Employer Consolidation and Innovation: Evidence from Inventor-Level Data*

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Abstract

In this paper, we study the impact of mergers and acquisitions on the earnings, employment, and innovative outputs of inventors. To do this, we match around 3,300 mergers and acquisitions between innovative companies which employ over 130,000 inventors to matched employer-employee data from the US Census. We document four key findings. First, both target and acquirer inventors experience a decline in earnings following M&As, both unconditionally and conditional on staying at the original firm. Second, both target and acquirer inventors experience a decline in the number of patents following M&As. Third, the separation rates of target and acquirer inventors from their original firms decrease following M&As, although the effect is temporary for target inventors. Fourth, we develop a novel measure of concentration based on inventors' patent technology classes and find that the negative effects on earnings, patents, and separation rates are concentrated among target and acquirer inventors of M&As where there is a large increase in concentration due to the merger. Our results are consistent with M&As leading to increased market power and depressing inventors' earnings and innovative output by diminishing their outside options, and suggest that market power for innovative labor should be an important consideration for M&As.

Keywords: Innovation, Mergers and Acquisitions, Labor Market Concentration

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Introduction

Innovation is a key driver of economic growth and firms' competitive advantage. Innovative firms are increasingly acquired by incumbent firms rather than going to IPOs (Ederer and Pellegrino, 2023). These acquisitions have spurred policy debates as some argue that the incumbent firms acquire potential competitors to protect their dominant position in innovation instead of realizing synergies (Cunningham et al., 2021). In this paper, we ask how mergers and acquisitions affect the employment, earnings, and innovation trajectories of inventors. We focus on inventors because innovative human capital is the engine of innovation and an essential input to firm R&D (Van Reenen, 2022).

We use individual-level, longitudinal data from the U.S. Census Bureau to estimate the impact of M&As on inventor outcomes. The data offer two unique advantages. First, we are able to link patent inventors to survey, census, and administrative employee-employer information at the Census Bureau building on the linkages developed in Akcigit and Goldschlag (2023a). The data allow us to unpack the black box of innovative activity and track inventors' employment and earnings outcomes over time.[1] Second, the administrative data allow us to capture a comprehensive set of mergers and acquisitions. In particular, many acquisitions of smaller firms are unreported and not subject to antitrust review (Wollmann, 2019), so we are able to identify smaller M&A deals not captured in standard M&A databases such as the SDC Platinum.

We analyze the effects of M&As on inventor outcomes by comparing the inventors of target and acquirer companies to "counterfactual" inventors who have similar characteristics but do not experience a merger event. Specifically, we match each inventor of the target or acquirer company in the year before the merger to a counterfactual inventor who has the same age, works in the same industry, has similar earnings, employer size, and number of patents, and is not involved in a merger in the five years before or after the event. We

[1] Previous studies have used the patent data to identify inventors' employers based on patent assignees, but the method requires the inventor to file patents in a given year.

then estimate the differences in inventor outcomes between target or acquirer inventors and respective counterfactual inventors over time using a dynamic difference-in-differences specification. The key identification assumption is that inventors in merging firms and matched counterfactual inventors would have had similar trends in terms of employment, earnings, and patenting in the absence of the merger.

Our final sample consists of around 3000 mergers and acquisitions between U.S. innovative firms during the period of 2005–2020. We define an inventor as an employee of the target or acquirer firm who have at least one patent during the 5-year window before the merger event. There are 21,500 unique inventors in the target firms and 109,000 unique inventors in the acquirer firms. An average inventor has 0.7 patents per year.

We assess three dimensions of inventor outcomes—earnings, patents, and turnovers—for both target and acquirer inventors. To our knowledge, these have never been systematically studied together in empirical work on M&A and innovation, and certainly not in a setting with rich administrative data. These outcomes are important to consider together because they provide a holistic picture of the impact of M&As on the career and earnings trajectories of inventors as well as the innovation and profits of their employers.

We find that M&As reduce the earnings of inventors of both the target and acquirer firms. Supporting our identification assumption, the earnings of treated and counterfactual inventors exhibit similar trends before the merger. Target inventors' earnings see a temporary increase of 5% in the first year after the merger, followed by a decrease by 5% a few years after the merger. Inventors at acquirer firms also experience a 2–5% reduction in earnings in the years following the merger.

M&As also have a negative and significant effect on the number of patents filed by inventors. For both acquirer and target inventors, the number of patents per year decline by about 0.1 after the merger, which is 12–14% of the mean. The negative effect on patenting is persistent over time and is mostly concentrated in low-citation patents.

We then examine whether inventors are more likely to stay with their original employer following M&As. Previous studies document that M&As are associated with increased employee turnovers (Kim, 2024). Surprisingly, we see no change in separation rates for target inventors and a negative and significant effect on separation rates for acquirer inventors. Five years after the merger, acquirer inventors are 10% less likely to move to other firms. As a result, the number of patents by acquirer inventors belonging to the acquirer firm increases relative to counterfactual inventors even though the acquirer inventors have fewer patents in total.

We decompose the effect on earnings and patents into three components—the effect on job stayers, the effect on job movers, and the effect due to changes in separation rates. We find that stayers contribute the most to the decline in earnings and patents (i.e., inventors who stay at the merged firm have lower earnings and patenting than counterfactual inventors who stay at their original employer), whereas movers explain the rest of the decline. The difference in separation rates explains none of the effect in the case of target inventors and leads to an increase in earnings and patents in the case of acquirer inventors, because acquirer inventors have lower separation rates and stayers generally have higher earnings and more patents than movers.

We propose three nonmutually exclusive channels through which M&As could affect inventors' earnings and productivity. First, M&As may lead to higher innovation efficiency through synergies and internalizing innovation spillovers. Second, the acquirer firm could outsource its R&D to the target firm. Finally, M&As could enhance the market power of the acquirer firm in the innovation market and the labor market for inventors.

While all three channels could be at play to some degree, the negative effects on earnings and patents point against a pure synergy story. The decrease in earnings and patents of target inventors is also inconsistent with a pure outsourcing story, which predicts that acquirer firm should increase innovation at the target firm and pay their inventors more to retain them. Our results are best aligned with the market power channel, where two firms that were in a patent race before the merger reduce R&D efforts in order to increase market power or cut duplicate costs. The increase in labor market concentration reduces outside options of inventors, leading to lower earnings and lower separation rates.

We further test the market power channel by comparing inventors for whom the merger has a high impact on labor market concentration with inventors for whom the merger has little impact on concentration. We measure concentration based on inventors' patent classes: an inventor is in a more concentrated market if inventors working in the same technology class are concentrated in a small number of firms. A merger has a high impact on concentration for an inventor when both the target and the acquirer are important players in the field of the focal inventor. Consistent with the market power channel, we find that high-impact inventors in target and acquirer firms suffer larger declines in earnings and patents and have lower separation rates. Since the concentration measure varies by inventors' fields, we can include firm fixed effects or firm-by-commuting-zone fixed effects to control for firm-specific or firm-location-specific shocks, and find that the results remain robust even when comparing across inventors within the same firm and the same commuting zone.

The main contribution of this paper is to provide evidence that M&As between innovative firms have a significant impact on market power in innovation. Antitrust authorities have historically focused on market power in the consumer market and recently also in the labor market (Naidu et al., 2018), but the effect on innovation receives less attention. Our results show that M&As alter the career trajectories of inventors: both target and acquirer inventors suffer from lower earnings and patenting productivity which persist over time. On the other hand, the merging firms benefit from (i) stronger dominance in innovation and potential cost reduction due to cutting duplicate costs; (ii) paying inventors less due to stronger labor market power; and (iii) higher retention rates of inventors and appropriation of their innovation outputs.

We contribute to several branches of literature. First, our paper is most closely related to the literature on how acquisitions affect innovation. Several papers document synergistic gains from mergers (Bena and Li, 2014; Li et al., 2023) or the outsourcing of R&D from acquirers to targets (Higgins and Rodriguez, 2006; Phillips and Zhdanov, 2013). Our results are consistent with Seru (2014), who shows that target inventors have lower patenting productivity after M&As, but we further show that acquirer inventors also have lower productivity and highlight the channel through which innovative firms benefit from M&As despite lower productivity of inventors. Our results are also related to Cunningham et al. (2021), who document that firms in the pharmaceutical industry engage in "killer" acquisitions to eliminate future competition. Our results show that the anti-competitive effects of M&As on innovation are prevalent using a comprehensive sample of M&As although most are not as extreme as killer acquisitions, and we also examine the effects of these mergers on inventors' careers.

Second, we contribute to the literature on the determinants of inventors' productivity and careers. With the availability of large administrative datasets characterizing the population inventors, recent work sheds light on the origins of inventors (Bell et al., 2019), the individual returns to innovative activity (Kline et al., 2019), the role of team-specific human capital (Jaravel et al., 2018; Baghai et al., 2024), the effect of wealth on inventor productivity (Bernstein et al., 2021), and reallocation of inventors across firms (Hombert and Matray, 2017; Xue, 2024). Bernstein (2015) and Akcigit and Goldschlag (2023b) show that where inventors work matter for their productivity and earnings: when inventors' employers go public or they move from a young firm to an incumbent firm, their earnings increase and innovative outputs decline. Our evidence show that changes in market structure and firm competition due to M&As have large and persistent effects on inventors' careers and productivity.

Third, we contribute to the literature on labor market power. Recent papers have documented strong negative associations between labor market concentration and wages (Azar et al., 2022; Benmelech et al., 2022; Schubert et al., 2024). Arnold (2019) and Prager and Schmitt (2021) show that M&As that increase labor market concentration more lead to lower worker earnings. We develop a novel measure of labor market concentration for inventors based on their patent technology classes. M&As are likely to have a stronger effect on labor market concentration for inventors than the average worker since inventors work in specialized fields and have more highly-concentrated labor markets. Our evidence suggests that stronger labor market power not only lowers earnings but also reduces inventors' productivity and innovation outputs. This resonates with contemporaneous work by Johnson et al. (2023) and Ma et al. (2024) showing that measures to restrict labor mobility and increase labor market power (through non-compete agreements or firm-specific human capital) affect the level and type of innovation outputs.

The remainder of the paper is organized as follows. Section 1 describes our data. Section 2 describes our empirical strategy to estimate the effect of M&As on inventor outcomes. Section 3 presents the main results on the effects of M&As on inventors' employment, earnings, and patenting productivity. Section 4 investigates potential mechanisms behind the main result. Section 5 concludes.

1 Data

To study the impact of M&As on inventors, we use firm- and worker-level data from the US Census Bureau. The firm-level dataset is the Longitudinal Business Database (LBD). The dataset covers all non-farm establishments with paid employees in the US from 1987 to 2021. An establishment is defined as a specific physical location where business occurs. The data provide information on plant-level owner (firm), geographic location (state and county), industry (six-digit NAICS), employment, and payroll.

The worker-level dataset is the Longitudinal Employer Household Dynamics (LEHD). The LEHD data provide information on workers' employer, earnings, gender, race, and age. It is constructed using administrative records from the state unemployment insurance (UI) system and the associated ES-202 program. Worker earnings include salary and wage earnings as well as bonuses, stock options, profit distributions, the cash value of meals and lodging, tips, and other gratuities in most states, and, in some states, employer contributions to certain deferred compensation plans such as 401(k) plans. We have access to LEHD worker-level data from 22 states and the District of Columbia, which covers about half of the US population.[2] The LEHD earnings data are currently available from the 1980s through 2021 (the start date varies across states and ranges from 1985 to 2002). While we include earnings from all employers, we associate workers with the "dominant" employer (i.e. the employer for which the worker earns the highest amount of income) in each year.

Inventor Data. To match inventors to workers in the LEHD, we use linkages between inventor records and the Census Bureau's disambiguated and anonymized person identifiers (known as Protected Identification Keys, or PIKs), developed by Akcigit and Goldschlag (2023a).[3]

We use the U.S. Patent and Trademark Office (USPTO) data to identify the patents associated with each inventor. Our data covers all patents granted between 2000 and 2021. We use the application date to calculate the number of patents associated with each inventor in each year. In addition, we use the number of citations received by each patent to measure the quality of patents and patent technology classes to determine the fields of inventors.

In some analyses, we also use the commuting zone an inventor is located in. We infer an inventor's commuting zone from the residential location reported in his or her patent applications. In years when the inventor does not apply for a patent, we use the commuting zones of the establishments belonging to the dominant employer from the LEHD data to measure the inventor's location. If the dominant employer owns multiple establishments in different commuting zones, we select the commuting zone that matches the inventor's location in the most recent patent applications or the commuting zone with the highest employment.

Mergers and Acquisitions. We use the LBD data to identify mergers and acquisitions. In

[2] The 22 states are: Arizona, Arkansas, California, Colorado, Delaware, Illinois, Indiana, Iowa, Kansas, Maryland, Missouri, Montana, Nebraska, Nevada, New Jersey, New Mexico, North Dakota, Ohio, Oklahoma, Pennsylvania, Tennessee, and Virginia.

[3] The match uses inventor name and location, as well as assignee-firm linkages. See Akcigit and Goldschlag (2023a) for details.

the LBD data, when an establishment changes ownership, the establishment-level identifier remains unchanged, whereas the firm identifier changes. As a result, we are able to infer M&As by observing when firm-level identifiers change (Maksimovic and Phillips (2001); Arnold (2019); Tate and Yang (2023)). To avoid spurious changes in firm identifiers unrelated to mergers, we only keep cases where two or more firm identifiers of establishments merge into one. For example, if establishment 1 has firm identifier A and establishment 2 has firm identifier B in a year, and they both have firm identifier A in the following year, we infer that the two establishments merge where firm A is the acquirer and firm B is the target. We drop cases where the new firm identifier did not exist before the merger, in which case we cannot identify the acquirer or target. We keep only full mergers, where all establishments of the target are acquired by the same acquirer.

The main benefit of relying on the LBD for detecting M&A activity is the systematic coverage of young, private firms. Under the Hart-Scott-Rodino (HSR) Act, firms are not obligated to report acquisitions valued under $50 million (Wollmann, 2019), leaving many acquisitions of smaller firms unreported and therefore not captured in standard M&A databases such as SDC Platinum.

The key outcome variables are annual earnings and the number of patents. For example, if two firms merged in July 2010, only earnings and patenting after July 2010 are affected by the merger. In the data, we would observe that the merger happened between 2010 and 2011. Therefore, the effect at year zero should be interpreted as a partial effect of the merger, given that a part of the earnings and patents year zero may be before the merger.

2 Empirical Strategy

In this section, we describe our empirical strategy to estimate the impact of M&As on inventor outcomes. We first match all inventors in target and acquirer firms to "counterfactual" inventors in firms without M&A activities. We then estimate a dynamic difference-in-differences specification comparing the outcomes of treated inventors and control inventors over time.

We construct the inventor sample as follows. We refer to an inventor-year observation as experiencing a year-t M&A event when (i) the worker has at least one patent within recent five years; (ii) the worker has positive earnings in year $t-1$, with no less than \$2000 earnings in all four quarters;[4] and (iii) the worker's dominant firm (the firm with the highest earnings) in year $t-1$ is either a target or an acquirer of a merger event between year $t-1$ and t.

We then match each such inventor-t observation to a "counterfactual" inventor-t observation that satisfies the following criteria: (i) the dominant firm in year $t-1$ did not experience any M&A activity within the (-5, +5) year window; (ii) the worker has at least one patent within recent five years; (iii) the worker has positive earnings in year $t-1$, with no less than \$2000 earnings in all four quarters; and (iv) the observation matches the treated inventor-year observation along five dimensions. Those five dimensions are:

- The inventors were in the same age cohort;
- The inventors were in the same quintile in terms of the number of patents between year $t-5$ and $t-1$;
- The inventors were in the same decile in terms of the average annual earnings between year $t-1$ and $t-5$;
- The dominant firms in year $t-1$ had the same two-digit NAICS industry code;
- The dominant firms in year $t-1$ were in the same size quintile.

Matching on these various dimensions helps in identifying counterfactual inventors that would plausibly exhibit common trends to treated inventors in the absence of M&As. If multiple inventor-t observations satisfy all the criteria, then we pick the inventor-t observation with the closest patent productivity in the recent five years as the counterfactual inventor.

[4] We require inventors to have positive earnings in all four quarters to exclude inventors who join or leave the firm during the year.

After conducting the matches, we construct a balanced panel of inventor outcomes for each inventor-event i and the matched counterfactual inventor i' for every year between five years before and five years after the merger event.[5] For around 80% of target firm inventor observations and 75% of acquirer firm inventor observations, we are able to match them to a counterfactual inventor observation. Our final sample comprises 160,000 matched pair-year observations for target firms and 2,210,000 matched pair-year observations for acquirer firms from 3,300 M&A events. Table 1 reports summary statistics from this sample. As the table shows, treated inventors and counterfactual inventors have similar earnings and number of patents as a result of our matching procedure.

Next, we use the sample of treated inventors and counterfactual inventors to estimate the impacts of M&As using a difference-in-differences specification. In particular, let i denote a treated inventor in a target or acquirer firm and i' denote the matched counterfactual inventor. Let j denote the firm-event combination.[6] For each matched pair-year observation, we compute the difference in the outcome of interest between the treated inventor and the counterfactual inventor in a given year s, $\Delta Y_{ii's} = Y_{is} - Y_{i's}$. We then regress the difference on event-time indicators in an event-study specification:

$$\Delta Y_{ii'js} = \sum_{k \in -5,-4,-3,-2,0,1,2,3,4,5} \beta_k D^k_{ijs} + \varepsilon_{is}, \tag{1}$$

where D^k_{is} is an indicator for inventor i having experienced the M&A event (denoted by j) k years in the past. The coefficients of interest, β_k, provide the time path of the difference in outcomes between treated and counterfactual inventors relative to the year before the merger event, which is normalized to zero. Note that because there are no controls, the coefficients β_k are raw differences-in-differences of the average outcome between treated inventors and counterfactual inventors between year $t-1$ and other years. We cluster standard errors by

[5] If an inventor experienced multiple events during our sample period, we construct a balanced panel with treated and counterfactual inventors for each event.

[6] For a given event, firm refers to the firm identifier in year $t-1$. A firm may have multiple events, and each event involves two or more firms.

firm-event j.

3 Effects of M&As on Inventor Outcomes

This section first presents the effects of M&As on earnings and innovation productivity of inventors in both target and acquirer firms. We then examine the effects on inventor turnover and decompose the effects on earnings and productivity between job-movers and job-stayers.

3.1 Effects on Earnings and Productivity

Figure 1 plots the point estimates and 95% confidence intervals from equation 1 for the outcome of log annual earnings. Panel A plots the effects for target inventors and Panel B plots the effects for acquirer inventors. In both panels, the pre-trends are flat before the merger event, corroborating the common trends assumption underlying the difference-in-differences analysis that in the absence of the merger, earnings of target or acquirer inventors and of counterfactual inventors would have trended similarly. Panel A shows that the earnings of inventors at target firms increase immediately in the first year following the merger but decline gradually afterwards. The immediate increase in earnings could derive from a number of mechanisms. The combined firm may share rents with the workers if M&As lead to efficiency gains. Or the acquirer firm may give the key employees like inventors an "award" to keep them from leaving the firm. However, the increase in earnings is short-lived: the effect becomes negative from year 2, and five years after the merger, target inventors earn 5.2% less than counterfactual inventors. In Table 2, we impose a a constant coefficient for all post-treatment periods instead of allowing the effects to be unrestricted over time. Column 1 of Panel A shows that the static treatment effect of M&As on the earnings of target inventors is -0.0275 (standard error = 0.0154).

Panel B of Figure 1 plots the effects on the earnings of inventors in acquirer firms. The earnings decline immediately and the effects remain negative and significant for five years following the merger. Column 1 of Panel B in Table 2 shows that the static treatment effect of M&As on the earnings of acquirer inventors is -0.0345 (standard error = 0.0065).

We next examine the effects of M&As on inventors' productivity. Our main measure of inventor productivity is the number of patents applied in a given year that are eventually granted. Figure 2 plots the differences in the number of patents between inventors in merging firms and counterfactual inventors over time. Panel A shows that inventors at target firms experience a decline in patenting which starts immediately after the merger and persists over time. The static effect as shown in column 2 of Panel A in Table 2 is -0.0969 (standard error = 0.0282). Given that the average number of patents per year is 0.67 for target inventors, this represents a 14% decline in the number of patents relative to counterfactual inventors. Panel B shows that M&As also reduce the number of patents for inventors at acquirer firms. The effects grow gradually over time, and by five years after the merger, inventors at acquirer firms have 0.0802 (standard error = 0.0208) fewer patents than counterfactual inventors, which is a 12% decline relative to the mean of 0.68.

To measure the quality of patents, we consider the number of forward citations normalized by patent class and grant year. We define high-citation patents as those with above-median citations in a year, and low-citation patents as those with below-median citations. Figure 3 plots the effects of M&As on the number of high-citation and low-citation patents. For inventors in both target and acquirer firms, the effects on the number of low-citation patents are larger and more negative than the effects on the number of high-citation patents. This suggests that the decline in patenting is mainly concentrated in less influential patents, although there is some decline in high-citation patents as well.

Overall, M&A lead to negative impacts on the earnings and innovative outputs of inventors at both target and acquirer firms. Several recent studies also document negative effects of M&As on target firm employees. For example, He and le Maire (2022) show that target firm employees experience a 2–3% decline in wages following mergers and acquisitions in Denmark, and Arnold et al. (2023) find that workers at target firms suffer earnings losses of around 2% in Canada. Our results on inventor earnings at target firms are quantitatively similar to these estimates, and we further show that acquirer firms' inventors experience similar earnings losses. We also find that inventors at both target and acquirer firms have lower productivity, suggesting that M&As generally do not create synergistic gains regarding innovation in our context. We explore the mechanisms explaining these findings in later sections.

3.2 Effects on Inventor Turnovers

So far, we have compared the outcomes of inventors who were initially employed by target or acquirer firms with counterfactual inventors over time regardless of whether they stay at the merged firms or not. Previous studies show that mergers and acquisitions often lead to higher departure rates of employees, especially for key employees like executives (Martin and Mcconnell (1991); Kim (2024); Lagaras (2019). In this section, we examine the effects on inventor turnovers around M&As and shed light on potential mechanisms driving the results.

We first consider inventor separations from the merged firm. We define the separation rate as whether the inventor is no longer employed by the dominant employer in year -1. For target inventors, the separation rate is one after the merger if the inventor is employed at a firm other than the acquirer firm. Therefore, the separation rate is cumulative and turns on once the inventor leaves the firm and joins another firm. Figure 4 plots the differences in separation rates between treated inventors and counterfactual inventors, where we only keep the years after the merger event and set year -1 to zero (by definition, separation rate is zero for all inventors in year -1). Panel A shows that the separation rates of target inventors and counterfactual inventors trend similarly following mergers and acquisitions, where the coefficients are statistically insignificant for all periods.

Panel B of Figure 4 looks at acquirer inventors. M&As have a negative and significant effect on the separation rates of acquirer inventors. The effect grows steadily over time, and acquirer inventors are 10.4% more likely to stay at the acquirer firm than counterfactual inventors five years after the merger. This suggests that inventors are more likely to stay at the same employer when their employer acquires another firm.

Next, we examine the effects on inventors' job mobility. For a given year t, we define the job switching rate as whether the inventor moves from one firm to another firm between year $t-1$ and year t. This is not cumulative unlike the separation rate: after the worker switches to a new firm, the job switching rate is set to zero if the worker remains with the new firm. The average job switching rate is 16.5% for target inventors and 10.5% for acquirer inventors.

Figure 5 reports the results on job switching rates. We also keep the years after the merger event and normalize the difference in year -1 to zero. Panel A shows that target inventors have lower job switching rates following mergers and acquisitions, but the effects are not statistically significant. Panel B shows that there is a decline in job switching rate in the first year after the merger for acquirer inventors by 1.7%—a 16% decline relative to the average job switching rate, but the differences became small and positive after the first year.

Our results indicate that there is no change in separation rates for target firm inventors, which contrasts with previous studies documenting increased employee turnovers in target firms. On the other hand, employee turnovers decline in acquirer firms, which is more pronounced for cumulative separation rates than yearly job switching rates. This suggests that M&As allow the acquirer firms to retain more inventors. In Figure 6, we plot the differences in the number of patents assigned to the original employer (employer in year -1) between acquirers' inventors and counterfactual inventors. The coefficients are positive except the last year, and statistically significant in the first year after the merger. Inventors in acquirer firms have more patents assigned to the acquirer, despite having a smaller number of patents overall as shown in Figure 2. This is because acquirers' inventors are less likely to move to other firms than counterfactual inventors. Therefore, acquirer firms can benefit from the M&As by retaining their inventors and recouping their patents even though their inventors become less productive after the M&As.

3.3 Decomposition Between Job-Movers and Job-Stayers

In this section, we decompose the effects of M&As on earnings and patenting between job-movers and job-stayers to analyze whether the effects are driven by movers or stayers.

To decompose the differences in outcomes into job-mover and job-stayer components, we write the mean outcome for the treated inventors as $y_t = y_t^m \delta_t + y_t^s(1-\delta_t)$. Here, the overall average outcome of treated inventors, y_t, is equal to the average outcome among treated job-movers, y_t^m, times the separation rate of treated inventors, δ_t, plus the average outcome among treated job-stayers, y_t^s, multiplied by the complement of the separation rate. Similarly, we can write the mean outcome for the counterfactual inventors as $y_c = y_c^m \delta_c + y_c^s(1-\delta_c)$, where y_c^m is the average outcome of counterfactual movers, y_c^s is the average outcome of counterfactual stayers, and δ_c is the separation rate of counterfactual inventors. Using these identities, we can decompose the difference between the average outcome of treated inventors and the average outcome of control inventors, $y_t - y_c$, using the following equation:

$$y_t - y_c = \underbrace{(y_t^m - y_c^m)\delta_c}_{\text{Movers}} + \underbrace{(y_t^s - y_c^s)(1-\delta_c)}_{\text{Stayers}} + \underbrace{(y_t^s - y_t^m)(\delta_c - \delta_t)}_{\text{Separation rate}} \tag{2}$$

Given estimates of $\{y_t^s, y_c^s, y_t^m, y_c^m, \delta_t, \delta_m\}$, equation 2 apportions the observed difference in average outcome between treated and counterfactual inventors into three components: the difference in the average outcome of job-movers scaled by the separation rate; the difference in the average outcome of job-stayers scaled by the complement of the separation rate; and the difference in the separation rate scaled by the difference between the outcomes of the movers and the stayers.

For each year, we calculate the separation rates δ_t and δ_c as the fraction of treated and counterfactual inventors who are no longer employed by the original firm. We then calculate each component of equation 2 by aggregating the difference between the outcomes of treated and counterfactual inventors separately scaled by respective separation rates. For example, we calculate the difference between the outcome of treated movers scaled by δ_c/δ_t and the outcome of counterfactual movers to get the first component regarding movers. We then use the difference as the dependent variable in equation 1 to estimate the effects attributed to movers.

Figure 7 summarizes the results from the decomposition for earnings. For each period, we plot three bars corresponding to the three components in equation 2. Panel A shows that for target inventors, the immediate increase in earnings in the first year is concentrated among stayers. The subsequent decline in earnings is driven predominantly by stayers and to a lesser extent by movers. For example, in year 5, the earnings difference between treated stayers and counterfactual stayers accounts for 72% of the overall earnings difference, whereas the earnings difference between treated movers and counterfactual movers accounts for 27% of the overall earnings difference. In all periods, the part due to differences in separation rates is almost zero. This is because the separation rates of target and counterfactual inventors closely track each other as shown in Figure 4, confirming that the earnings losses of target inventors are not due to job displacement.

In Panel B of Figure 7, we see similar patterns for acquirer inventors, with stayers explaining the majority of the earnings differences and movers explaining a smaller part of the earnings differences. For example, in year 5, the earnings difference between treated stayers and counterfactual stayers explains 78% of the overall earnings difference, and the earnings difference between treated movers and counterfactual movers explains 48% of the overall earnings difference. The difference in the separation rate explains -26% of the overall earnings difference. Therefore, the lower separation rate of acquirer inventors leads to higher earnings because stayers tend to earn more than movers (i.e., $(y_t^s - y_t^m)$ in equation 2 is positive).

In Figure 8, we conduct the same decomposition for the number of patents. Panel A shows that for target inventors, the difference between stayers accounts for almost all of the decline in patenting, and the difference between movers explain 15–40% of the decline in patenting only in year 4 and year 5. Panel B shows that for acquirer inventors, stayers and movers both contribute to the decline in patenting, with stayers explaining a larger part than movers. As in the case of earnings, the difference in separation rates explains none of the decline in patenting for target inventors, and contributes to a *increase* in patenting for acquirer inventors, since acquirer inventors have lower separation rates and stayers have more patents than movers.

The results from the decomposition indicate that the decline in earnings and patenting among target and acquirer inventors are mostly attributed to the lower earnings and patenting of treated stayers compared to counterfactual stayers. We also see that treated movers (inventors in acquirer or target firms who later move to other firms) have lower earnings and number of patents relative to counterfactual movers. On the other hand, the difference in separation rates between treated and counterfactual inventors explains almost none of the effects for target inventors and dampens the negative effects on earnings and patenting in the case of acquirer inventors.

4 Mechanisms

In this section, we examine the channels through which M&As affect the earnings and productivity of inventors. We consider three nonmutually exclusive channels. First, M&As may lead to synergy gains in terms of innovation by fostering collaboration and internalizing knowledge spillovers. Second, M&As may happen when acquirer firms outsource innovation and acquire smaller firms that successfully innovate. Third, M&As may dampen competition for innovation and innovative labor and allow the merging firms to have more market power in the innovation market and the labor market of inventors. Below, we examine how our main results on the effects of M&As on earnings, patenting, and inventor turnovers in target and acquirer firms align with these three channels.

4.1 Synergy Gains

Efficiency gains through synergies in product markets or labor markets are often argued as the main motivation of merger activities (Hoberg and Phillips, 2010; Tate and Yang, 2023). Bena and Li (2014) find that innovation output increases following mergers when there is premerger technological overlap between merging firms. Li and Wang (2023) show that a key mechanism for achieving synergy is collaboration between acquirer and target inventors, which leads to more radical, impactful, and valuable patents.

M&As also allow firms to internalize knowledge spillovers and enhance private returns to innovation. Arora et al. (2021) show that firms produce more innovation when they can capture more of the spillovers it creates and under-invest in innovation when it is used by their rivals.

If M&As lead to synergies in innovation or internalization of spillovers, we would expect inventors in target and acquirer firms to produce more and better patents. We would also expect their earnings to go up due to rent-sharing from the increased innovation (Kline et al., 2019). However, in our main analysis, we instead find that M&As reduce both the number of patents and earnings of inventors in both target and acquirer firms. This suggests that the synergy gains from M&As regarding innovation are not quantitatively important and unlikely to explain the results in our context.

4.2 Outsourcing Innovation

A second possibility is that firms acquire other innovative firms to outsource innovation and replenish their research pipeline. This could occur when firms experience a decline in their internal R&D productivity (Higgins and Rodriguez, 2006). It can also arise in an equilibrium where large firms optimally decide to let small firms conduct R&D and then subsequently acquire the successful innovators (Phillips and Zhdanov, 2013). A number of papers document "acqui-hiring", where firms engage in acquisitions to obtain skilled employees of the target firms like the inventors (Ouimet and Zarutskie, 2020; Beaumont et al., 2019), although it may fail because the acquired workers often have higher turnover rates than regular hires (Kim, 2024).

If acquirer firms acquire key inventors from the target firms and outsource innovation, we expect that M&As should lead to lower number of patents by acquirer inventors, as the acquirer firms gain access to successful innovations through the acquisitions instead of investing in R&D themselves. The effects should be larger when the acquirer firm is larger or less R&D intensive than the target firm. Our results on patenting of acquirer inventors are generally consistent with these predictions: following M&As, acquirer inventors produce fewer patents, although we do not find larger effects when acquirer firms are larger (unreported).

However, the negative effect of M&As on the patenting and earnings of target inventors contradicts this channel because inventors at target firms should produce more patents when the acquirer firm outsources innovation to the target firm. The earnings of target inventors should also go up as the acquirer firms try to retain the valuable inventors. Furthermore, acquirer inventors are not less productive and in fact slightly more productive than target inventors in our data.

In sum, acquirer firms acquire target firms' inventors and outsource innovation to target firms, which may account for some of the effects on patenting of acquirer inventors, but it does not explain the results for target inventors and is unlikely to be the main mechanism for our findings.

4.3 Market Power

Finally, the effects of M&As on inventor outcomes may reflect increased market power of the merging firms. First, the acquirer and target firms may engage in a patent race (Grossman and Shapiro, 1987). After the two firms merge, the merged firm internalize the negative externalities the two competing firms impose on each other's profits and lower the R&D efforts especially for the lagging firm. Li et al. (2023) shows that common ownership in the pharmaceutical industry—where a VC owner invests in multiple potentially competing startups—reduce funding and hold back projects at lagging startups in order to increase market power of the leading companies and cut duplicate costs. In extreme cases, the acquirer firm may even engage in "killer" acquisitions and discontinue the target's innovation projects completely (Cunningham et al., 2021).

Second, mergers also increase labor market concentration and allow the merging firms to have more labor market power. Arnold et al. (2023) and Prager and Schmitt (2021) show that mergers and acquisitions lead to lower worker earnings. The effects are more pronounced when the labor market concentration is high and workers have specialized skills, which is likely to be true in the case of inventors since inventors often work in highly-specialized fields and have a limited set of employers.

The two channels—patent race and labor market power—are not mutually exclusive and related to each other. When two firms are in a patent race, they are likely to compete for key inventors, and the merging of two firms reduces competition for labor and gives firms more market power in the labor market of inventors. Both channels predict that: (i) M&As should reduce patenting in target and acquirer firms as two firms are no longer in a patent race; (ii) inventors in target and acquirer firms have lower earnings because firms have more labor market power and no longer compete aggressively for inventors; and (iii) inventors are less likely to move to other firms because they have fewer outside options.

Our results line up with all these predictions. Regarding (i), there is a strong and negative effect of M&As on the number of patents by both target inventors and acquirer inventors. The decline is mostly driven by stayers having lower productivity, consistent with merging firms cutting their R&D efforts to enhance market power and cut duplicate costs. However, movers also have lower patenting because they have fewer options and are likely to have worse matches. We also find larger declines among low-citation patents, suggesting that firms mainly cut less important R&D. Regarding (ii), M&As have strong negative effects on the earnings of both target and acquirer inventors, which are also concentrated among stayers. Regarding (iii), we find that acquirer inventors are less likely to separate from the acquirer firm, although the effect on separation rates of target inventors is zero (for reasons we will discuss later).

To further test the market power channel, we split our sample into high-impact inventors, who are more affected by the merger in terms of market power, and low-impact inventors. As shown in Arnold (2019), the impact on market power is larger when the initial level of concentration is high and there is a large increase in concentration due to the merger. To measure concentration in the market of inventors, we use inventors' field specialization, as inventors often work in teams and prefer to work with other inventors in the same field (Jaravel et al., 2018; Bhaskarabhatla et al., 2021; Baghai et al., 2024). In particular, we use the technology class of inventors' patents to determine an inventor's field of specialization.[7] We then construct the Herfindahl-Hirschman Index (HHI) for technology class m in year t as follows: $HHI_{mt} = \sum_j s_{jmt}^2$, where s_{jmt} is firm j's market share, defined as the number of inventors in technology class m in year t divided by the total number of inventors in all firms in technology class m in year t. A merger between two firms with market share s_{jm} and $s_{j'm}$ in the year before the merger would increase the HHI by $\Delta HHI = 2 s_{jm} s_{jm}$. Intuitively, a field has higher concentration if all inventors working in that field are concentrated in a few firms, in which case each inventor fewer outside options to move to.[8]

We define high-impact inventors as those who have above-median initial level of HHI in the year before the merger and above-median change in HHI resulting from the merger.[9]

[7] There are around 600 technology classes in total. Our primary analysis uses the inventor' main technology class (i.e., the technology class in which the inventor files the most patents). Our results are robust to using a weighted average of all technology classes.

[8] We do not define local labor markets and instead treat all inventors in a certain field across all locations as in the same market. This is because inventors are more mobile than the average worker (Moretti and Wilson, 2017; Akcigit et al., 2022), and we observe a lot of cross-commuting-zone and cross-state movements for inventors in the data.

[9] We calculate the median for the sample of target inventors and the sample of acquirer inventors separately.

We then estimate a variation of regression 1 to compare the effects on high-impact and low-impact inventors:

$$\Delta Y_{ii'js} = \sum_{k \in -5,-4,-3,-2,0,1,2,3,4,5} \left(\gamma_k D_{ijs}^k \times HiImpact_i + \mu_k D_{ijs}^k \times LoImpact_i \right) + \varepsilon_{is}, \qquad (3)$$

where $HiImpact_i$ is an indicator for high-impact inventor with above-median initial level of concentration and above-median change in concentration due to the merger. $LoImnpact_i$ is the complement of $HiImpact_i$. Importantly, whether a merger has a high impact on concentration varies at the inventor level. Even within the same firm, a merger may be high-impact for some inventors and low-impact for other inventors.

Figure 9 to Figure 11 plot the differential effects of high-impact and low-impact mergers on inventors' separation rates, earnings, and innovation. Panel A of each figure reports the estimates for target inventors. Figure 9 shows that the separation rates increase for low-impact target inventors and decrease for high-impact target inventors following M&As. The higher separation rates of low-impact inventors may be due to a poor fit (e.g., culture clash) between the target inventors and the acquirer firm (Kim, 2024). On the other hand, the lower separation rates among high-impact inventors are consistent with those inventors having fewer outside options to move to after the merger. The two opposite effects on separation rates explain the overall null effect on the separation rates of target inventors in Figure 4. Panel A of Figure 10 shows similar earnings trajectories for high-impact and low-impact target inventors. This is likely because low-impact inventors having earnings losses due to job separations, whereas high-impact inventors who stay at the merged firm suffering lower earnings due to higher market power. Finally, Panel A of Figure 11 shows large negative effects for high-impact target inventors and insignificant effects for low-impact inventors, consistent with the merged firm reducing R&D efforts in fields with high concentration to reduce competition and cut costs.

Panel B of Figure 9 to Figure 11 reports the estimates for acquirer inventors. Aligning with the market power channel, we see larger declines in separation rates, earnings, and the number of patents among high-impact inventors. Therefore, when M&As enhance the market power of the acquirer firm, their existing inventors have fewer outside options, are more likely to stay with the firm, and have lower earnings. They also patent less due to the acquirer firm reducing its innovation efforts and lower benefit from productive reallocation.

Table 3 reports the static estimates when we aggregate all post-treatment periods. One concern is that high-impact mergers may happen in certain firms or lead to other firm-level changes. For example, if firms benefit more from high-impact mergers, they may invest more in R&D, which can confound the effects of market power. To address this concern, we add firm fixed effects to compare high-impact and low-impact inventors within the same firm. In some specifications, we further include firm-by-commuting zone fixed effects to control for shocks to inventors in the same location and the same firm. Table 3 shows that our results are robust to the inclusion of firm and firm-by-commuting zone fixed effects. Even with the most stringent specification, high-impact target inventors have lower patenting and lower separation rates, whereas high-impact acquirer inventors have lower patenting, earnings, and separation rates.

5 Conclusion

In this paper, we use individual-level administrative data to study the effect of M&As on inventors' employment, earnings, and innovation outputs. We show that M&As reduce the earnings and number of patents of inventors at both target and acquirer firms. We also show that acquirer firms' inventors have lower separation rates and are more likely to remain employed by the merged firm. Our results are most aligned with the market power channel: when firms in a patent race merge, the merged firm enjoys higher market power and reduces its innovation efforts, and the increased labor market power enables the firm to pay its inventors less while retaining more inventors. Consistent with this channel, we find larger negative effects on earnings, patents, and separation rates when mergers have a larger impact on market concentration within the inventor's field of specialization.

Our evidence suggests that M&As between innovative firms reduce inventors' surplus and enhance the value of the merging firms. However, the impact on overall welfare is less clear. On the one hand, less innovation is produced, which could harm economic growth and reduce consumer surplus. These effects are amplified when considering the positive spillovers from innovation. On the other hand, the merging firm could improve innovation efficiency by reducing cost duplication (Li et al., 2023). We leave the full welfare analysis to future work.

Our results also suggest that antitrust policy should scrutinize the impact of M&As on innovation in addition to consumer surplus and worker surplus. M&As could have a large effect on concentration in innovation and labor market of inventors even if the impact on product market concentration and overall labor market concentration is negligible given that inventors are more likely to be concentrated in a small number of firms than non-specialized workers.

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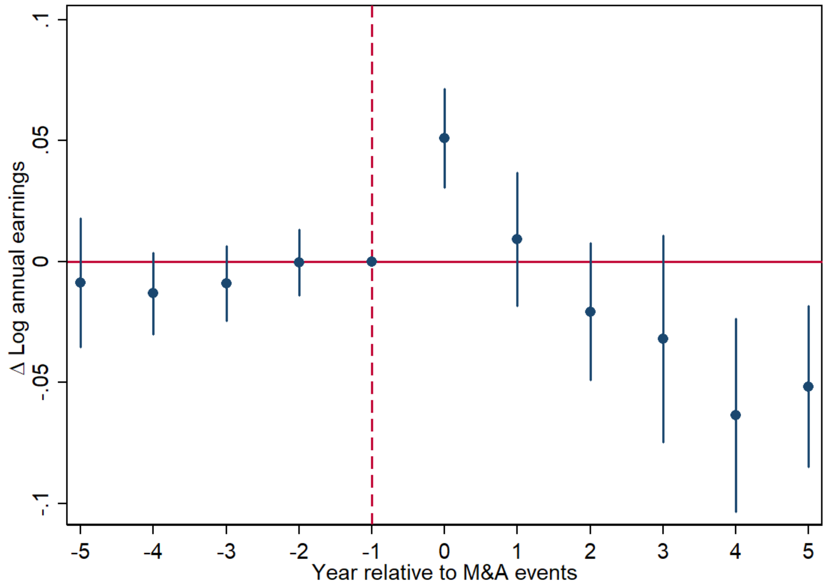
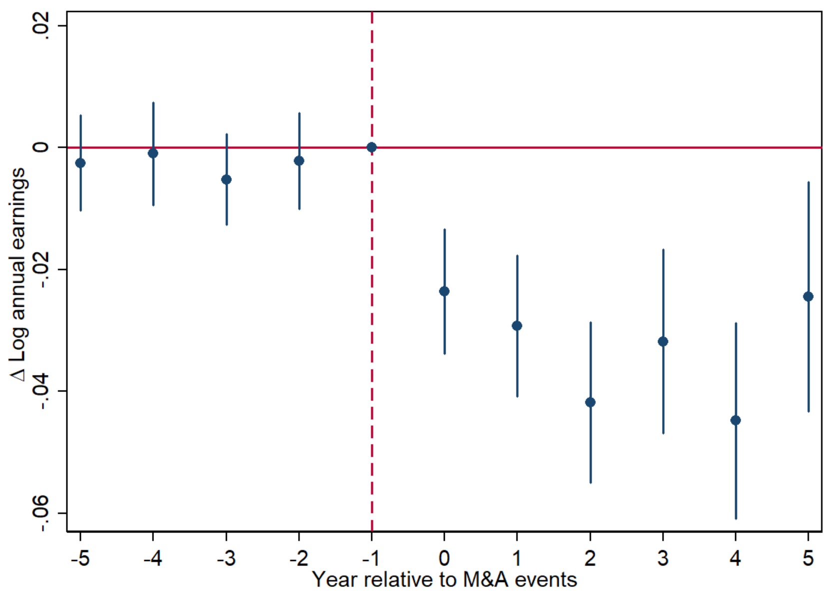
Figure 1: The Impact of M&As on Inventors' Earnings



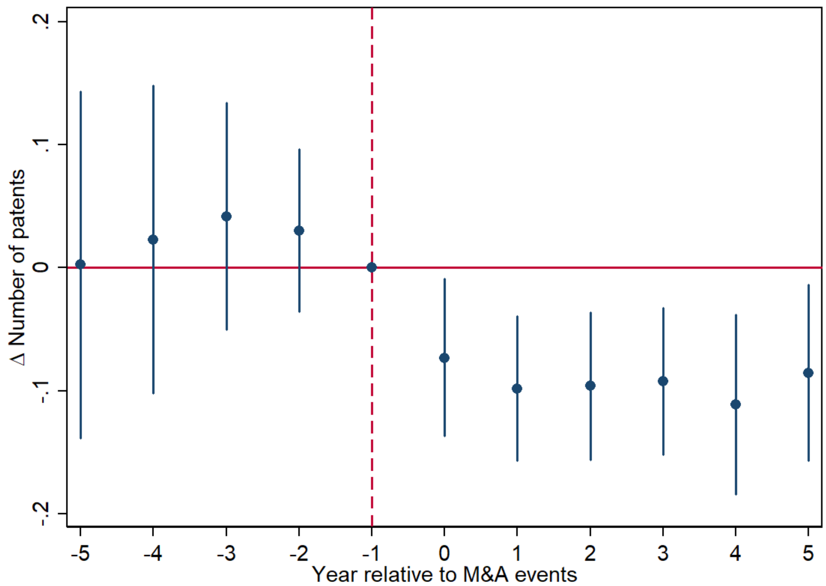
Panel A: Target Inventors



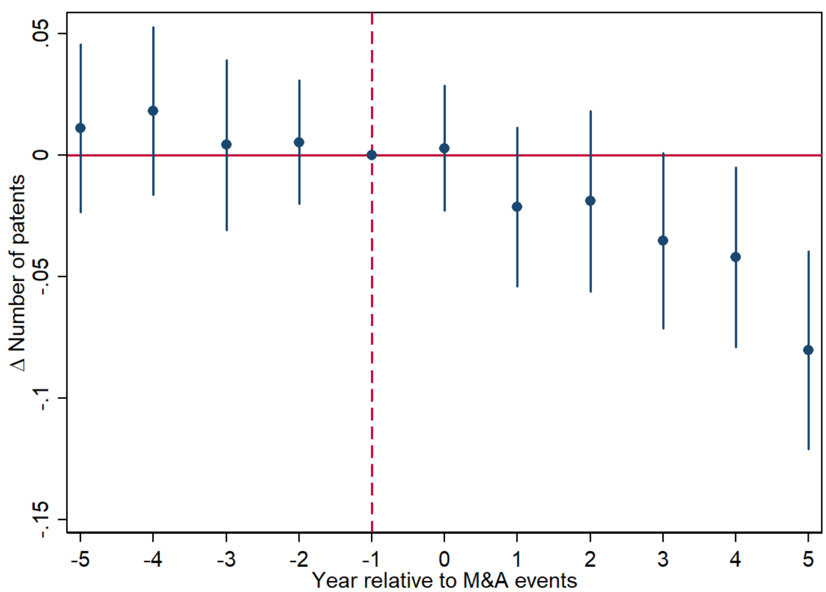
Panel B: Acquirer Inventors

This figure plots the event-study estimates for the impact of M&As on the annual earnings of inventors based on equation 1. Panel (a) and (b) show the estimates for the effects on target inventors and acquirer inventors respectively. The coefficient is normalized to be zero in year -1. The lines indicate 95 percent confidence intervals where the standard errors are clustered at the firm-event level.

Figure 2: The Impact of M&As on the Number of Patents



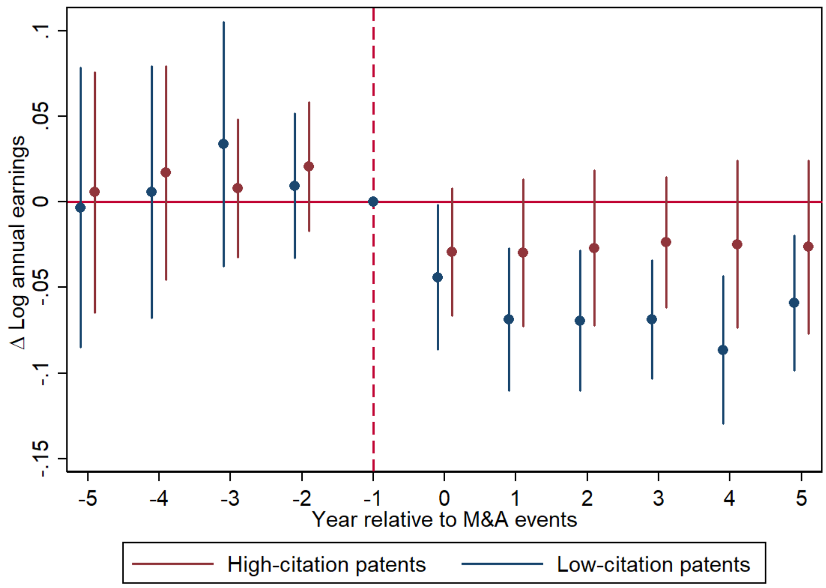
Panel A: Target Inventors



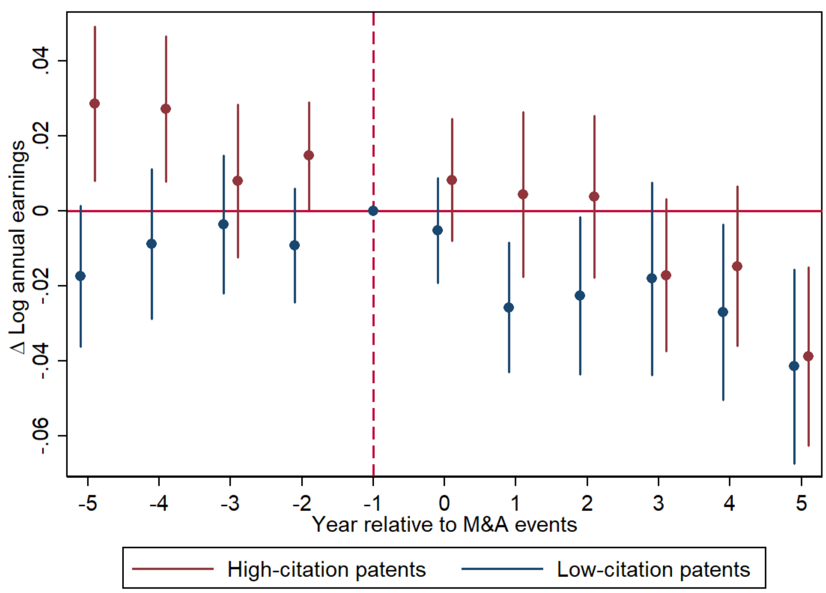
Panel B: Acquirer Inventors

This figure plots the event-study estimates for the impact of M&As on the number of granted patents applied by inventors based on equation 1. Panel (a) and (b) show the estimates for the effects on target inventors and acquirer inventors respectively. The coefficient is normalized to be zero in year -1. The lines indicate 95 percent confidence intervals where the standard errors are clustered at the firm-event level.

Figure 3: The Impact of M&As on the Number of High-Citation and Low-Citation Patents



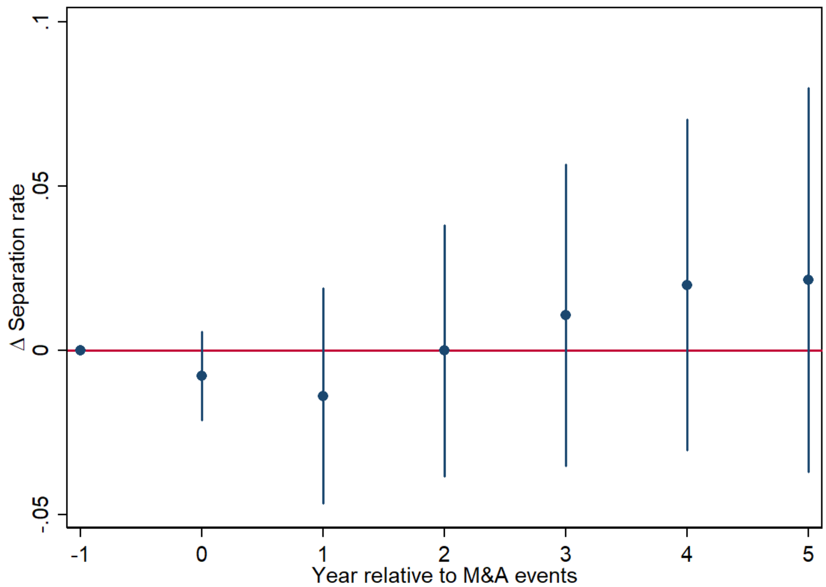
Panel A: Target Inventors



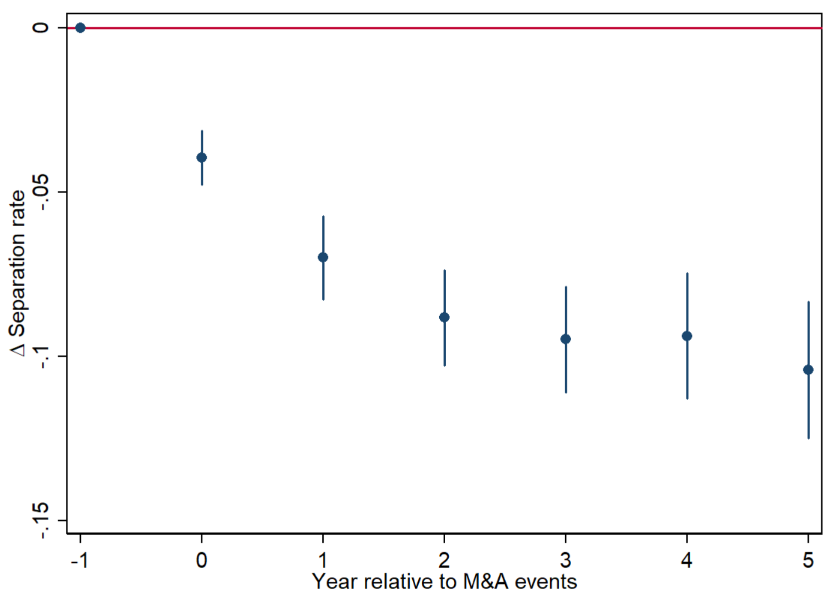
Panel B: Acquirer Inventors

This figure plots the event-study estimates for the impact of M&As on the number of granted patents with high citations (red lines) or with low citations (blue lines) applied by inventors based on equation 1. We define high-citation patents as those with above-median citations in a year, and low-citation patents as those with below-median citations. Panel (a) and (b) show the estimates for the effects on target inventors and acquirer inventors respectively. The coefficient is normalized to be zero in year -1. The lines indicate 95 percent confidence intervals where the standard errors are clustered at the firm-event level.

Figure 4: The Impact of M&As on Inventors' Separation Rates



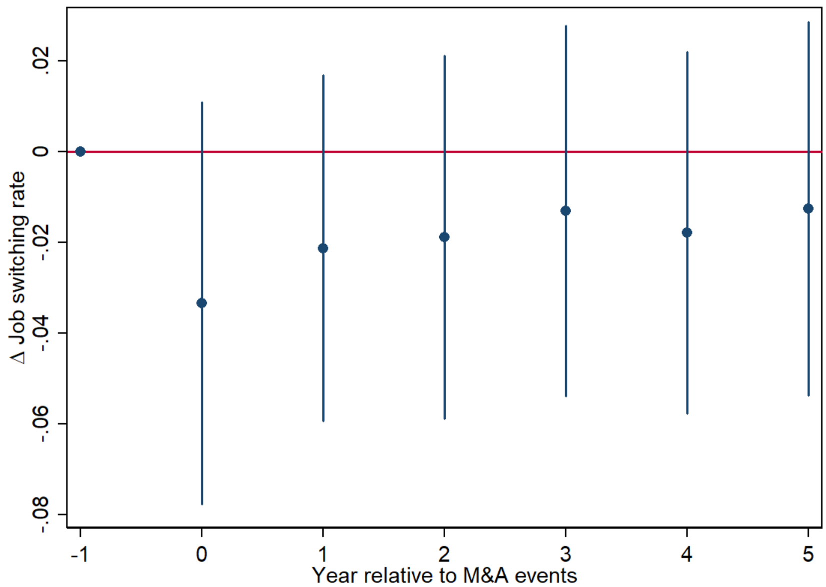
Panel A: Target Inventors



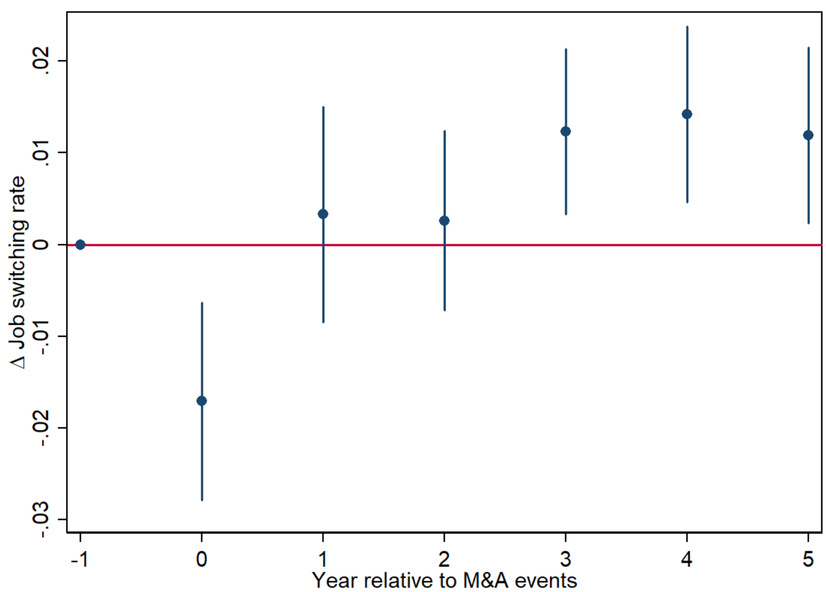
Panel B: Acquirer Inventors

This figure plots the event-study estimates for the impact of M&As on the separation rate of inventors based on equation 1. Panel (a) and (b) show the estimates for the effects on target inventors and acquirer inventors respectively. We define the separation rate as whether the inventor is no longer employed by the dominant employer in year -1. The coefficient is normalized to be zero in year -1. The lines indicate 95 percent confidence intervals where the standard errors are clustered at the firm-event level.

Figure 5: The Impact of M&As on Inventors' Job Switching Rates



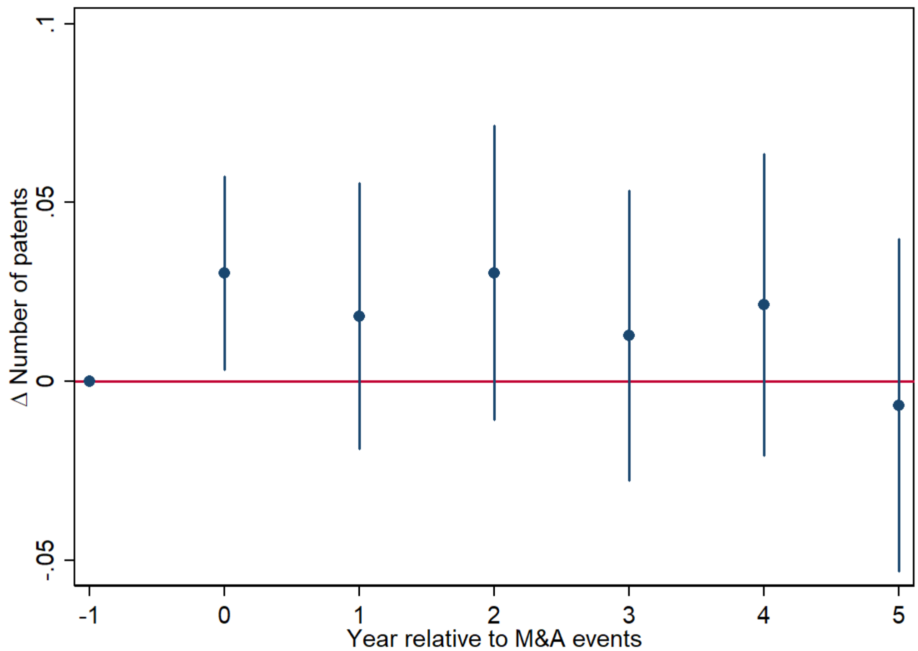
Panel A: Target Inventors



Panel B: Acquirer Inventors

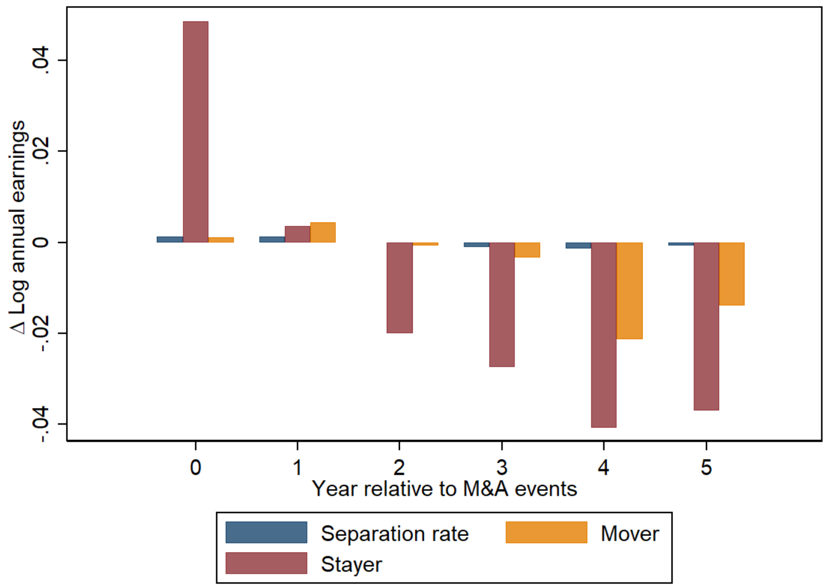
This figure plots the event-study estimates for the impact of M&As on the job switching rate of inventors based on equation 1. Panel (a) and (b) show the estimates for the effects on target inventors and acquirer inventors respectively. We define the job switching rate as whether the inventor moves from one firm to another firm between the previous year and current year. The coefficient is normalized to be zero in year -1. The lines indicate 95 percent confidence intervals where the standard errors are clustered at the firm-event level.

Figure 6: The Impact of M&As on the Number of Patents Belonging to the Acquirer



This figure plots the event-study estimates for the impact of M&As on the number of granted patents applied by acquirers' inventors that belong to the original firm at year $t-1$ based on equation 1. The coefficient is normalized to be zero in year -1. The lines indicate 95 percent confidence intervals where the standard errors are clustered at the firm-event level.

Figure 7: Decomposition of the Impact on Earnings Between Stayers and Movers

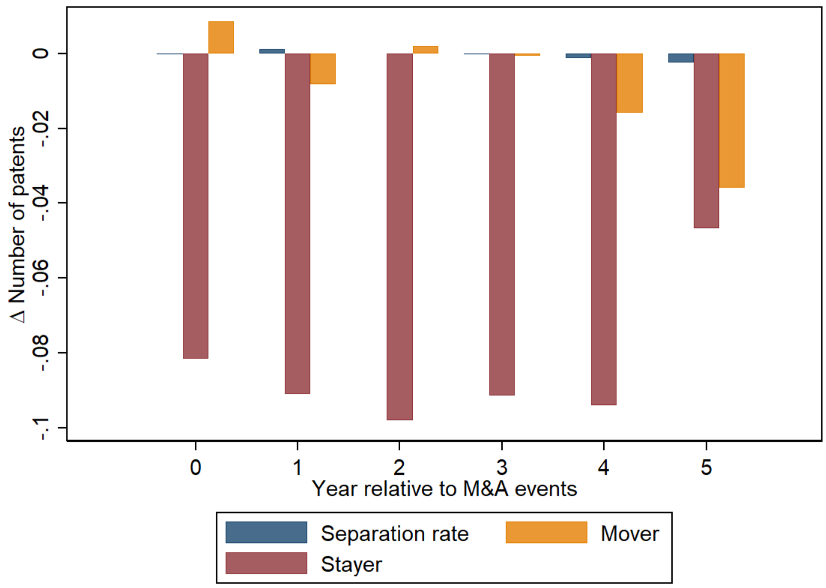


Panel A: Target Inventors

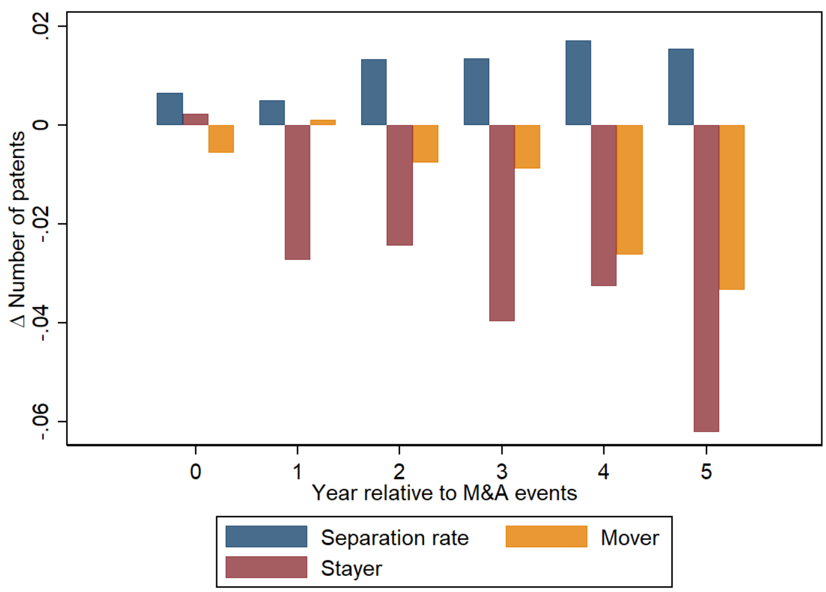
Panel B: Acquirer Inventors

This figure plots the decomposition for the impact of M&As on the annual earnings of inventors based on equation 2. Panel (a) and (b) show the estimates for the effects on target inventors and acquirer inventors respectively. The coefficient is normalized to be zero in year -1. The red bars represent the effects for stayers, the yellow bars represent the effects for movers and the blue bars represent the effects due to changes in separation rates.

Figure 8: Decomposition of the Impact on Patents Between Stayers and Movers



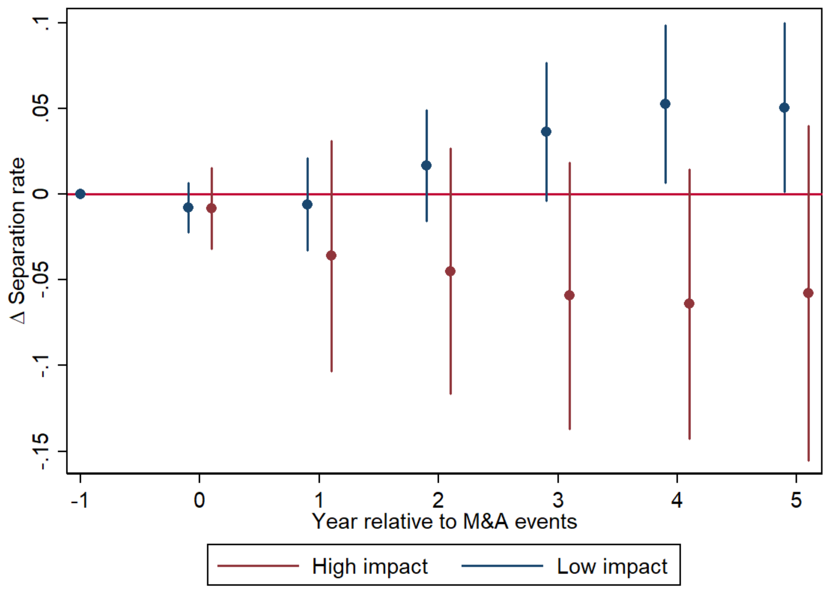
Panel A: Target Inventors



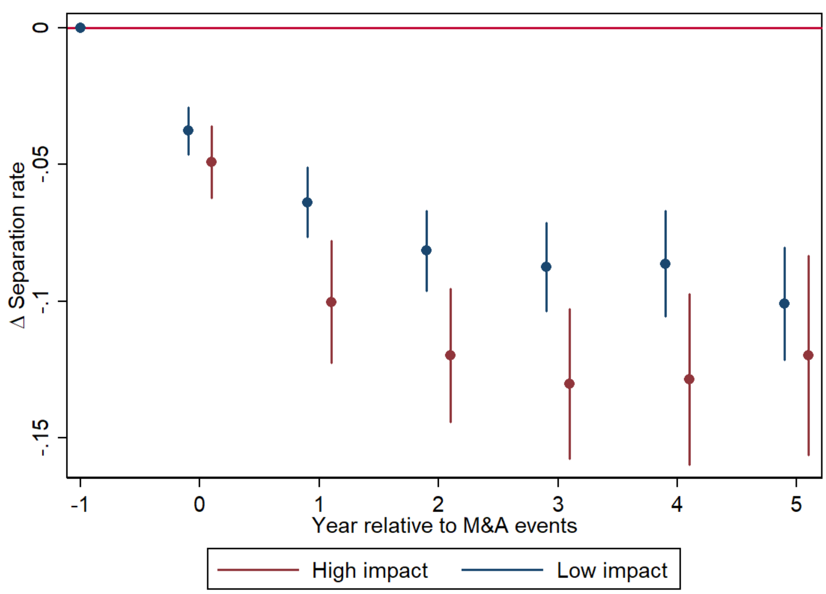
Panel B: Acquirer Inventors

This figure plots the decomposition for the impact of M&As on the number of granted patents applied by inventors based on equation 2. Panel (a) and (b) show the estimates for the effects on target inventors and acquirer inventors respectively. The coefficient is normalized to be zero in year -1. The red bars represent the effects for stayers, the yellow bars represent the effects for movers and the blue bars represent the effects due to changes in separation rates.

Figure 9: The Impact of M&As on Separation Rates for High-Impact and Low-Impact Inventors



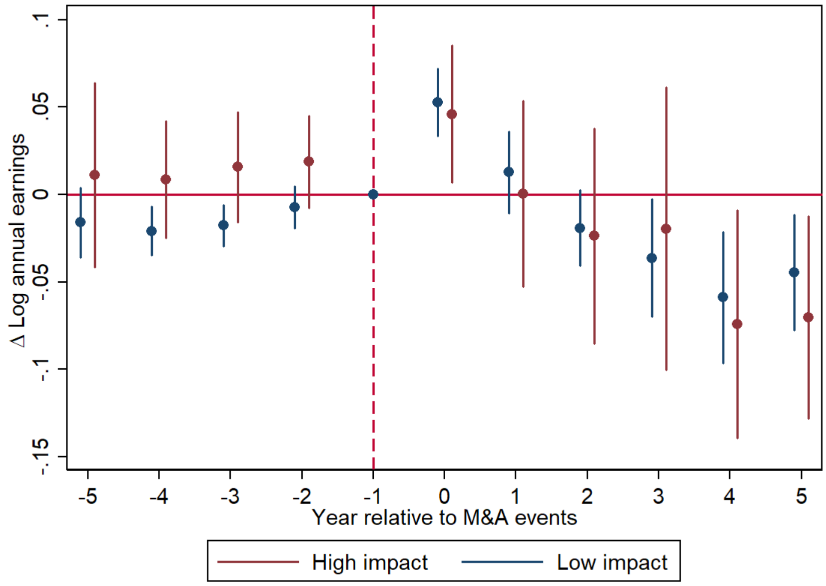
Panel A: Target Inventors



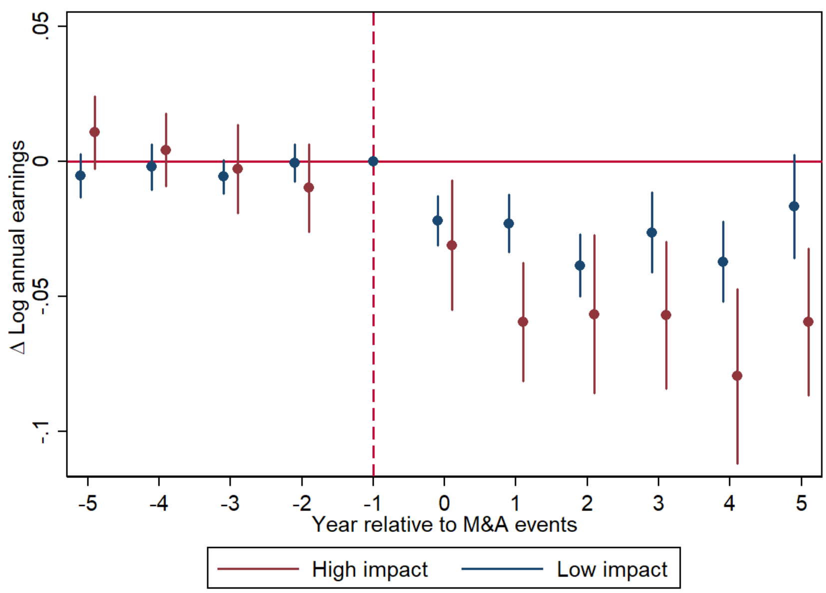
Panel B: Acquirer Inventors

This figure plots the event-study estimates for the impact of M&As on the separation rates of high-impact and low-impact inventors based on equation 3. Panel (a) and (b) show the estimates for the effects on target inventors and acquirer inventors respectively. The red (blue) plots indicate inventors experiencing M&As with a high impact (low impact) on labor market concentration. We define the separation rate as whether the inventor is no longer employed by the dominant employer in year -1. The coefficient is normalized to be zero in year -1. The lines indicate 95 percent confidence intervals where the standard errors are clustered at the firm-event level.

Figure 10: The Impact of M&As on Earnings for High-Impact and Low-Impact Inventors



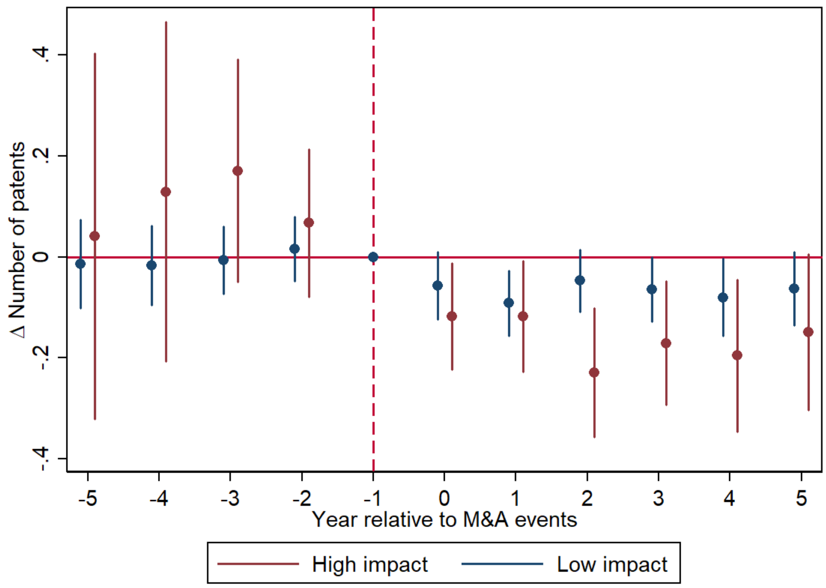
Panel A: Target Inventors



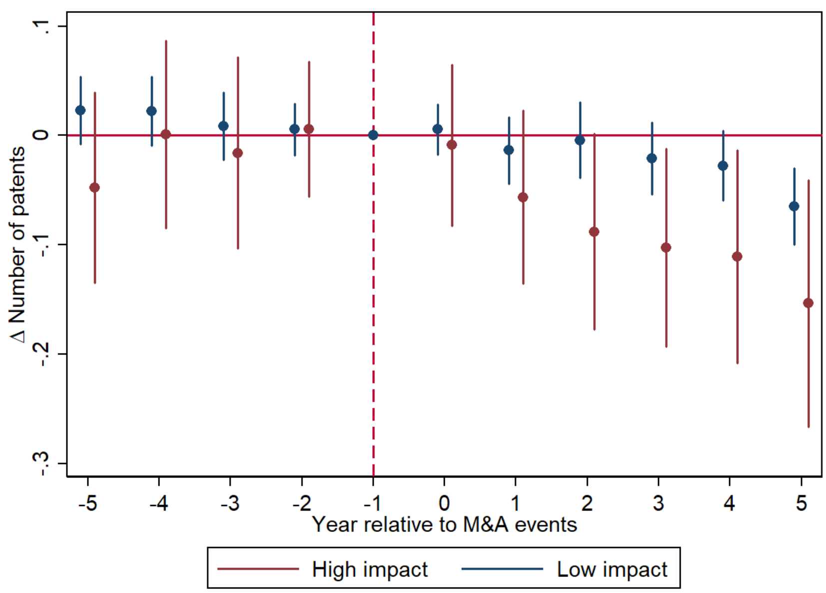
Panel B: Acquirer Inventors

This figure plots the event-study estimates for the impact of M&As on the annual earnings of high-impact and low-impact inventors based on equation 3. Panel (a) and (b) show the estimates for the effects on target inventors and acquirer inventors respectively. The red (blue) plots indicate inventors experiencing M&As with a high impact (low impact) on labor market concentration. The coefficient is normalized to be zero in year -1. The lines indicate 95 percent confidence intervals where the standard errors are clustered at the firm-event level.

Figure 11: The Impact of M&As on the Number of Patents for High-Impact and Low-Impact Inventors



Panel A: Target Inventors



Panel B: Acquirer Inventors

This figure plots the event-study estimates for the impact of M&As on the number of granted patents applied by high-impact and low-impact inventors based on equation 3. Panel (a) and (b) show the estimates for the effects on target inventors and acquirer inventors respectively. The red (blue) plots indicate inventors experiencing M&As with a high impact (low impact) on labor market concentration. The coefficient is normalized to be zero in year -1. The lines indicate 95 percent confidence intervals where the standard errors are clustered at the firm-event level.

Table 1: Summary Statistics

Panel A: Target Inventors

		Treated inventors		Control inventors	
	N	Mean	Std dev	Mean	Std dev
Age	160000	45.52	9.002	45.61	9.080
Log annual earnings	160000	12.00	0.7051	12.00	0.7034
Annual earnings	160000	251400	1909000	243000	1311000
Job switching rate	160000	0.1650	0.3712	0.1459	0.3530
Separation rate	96000	0.1889	0.3914	0.1870	0.3899
Number of patents	160000	0.6722	1.835	0.6436	1.492
Number of high-citation patents	160000	0.3298	1.084	0.3392	0.9920
Number of low-citation patents	160000	0.3423	1.097	0.3044	0.8408
Herfindahl–Hirschman index	160000	1.799	1.980		
Number of persons	21500				
Number of firms	3300				

Panel B: Acquirer Inventors

		Treated inventors		Control inventors	
	N	Mean	Std dev	Mean	Std dev
Age	2210000	45.30	9.005	45.30	8.918
Log annual earnings	2210000	11.93	0.6276	11.95	0.6552
Annual earnings	2210000	209200	840800	228000	1214000
Job switching rate	2210000	0.1050	0.3065	0.1366	0.3435
Separation rate	1353000	0.1169	0.3213	0.1788	0.3832
Number of patents	2210000	0.6828	2.041	0.6290	1.538
Number of high-citation patents	2210000	0.3310	1.187	0.3388	1.027
Number of low-citation patents	2210000	0.3518	1.163	0.2902	0.8335
Herfindahl–Hirschman index	2210000	2.655	3.990		
Number of persons	109000				
Number of firms	3300				

This table provides summary statistics for the variables used in the paper on the matched sample of inventors. Panel A reports characteristics of target inventors and their matched counterfactual inventors. Panel B reports characteristics of acquirer inventors and their matched counterfactual inventors. The matching criteria are described in Section 2. The number of observations is rounded in accordance with the disclosure rules set by the U.S. Census Bureau.

Table 2: The Impact of M&As on Inventor Outcomes

Panel A: Target Inventors

	Δ Log annual earnings	Δ Number of patents	Δ Number of high-citation patents	Δ Number of low-citation patents	Δ Separation rate	Δ Job switching rate
	(1)	(2)	(3)	(4)	(5)	(6)
Post	-0.0275*	-0.0969***	-0.0264	-0.0705***	0.0053	-0.0172
	(0.0154)	(0.0282)	(0.0205)	(0.0167)	(0.0204)	(0.0193)
Obs	160000	160000	160000	160000	160000	96000

Panel B: Acquirer Inventors

	Δ Log annual earnings	Δ Number of patents	Δ Number of high-citation patents	Δ Number of low-citation patents	Δ Separation rate	Δ Job switching rate
	(1)	(2)	(3)	(4)	(5)	(6)
Post	-0.0345***	-0.0362**	-0.0102	-0.0260***	-0.0886***	0.0082*
	(0.0065)	(0.0157)	(0.0094)	(0.0095)	(0.0074)	(0.0042)
Obs	2210000	2210000	2210000	2210000	2210000	1353000

This table reports the impact of M&As on inventor outcomes. Panel (a) and (b) show the estimates for the effects on target inventors and acquirer inventors respectively. The *Post* dummy indicates the years after the the M&A event. In column 1, the dependent variable is log annual earnings. In column 2, the dependent variable is the number of patents applied by the inventor in a given year. In column 3, the dependent variable is the number of patents with above-median forward citations. In column 4, the dependent variable is the number of patents with below-median forward citations. In column 5, the dependent variable is separation rate, defined as whether the inventor is no longer employed by the dominant employer in year -1. In column 6, the dependent variable is job switching rate, defined as whether the inventor moves from one firm to another firm between the previous year and current year. The coefficient is normalized to be zero in year -1. Standard errors are clustered at the firm-event level. Stars denote standard statistical significance (***$p < 0.01$, **$p < 0.05$, *$p < 0.1$, respectively).

Table 3: The Impact of M&As for High-Impact vs Low-Impact Inventors

Panel A: Target Inventors

	Δ Log annual earnings			Δ Number of patents			Δ Separation rate		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post × High Impact	-0.0241	-0.0079	-0.0033	-0.1619***	-0.0899**	-0.0830**	-0.0771**	-0.0411**	-0.0339*
	(0.0208)	(0.0145)	(0.0156)	(0.0498)	(0.0406)	(0.0389)	(0.0311)	(0.0177)	(0.0187)
FE	No	Firm FE	Firm×CZ FE	No	Firm FE	Firm×CZ FE	No	Firm FE	Firm×CZ FE
Obs	160000	160000	160000	160000	160000	160000	96000	96000	96000

Panel B: Acquirer Inventors

	Δ Log annual earnings			Δ Number of patents			Δ Separation rate		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post × High Impact	-0.0338***	-0.0322***	-0.0316***	-0.0551**	-0.0564**	-0.0533*	-0.0316***	-0.0275***	-0.0257***
	(0.0091)	(0.0093)	(0.0093)	(0.0274)	(0.0279)	(0.0279)	(0.0097)	(0.0085)	(0.0083)
FE	No	Firm FE	Firm×CZ FE	No	Firm FE	Firm×CZ FE	No	Firm FE	Firm×CZ FE
Obs	2210000	2210000	2210000	2210000	2210000	2210000	1353000	1353000	1353000

This table reports the differential effect for high-impact vs low-impact M&As on the inventor outcomes. Panel (a) and (b) show the estimates for the effects on target inventors and acquirer inventors respectively. The *Post* dummy indicates the years after the M&A event. The *High Impact* dummy indicates M&As with a high impact on labor market concentration. In columns 1 to 3, the dependent variable is log annual earnings. In columns 4 to 6, the dependent variable is the number of patents applied by the inventor in a given year. In columns 7 to 9, the dependent variable is separation rate, defined as whether the inventor is no longer employed by the dominant employer in year -1. Columns 2, 5, and 8 include firm fixed effects (where firm is the dominant employer in year $t-1$), and column 3, 6, and 9 include firm-by-commuting zone fixed effects. Standard errors are clustered at the firm-event level. Stars denote standard statistical significance (*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$, respectively).