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Policy Brief: Employer Market Power in Silicon Valley

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Matthew Gibson
Williams College and IZA

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ABSTRACT

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Adam Smith alleged that secret employer collusion to reduce labor earnings is common. This paper examines an important case of such behavior: no-poach agreements through which technology companies agreed not to compete for each other's workers. Exploiting the plausibly random timing of a US Department of Justice investigation, I estimate that these agreements cost affected workers approximately 5 percent of annual salary. Stock bonuses and ratings of job satisfaction were also negatively affected.

Corresponding author:
Matthew Gibson
Department of Economics
Williams College
24 Hopkins Hall Drive
Williamstown MA 01267
USA

E-mail: mg17@williams.edu

I would be very pleased if your recruiting department would stop doing this.
–Steve Jobs (Apple), in an email to Eric Schmidt (Google; 2005)

Steve, as a followup we investigated the recruiter's actions and she violated our policies. Apologies again on this. . . Should this ever happen again please let me know immediately and we will handle. . . . On this specific case, the sourcer who contacted this Apple employee should not have and will be terminated within the hour.
–Schmidt reply to Jobs

:)
–Jobs reply to Schmidt

- From at least 2005 through 2009, eight large technology firms implemented secret, illegal "no-poach" agreements under which they did not compete for each other's workers.

- These agreements reduced worker salaries by approximately 5 percent.

- Total worker losses were roughly $2.7 billion, but colluding firms paid just $435 million in damages.

- Stock bonuses and job satisfaction were also negatively affected.

"We rarely hear...of the combinations of masters, though frequently of those of work-men," writes Adam Smith, "But whoever imagines...that masters rarely combine [to lower wages], is as ignorant of the world as of the subject. ...These are always conducted with the utmost silence and secrecy...and when the workmen yield...they are never heard of by other people" [Smith, 1790]. Recent years have seen renewed interest in the causes and consequences of employer market power, including declining unionization, mergers, and non-compete clauses. But this literature has not investigated the case Smith considered so common: secret coordination of managers aimed at reducing labor earnings. Today such behavior is difficult to study because it is typically illegal, giving firms powerful incentives to hide it from both government officials and researchers. The 2005-2009 "no-poach" agreements among Silicon Valley technology firms provide a rare opportunity to examine the clandestine exercise of employer market power.

The following firms were party to at least one no-poach agreement: Adobe, Apple, eBay, Google, Intel, Intuit, Lucasfilm and Pixar. Concluded at the highest levels of management, including boards and CEOs, the agreements prohibited participating firms from recruiting or hiring each other's employees. Managers informed recruiters which potential hires were off-limits and some recruiting departments maintained written lists. In cases where a firm violated an agreement, its counterparty often contacted a senior manager at the violating firm, who would then put a stop to the violation [US Department of Justice, 2010, 2012]. This use of market power was remarkably simple and cheap, relying on well-defined commitments from a small number of individuals. It required no elaborate salary schedules. The ease with which these firms coordinated stands in some contrast to the difficulty of sustaining coordination in many textbook theoretical models of firm behavior.[1]

Prompted by a whistleblower, a US Department of Justice (DOJ) investigation began to unravel the no-poach agreements in early 2009. National media revealed the antitrust investigation on June 3, 2009 and the DOJ filed its civil complaint in US v. Adobe Systems on Sept. 24, 2010 [US Department of Justice, 2010]. This was followed by a civil class action in 2011, with settlements in 2015 and 2018. While the DOJ did not undertake a criminal prosecution in response to the no-poach agreements, it had the authority to do so under the Sherman Act. The DOJ made this explicit in 2016 guidance for human resources departments: "Going forward, the DOJ intends to proceed criminally against naked wage-fixing or no-poaching agreements. These types of agreements eliminate competition in the same irredeemable way as agreements to fix product prices or allocate customers, which have traditionally been criminally investigated and prosecuted as hardcore cartel conduct" [U.S. DOJ and U.S. FTC, 2016].

By comparing employees at colluding firms to others in the tech sector, before and after the no-poach agreements dissolved, I estimate effects on salaries, stock bonuses, and ratings of job satisfaction. This research design relies on the plausibly random timing of the DOJ investigation, which forced defendant firms to end the agreements. My findings are important because the information technology sector is a large and growing part of the US economy. From 1997 to 2019, value added in this sector rose from $232 billion to $1.7

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[1]Adam Smith also commented on the enforcement of collusive agreements among employers: "To violate this combination is every where a most unpopular action, and a sort of reproach to a master among his neighbours and equals" [Smith, 1790].

trillion. This study's findings may assume more general significance because recent evidence suggests growing scope for employer market power in the US. The DOJ identified reduced coordination costs from market concentration as a contributor to the technology-sector no-poach agreements. From 1997 to 2012, the revenue share of the top 50 firms increased in the majority of US industries [US CEA, 2016]. Workers in a majority of US occupations face labor markets that are "highly concentrated" under DOJ guidelines [Azar et al., 2020]. Growing use of arbitration and non-compete clauses may also be increasing employer market power [US CEA, 2016].

My primary data come from Glassdoor, an online aggregator of wage and salary reports from workers. Reports cover employer, work location, job, salary, and years of experience. Glassdoor uses machine-learning models to classify users' jobs at three increasingly granular levels: general occupation, specific occupation, and job. Some users report non-salary compensation variables, including stock and cash bonuses.[2] My estimation sample comprises Glassdoor reports by regular, full-time employees 2007-2018 in US industries containing at least one colluding firm: "Computer Hardware & Software", "Internet", and "Motion Picture Production & Distribution." A second Glassdoor data set contains user ratings of jobs and job attributes: career opportunities, compensation and benefits, senior leadership, and work-life balance. Ratings range from one to five stars. These data begin a year later, in 2008. Users are a subset of those who contribute salary reports.

Figure 1 shows how the difference between salaries at "treatment" (colluding) firms and "control" (non-colluding) firms evolved over time. The treatment group is comprised of Adobe, Apple, eBay, Google, Intel, Intuit, Lucasfilm and Pixar. The three most frequently observed control-group firms are Amazon, Microsoft, and Cisco. The effect of the no-poach agreements is visible in the left-hand region of Figure 1, where treatment-group salaries are below control-group salaries by approximately five percent. As the average number of no-poach agreements in the treatment group was very close to two, the effect of each agreement was a salary reduction of roughly 2.5 percent.[3] DOJ documents indicate that the no-poach agreements ended in 2009, but that at least some continued after the investigation was publicly revealed in June [US Department of Justice, 2012]. Therefore I assume that all agreements continued through the end of that year, as indicated by the vertical dashed line. Treatment-group salaries began to converge to control-group salaries after 2009, but estimates remain substantially negative in 2010 and 2011. By 2012 estimates are consistent with full convergence. Glassdoor data on non-salary compensation are much less complete, but I find that stock bonuses were approximately 40 percent lower during the no-poach agreements.

The magnitude of these no-poach effects is striking because affected workers are well educated and highly paid. Thirty-one percent have an advanced degree and the mean salary in the larger sample is $93,158 (2009 US$). One might expect these characteristics to make them less vulnerable than other workers to employer market power. My estimates are in the range of the firm- and year-specific effects on total compensation estimated by the plaintiffs' expert report from the class action: from -1.6 to -20.1 percent, with most from -1.6 to -10

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[2]I convert all nominal amounts to 2009 US dollars using the chained personal consumption expenditures deflator from the US Bureau of Economic Analysis.

[3]Please see the working paper for complete per-agreement regression results and standard errors.

percent.

The following approximate calculation estimates aggregate damages based on salary alone. The plaintiffs' expert report estimates 109,048 members of the class and $52 billion in affected earnings. Earnings in the absence of the agreements would then have been $\frac{\$52bn}{1-.05} = \$54.74bn$ and employee losses were $2.74bn$, or approximately $5,000 per employee-year. This estimate should be viewed as a lower bound. It excludes not only non-salary compensation, but also additional job search costs incurred by affected workers. Even ignoring these omissions, my damage estimate is substantially greater than the $435 million the defendants paid to settle the case.[4] This gap raises the question of whether civil penalties will meaningfully deter future exercise of employer market power.

Earnings damages from the no-poach agreements represent a transfer from labor to owners of other production inputs like land and capital. Given the high mean salary among affected workers, one could argue that the consequences of earnings lost to the no-poach agreements are in some sense small. For many technology workers this argument is unconvincing because high urban housing costs greatly reduce the real purchasing power of six-figure nominal salaries. For example, in June 2018 the US Department of Housing and Urban Development revised its eligibility threshold for low-income housing assistance to $117,400 for Marin, San Mateo, and San Francisco counties.

Finally Figure 2 presents estimated effects on job satisfaction ratings. Perhaps unsurprisingly, the largest difference is for compensation and benefits: -.2 stars, or -5.4 percent of the sample mean. In proportional terms this is strikingly similar to the effect on salaries. My estimate is consistent with employees being aware their salaries were depressed relative to their own reference points. This may have caused employees to exert more effort searching for new jobs, and from the social point of view this effort was wasted. Figure 2 also shows a negative effect on ratings of opportunities, -.1 stars (-3.8 percent of the mean). This could reflect both decreased internal opportunities, e.g. reduced promotion opportunities from senior employees leaving less frequently, and decreased external opportunities caused directly by the no-poach agreements. The estimate for senior leadership is small and not statistically distinguishable from zero. This is consistent with most employees remaining ignorant of the no-poach agreements; it is difficult to imagine that leadership ratings would not have suffered, had the agreements been widely known. In light of the negative effects on ratings of opportunities and compensation, the small negative estimate for overall job rating is striking: -.03 stars. There are many possible reasons for this contrast, but at minimum it suggests that ratings of overall job satisfaction may not be a useful indicator of employer market power.

Employer market power has drawn the interest of economists since Adam Smith [Smith, 1790] and Joan Robinson [Robinson, 1933], but it has attracted renewed attention of late. Using novel compensation data from Glassdoor, this study estimates the effects of secret, illegal no-poach agreements among Silicon Valley technology companies. Estimated effects are large and negative for both salaries and stock bonuses. They suggest that the increasing market concentration in many US industries creates scope for increased use of employer market power, with potential negative impacts on workers and broad social welfare. My

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[4]Apple, Google, Intel and Adobe settled together for $415 million in 2015. The other defendants settled for $20 million.

analysis lends weight to calls for greater policy and research scrutiny of employer market power and its sources, including mergers, mobility constraints, information frictions, and non-compete clauses.
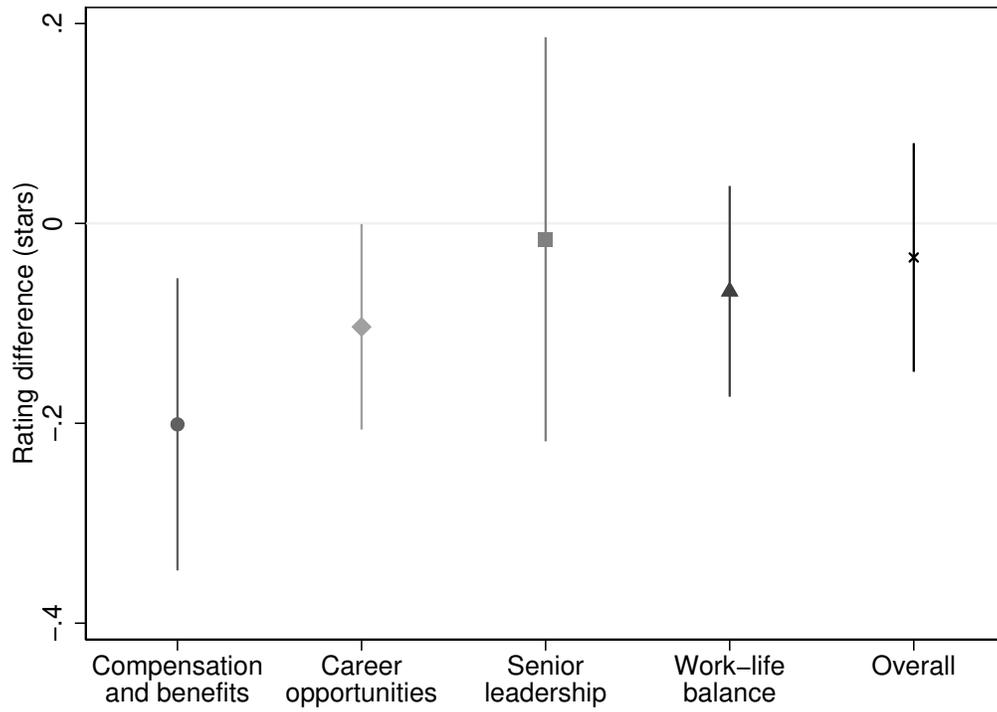
References

José Azar, Ioana Marinescu, Marshall Steinbaum, and Bledi Taska. Concentration in US labor markets: Evidence from online vacancy data. *Labour Economics*, 66, 2020.

Joan Robinson. *The Economics of Imperfect Competition*. Macmillan, 1933.

Adam Smith. *The Wealth of Nations*. Folio Society, 3rd edition, 1790.

US CEA. Labor market monopsony: trends, consequences, and policy responses. Technical report, 2016.

US Department of Justice. Complaint, United States of America v. Adobe Systems, Inc., 2010.

US Department of Justice. Complaint, United States of America v. eBay, Inc., 2012.

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

Figure 1: Ending no-poach agreements increased salaries
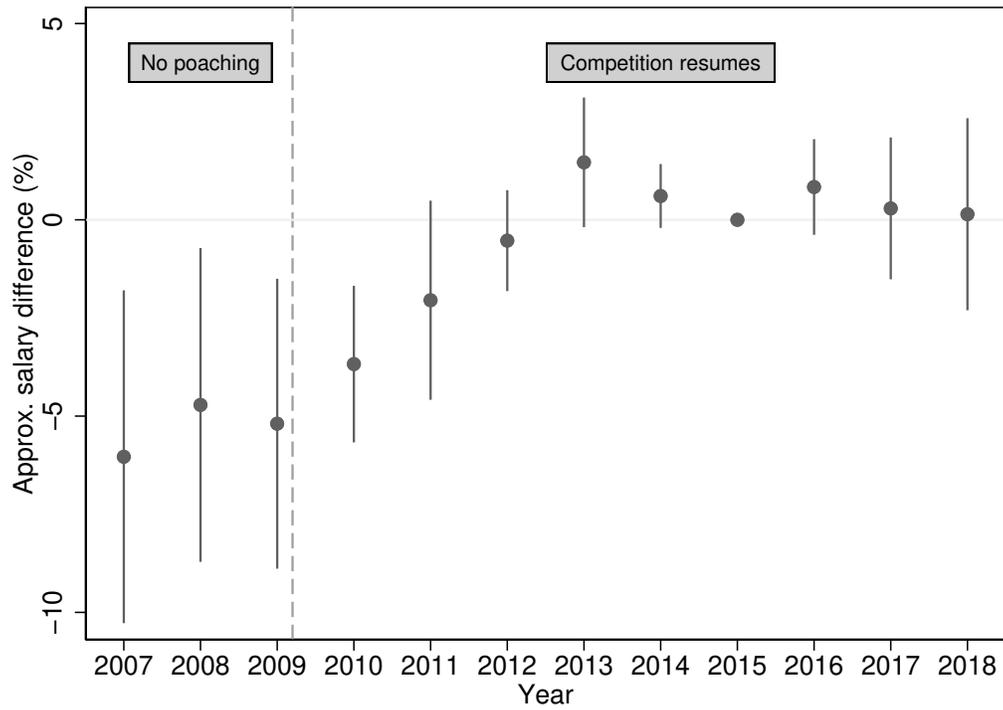
Note: Dots represent approximate percentage salary differences between firms that took part in at least one no-poach agreement and other technology firms. Whiskers represent 95 percent confidence intervals. Differences are estimated using Glassdoor data in a model that controls for job-level salary differences, both across firms and over time. The vertical dashed line represents the end of the no-poach agreements in response to an investigation by the US Department of Justice.

Figure 2: No-poach agreements decreased job ratings

Note: Dots represent ratings differences between firms that took part in at least one no-poach agreement and other technology firms. Ratings range from 1 to 5 stars, with averages across all firms from 3 to 3.5 stars, depending on category. Whiskers represent 95 percent confidence intervals. Effects are estimated using Glassdoor data in a model that controls for job-level rating differences, both across firms and over time.