertrand, M., Duflo, E., and Mullainathan, S. (2004). How much should we trust differences-in-differences estimates? *The Quarterly journal of economics*, 119(1):249–275.

Bivens, J. and Mishel, L. (2015). Understanding the historic divergence between productivity and a typical worker's pay: Why it matters and why it's real. *Economic Policy Institute*, 2.

Blume, M. E. and Keim, D. B. (2012). Institutional investors and stock market liquidity: trends and relationships. *Jacobs Levy Equity Management Center for Quantitative Financial Research Paper*.

Boller, L. and Morton, F. S. (2020). Testing the theory of common stock ownership. Technical report, National Bureau of Economic Research.

Callaci, B., Gibson, M., Pinto, S., Steinbaum, M., and Walsh, M. (2024). The effect of franchise no-poaching restrictions on worker earnings. *Review of Economics and Statistics*, pages 1–35.

Carvalho, D. R. (2023). Talent management under uncertainty. *Available at SSRN 4494641*.

CEA, U. (2016). Labor market monopsony: trends, consequences, and policy responses. *White House Council of Economics Advisors*.

Deming, D. J. (2023). Why do wages grow faster for educated workers? Technical report, National Bureau of Economic Research.

Doidge, C., Karolyi, G. A., and Stulz, R. M. (2017). The us listing gap. *Journal of Financial Economics*, 123(3):464–487.

DOJ, U. and FTC, U. (2016). Antitrust Guidance for Human Resource Professionals. Technical report.

DOJ and FTC (2023). 2023 Draft Merger Guidelines. Discussion paper.

Ederer, F. and Pellegrino, B. (2021). A tale of two networks: Common ownership and product market rivalry. *SSRN Electronic Journal*.

Ferrés, D., Kankanhalli, G., and Muthukrishnan, P. (2022). Anti-poaching agreements, corporate hiring, and innovation: Evidence from the technology industry. Technical report, Tech. rep.

Fichtner, J., Heemskerk, E. M., and Garcia-Bernardo, J. (2017). Hidden power of the big three? passive index funds, re-concentration of corporate ownership, and new financial risk. *Business and politics*, 19(2):298–326.

Friedman, M. (1953). *Essays in positive economics*. University of Chicago press.

Gibson, M. (2024). Employer market power in silicon valley. *Available at SSRN 4765016*.

Goshen, Z. and Levit, D. (2022). Agents of inequality: Common ownership and the decline of the american worker. *Duke LJ*, 72:1.

Gutiérrez, G. and Philippon, T. (2016). Investment-less growth: An empirical investigation. Technical report, National Bureau of Economic Research.

Gutiérrez, G. and Philippon, T. (2018). Ownership, concentration, and investment. In *AEA Papers and Proceedings*, volume 108, pages 432–437. American Economic Association 2014 Broadway, Suite 305, Nashville, TN 37203.

Haslag, P. H., Sensoy, B. A., and White, J. T. (2022). Human capital disclosure and workforce turnover. *Vanderbilt Owen Graduate School of Management Research Paper*.

He, J. and Huang, J. (2017). Product market competition in a world of cross-ownership: Evidence from institutional blockholdings. *The Review of Financial Studies*, 30(8):2674–2718.

He, Z. and Wintoki, M. B. (2023). Who benefits from removing restrictions in labor mobility? *Available at SSRN 3209480*.

Herrera-Caicedo, A., Jeffers, J., and Prager, E. (2024). Collusion through common leadership.

Lewellen, K. and Lowry, M. (2021). Does common ownership really increase firm coordination? *Journal of Financial Economics*, 141(1):322–344.

López, Á. L. and Vives, X. (2019). Overlapping ownership, r&d spillovers, and antitrust policy. *Journal of Political Economy*, 127(5):2394–2437.

Newham, M., Seldeslachts, J., and Banal-Estanol, A. (2018). Common ownership and market entry: Evidence from pharmaceutical industry.

O'brien, D. P. and Salop, S. C. (1999). Competitive effects of partial ownership: Financial interest and corporate control. *Antitrust LJ*, 67:559.

Oi, W. (1996). Labor as a quasi-fixed factor, journal of political economy, 70, 538-55. *International Library of Critical Writings in Economics*, 65:33–50.

Rotemberg, J. (1984). Financial transaction costs and industrial performance.

Sharma, G. (2024). Collusion among employers in india.

Starr, E. P., Prescott, J. J., and Bishara, N. D. (2021). Noncompete agreements in the us labor force. *The Journal of Law and Economics*, 64(1):53–84.

Steinbaum, M. (2021). Common ownership and the corporate governance channel for employer power in labor markets. *The Antitrust Bulletin*, 66(1):123–139.

Topel, R. H. and Ward, M. P. (1992). Job mobility and the careers of young men. *The Quarterly Journal of Economics*, 107(2):439–479.

Wachter, T. v. and Bender, S. (2006). In the right place at the wrong time: The role of firms and luck in young workers' careers. *American Economic Review*, 96(5):1679–1705.