Permanence and Performance: The Incentive Effect of Tenure on Worker Productivity

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Abstract

Temporary or fixed-term contracts (FTCs) are common in global labor markets and often serve as a stepping stone to permanent, open-ended contracts (OECs). This study examines how transitioning from FTC to OEC affects worker productivity. Using high-frequency production data from a Chinese garment factory, where piece-rate workers' tasks and wages remain unchanged after securing tenure, we isolate the incentive effect of tenure on productivity. We find a significant 5% drop in productivity immediately following the transition to permanent status, with the decline deepening over time. This suggests that workers exert extra effort under FTCs to secure permanent employment. The productivity decline is more pronounced among workers with weaker outside options, such as those with lower levels of education or those from regions with less favorable labor markets. In contrast, a comparable plant in Vietnam, where workers are guaranteed an OEC after two FTCs, shows no such decline in productivity. These findings underscore the role of tenure uncertainty in motivating effort under FTCs.

Keywords: fixed-term contracts, permanent contracts, incentives, labor productivity

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1. Introduction

Temporary employment, or fixed-term contracts (FTCs), defined by pre-determined termination dates, is a widespread phenomenon, representing a significant share of the workforce in both developing (Aleksynska and Muller, 2015) and developed (Boeri and Garibaldi, 2024) countries. FTCs offer employers a flexible tool to maintain a labor buffer and respond to demand fluctuations. Simultaneously, many countries—including France, Spain, Germany, Italy, China, and Vietnam—have enacted labor protection policies that limit the duration or number of FTC renewals, requiring employers to transition workers to permanent contracts once statutory limits are reached. Consequently, FTCs are often seen as a pathway to permanent employment (de Graaf-Zijl, Van den Berg and Heyma, 2011; Givord and Wilner, 2015; García-Pérez, Marinescu and Vall Castello, 2019).

In this paper, we examine the incentive effect of transitioning from FTCs to permanent employment by studying the productivity dynamics of workers before and after securing tenure. Theoretically, the impact of this transition is ambiguous. On the one hand, when permanent employment depends on demonstrated performance, workers may exert additional effort to secure tenure. On the other hand, job insecurity, common among FTC workers, can induce psychological stress, weaken organizational commitment, and erode a sense of belonging, potentially reducing motivation and performance (Witte, 1999; Sverke, Hellgren and Näswall, 2002; Kim and Jo, 2024).

Additionally, tenure introduces complexities, often accompanied by salary increases, expanded responsibilities, and changes in work expectations. For example, tenured professors typically receive higher pay and take on additional service duties, which may divert attention from their core responsibilities. Even when formal duties remain unchanged, managers may assign more complex tasks or allocate more resources to tenured workers, making it difficult to

compare productivity before and after tenure.

To address these challenges, we analyze high-frequency production data from a Chinese garment factory. This setting is ideal for our study for several reasons. First, under Chinese Labor Law, firms must offer an open-ended contract after two fixed-term contracts if they wish to retain a worker. However, tenure is not guaranteed: only about 85% of workers nearing the end of their second FTC secure permanent employment. Importantly, workers who eventually secure tenure show significantly higher productivity before their tenure is confirmed, highlighting the role of performance in obtaining permanent status.

Second, in this setting, tenure status does not coincide with other factors that typically complicate productivity comparisons. Workers are paid according to a piece rate, which remains constant before and after securing tenure, and their core responsibility—sewing garments—does not change post-tenure. Our dataset also includes detailed task-assignment data, allowing us to confirm whether tenured workers are assigned more complex tasks after obtaining tenure. Furthermore, no additional production resources are provided to workers upon obtaining tenure.

Third, the firm operates a comparable plant in Vietnam, where the same high-level managers oversee operations. Vietnam's labor laws also mandate a transition to OECs after two FTCs, but unlike the Chinese plant, all workers at the Vietnamese facility obtain permanent contracts, as the plant is newer and expanding. This provides a unique opportunity for comparison, enabling us to study productivity responses in a setting where tenure is uncertain (China) versus one where tenure is guaranteed (Vietnam).

Finally, the high-frequency and longitudinal nature of our data allows us to observe the productivity of the same workers within a narrow window around the tenure decision, minimizing the risk that factors such as age or accumulated experience confound our estimates.

Additionally, since workers in this factory can only secure tenure four years after starting—by which time productivity growth has typically stabilized—we can more confidently attribute changes in output to the tenure decision rather than to learning curves. To further address this concern, we follow the approach of Bhuller et al. (2013), Goodman-Bacon (2021*a*), and Goodman-Bacon (2021*b*) by controlling for pre-tenure trends, which allows us to account for the impact of experience.

Our empirical findings from the plant in China indicate a significant 5% drop in productivity immediately after the attainment of tenure, with the decline deepening over time. These results are robust to the inclusion of controls for pre-existing trends and the application of the method proposed by Callaway and Sant'Anna (2021). Crucially, we do not observe a similar productivity pattern between the first and second fixed-term contracts, suggesting that the tenure decision itself represents a key inflection point in worker behavior, rather than the contract renewal process.

We further show that the productivity decline is not driven by factors such as assignment to more complex tasks, broader task ranges, or being paired with more junior colleagues. Interestingly, no similar productivity drop is observed among Vietnamese workers after they receive tenure. Since these workers are guaranteed an open-ended contract (OEC), the absence of a productivity decline provides suggestive evidence that the uncertainty surrounding the attainment of an OEC in the Chinese setting is a key driver of the additional effort observed under FTCs.

These findings are consistent with the hypothesis that workers exert extra effort before securing tenure to improve their chances of obtaining long-term job security. We argue that the incentive to exert such effort under FTCs is closely tied to workers' outside options. Specifically, workers with fewer alternative employment prospects—such as those with lower ed-

ucational attainment, migrant workers without local networks, or those from cities with less favorable labor market conditions for low-skill workers—are more incentivized to work harder to secure permanent employment. Consistent with this, the post-tenure productivity decline is more pronounced among these groups. As a placebo test, we observe no such heterogeneous impacts in high-skill workers from cities with better labor market conditions.

This research contributes to the growing literature on the effects of fixed-term employment arrangements (see Boeri and Garibaldi (2024) for a comprehensive review). Much of the existing literature focuses on the role of FTCs as a labor buffer to respond to demand fluctuations (Bentolila and Saint-Paul, 1992; Boeri and Garibaldi, 2007). In addition, studies have examined their role in the screening and sorting of workers (Faccini, 2014; Boockmann and Hagen, 2008). However, the incentive effects related to the transition from FTC to OEC - specifically, the additional effort exerted by workers to secure tenure - have received comparatively little attention and are supported by limited empirical evidence. Theoretical work by Basu, Chau and Soundararajan (2021) suggests that FTCs may serve as a disciplinary tool for workers on open-ended contracts.

A related strand of research explores how the use of temporary workers impacts aggregate outcomes such as total employment, earnings inequality, labor market segmentation, and firm-level productivity (e.g., Blanchard and Landier (2002), Kleinknecht et al. (2006), Bentolila et al. (2012), Hirsch and Mueller (2012), Nielen and Schiersch (2016), and Daruich, Di Addario and Saggio (2023)). The mechanisms underlying these effects on firm-level productivity typically include screening, flexibility, firm-specific human capital accumulation, and capital per worker.[1] This paper highlights an additional channel: that workers exert extra effort to enhance their chances of securing tenure, which can directly boost firm-level productivity.

[1] A similar set of mechanisms is explored in the literature on employment protection, which affects worker composition, employment flows, firm entry rates, and capital intensity, thereby influencing firm productivity (Jacob, 2013; Besley and Burgess, 2004; Bjuggren, 2018; Cingano et al., 2016).

Pioneering studies have shown that contract arrangements can influence various aspects of worker behavior, often by comparing employees on fixed-term versus permanent contracts. For instance, temporary workers have been found to provide more unpaid work time (Engellandt and Riphahn, 2005) and invest more in on-the-job learning (Ferreira, de Grip and Van der Velden, 2018). More recently, Garcia-Louzao, Hospido and Ruggieri (2023) demonstrates that experience gained under fixed-term contracts yields lower returns compared to experience gained under permanent contracts.

Our study directly examines how workers' productivity changes when transitioning from fixed-term to permanent contracts by comparing the output of the same individuals before and after securing tenure, all within a consistent work environment and set of responsibilities. Previous research has shown that white-collar workers tend to have higher absenteeism after gaining tenure (Ichino and Riphahn, 2005; Jacob, 2013). While absenteeism is easily tracked, firms face greater challenges when employees are present but not fully productive, such as engaging in shirking during work hours. In contrast, we focus on changes in productivity while controlling for attendance. Additionally, we examine this effect in a piece-rate setting, where such changes are least expected. Unlike white-collar workers, whose output is not directly tied to short-term earnings, factory workers' daily output is directly and immediately linked to their pay.

2. Institutional Background and Data

2.1. Institutional Background

Labor Contract Law in China and Vietnam China's Labor Contract Law, in effect since 2008 and slightly refined post-2010, aims to protect employees' rights and stabilize employment relationships. One core provision is that if an employee has signed two consecutive fixed-term contracts with the same employer, the third contract must generally be open-ended (unless the

employee requests otherwise and no statutory termination grounds apply).

In the context of China's Labor Contract Law, an employer must provide severance pay when it lawfully terminates an open-ended employment contract. The standard calculation is one month's wage for each full year of service. Where a termination lacks legitimate grounds or fails to follow proper procedures, employees may seek remedies such as reinstatement or additional compensation through labor arbitration or civil litigation.

In practice, firms may exploit the voluntary third fixed-term contract when they do not want to give the work an open-ended contract. The firm can "persuade" the worker to choose another fixed-term contract. This is why 4.9% workers signed the third fixed term contract.

Labor contract laws in Vietnam share similarities with those in China, requiring firms to offer open-ended contracts after two fixed-term contracts. In the focal firm examined in our study, interviews with managers and evidence from our data indicate that every worker is offered an open-ended contract. This practice is driven by the relative difficulty of hiring skilled sewing workers in Vietnam compared to China.

The China Factory This factory is a major production site for a leading Japanese fashion brand. The contractor conducts regular on-site inspections to ensure workers' protections and overall working conditions, resulting in relatively high standards of labor law enforcement, even if implementation of relevant legislation in China is not well enforced. From the workers' perspective, the security provided by permanent employment in this factory is highly valued, and wages exceed the industry average for other low-skill occupations.

The factory specializes in clothing processing and export, functioning as the largest garment exporter in East China, with products shipped to 26 countries and regions. It operates under an arrangement in which it processes orders for upstream brands and earns processing fees. The corporate headquarters is located in Jiangsu Province.

The Vietnam Factory In 2016, the company established a subsidiary in Vietnam, replicating the same production lines and operational structures. All senior managers are from China, while sewing workers are recruited locally. One of the primary reasons for this relocation was the rising labor costs in China, along with increasing challenges in hiring workers, particularly in the manufacturing sector.

Labor market conditions in China and Vietnam differ significantly. In China, factory jobs are often regarded as among the most desirable employment opportunities in local areas. In contrast, Vietnamese workers have access to a broader range of comparable opportunities offered by other foreign firms. Consequently, companies in Vietnam face persistent challenges in recruitment. Therefore, the company provides OECs to all the workers who complete the second FTCs, as these employees are generally more qualified than most new hires.

Differences in local labor market conditions also influence the pre-tenure contract period. In China, a worker typically needs to be employed for more than four years to reach a third contract. In contrast, in Vietnam, a worker generally attains this status after completing two one-year contracts.

Workshop Organization and Production Cycle Garment production involves three primary stages: cutting, sewing, and finishing. Each factory comprises one cutting workshop, three sewing workshops, and two finishing workshops. Each workshop has a designated supervisor tasked with overseeing its entire production process. Within each sewing workshop, there are roughly 10 production lines (also referred to as "teams" or "assembly lines"). The typical composition includes approximately eight standard assembly lines, as well as specialized lines for down filling and template sewing. Each assembly line normally employs about 40 workers and is headed by a team leader (or line manager).

When headquarters issues a production order, it specifies the required quantity of garments

to be completed by a certain date. The factory allocates the order to the sewing workshop, which in turn assigns the workload to one or more assembly lines. Generally, a single assembly line produces only one garment style at a time, moving on to a new style once the production quota is met.[2]

Sewing Operations and Tasks. Sewing each garment entails numerous operations, and each operation can be broken down into distinct tasks. A garment typically involves around 100 tasks, although complexity varies by style. On each assembly line, there are roughly 30 work stations, and the line manager distributes tasks among workers on a daily basis. Workers perform a given operation repeatedly (e.g., attaching sleeves) on a bundle of garments, usually 10 or 20 pieces, before passing them on to the next station.[3] On average, each worker undertakes about check2.3 distinct tasks per day.

Compensation Workers' total earnings consist of four primary components: piece-rate wages, team bonuses, housing subsidies, and full attendance bonuses.[4] On average, the piece rate wage accounts for around 70% of a typical worker's total earnings. It is a prevailing view among workers that higher effort directly translates into higher earnings, forming the foundation of our empirical setting.

2.2. Data

Task-level Production Data We use daily production records from the factory's sewing workshops. Each record contains the date, worker ID, workshop and assembly line identifier, prod-

[2]During peak seasons, some lines may need to handle multiple styles simultaneously, although such cases are rare.

[3]This system is known as a multi-piece flow production method. An alternative is single-piece flow, where each garment is immediately transferred upon completion of one operation. Multi-piece flow reduces the time spent transferring items between stations but can cause imbalances and material accumulation if tasks are not well-coordinated.

[4]Team bonuses are decided by line managers. They exercise discretion in compensating for productivity losses arising from collaboration or unforeseen events. For instance, if a team member goes on sick leave, the manager may reassign tasks to a worker who is unfamiliar with them, thereby reducing her efficiency. To offset these productivity gaps, managers may grant additional compensation.

uct and task codes, piece rate and output for each task. The data is at the "worker-day-task" level. Because workers usually perform multiple tasks per day and the precise time allocation across tasks is unavailable, it is not feasible to measure productivity at the "worker-day-task" level. Instead, we aggregate to the "worker-day" level to examine individual productivity in a way that accommodates variations in task allocation. Each task is automatically logged at the workstation: the worker enters her ID and the corresponding task code, and the system tracks the number of parts she completes under that task.

HR Data We match the production record with the human resource department data, we can obtain background information of those front-line production workers, including gender, birth year, birth place, education and date entering the factory.

In Figure A.1, we use matched HR data and daily wage data to compare the productivity of tenured and untenured workers six months before the renewal of the third contract. The results indicate that workers who ultimately receive tenure demonstrate higher productivity during this period. Untenured workers consist 15% of our sample, and approximately one-third of them "voluntarily" signed another fixed-term contract.

Job Postings Data Our labor demand and supply measures come from Zhaopin.com (hereafter, Zhaopin), a leading online job portal in China. Importantly, the data from Zhaopin are representative of China's online labor market. Zhaopin is now one of China's two largest online job boards, with a market share of over 30% in China's online job posting industry. Zhaopin has over 230 million active individual users and approximately 6 million corporate users, covering all large and medium-sized cities in China.[5] We restrict our sample to the top 100 cities ranked by the total number of job postings in 2018 to minimize the bias caused by the low penetration

[5] Admittedly, the online job market is not representative of China's overall labor market. Zhaopin has little presence in specific sectors, such as the agriculture industry and government sector hiring. However, this bias does not undermine our argument as long as the bias is similar across cities.

rates of online job portals in smaller cities. [6]

3. Conceptual Framework

To illustrate how job security influences workers' effort choices, we propose a simple two-period model in which the employee exerts effort in the first period to increase the probability of securing an open-ended contract, taking into account an outside option should the contract not be renewed. Let the worker's indirect utility depend on income I and the dis-utility of effort e:

$$U(I, e) = I - \alpha_1 e - \alpha_2 e^2, \tag{1}$$

where $\alpha_1 > 0$ and $\alpha_2 > 0$ capture the marginal and quadratic cost of effort, respectively. The income is given by $I = \beta e$ with $\beta > 0$, reflecting a piece-rate compensation system in which higher effort directly raises the worker's wage.

We examine each period separately. In the second period, there is no uncertainty regarding contract renewal, so the worker solves:

$$\max_{e_2} \Big(\beta e_2 - \alpha_1 e_2 - \alpha_2 e_2^2 \Big). \tag{2}$$

From the first-order condition, $\beta - \alpha_1 - 2\alpha_2 e_2 = 0$, we obtain

$$e_2^* = \frac{\beta - \alpha_1}{2\alpha_2}, \quad u_2^* = \frac{(\beta - \alpha_1)^2}{4\alpha_2}. \tag{3}$$

Thus, e_2^* is the optimal effort once the open-ended contract is already secured, and u_2^* is the corresponding utility.

[6] The top 100 cities in our sample account for approximately 95% of the total job postings.

In the first period, the worker faces the possibility of non-renewal and hence accounts for the outside option μ, which applies if the contract is not extended. Let the probability of renewal be $p(e_1) = \lambda e_1$ with $\lambda > 0$, assumed to lie in $(0, 1)$ for $e_1 \in (0, 1)$. The worker's two-period expected utility is:

$$\max_{e_1} \Big(\beta e_1 - \alpha_1 e_1 - \alpha_2 e_1^2 \Big) \; + \; p(e_1) \times u_2^* \; + \; \big[1 - p(e_1) \big] \times \mu. \tag{4}$$

Taking the derivative with respect to e_1 and setting it to zero yields:

$$\beta - \alpha_1 - 2\alpha_2 e_1 + \lambda \frac{(\beta - \alpha_1)^2}{4\alpha_2} - \mu\lambda = 0, \tag{5}$$

which implies

$$\begin{aligned} e_1^* &= \frac{\beta - \alpha_1}{2\alpha_2} + \frac{\lambda}{2\alpha_2} \Big(u_2^* - \mu \Big) \\ &= e_2^* + \frac{\lambda}{2\alpha_2} \Big(u_2^* - \mu \Big). \end{aligned} \tag{6}$$

The difference $e_1^* - e_2^*$ measures the "effort gap" between the period of contract uncertainty and the period after securing the open-ended arrangement. Because $u_2^* > \mu$ by assumption (i.e., the current job is preferable to the outside option), it follows that $e_1^* - e_2^* > 0$. As μ decreases (indicating worse outside options), the incentive to secure the current position becomes stronger, reducing the size of the gap $e_1^* - e_2^*$. This framework highlights how open-ended contracts can affect workers' effort decisions, especially when alternative employment options are less attractive.

4. Effects of Tenure on Worker Productivity

4.1. Output Decline after Tenure

In Figure 1, we present the main findings on how productivity evolves around the tenure announcement among workers who successfully receive tenure. In this company, workers are informed of their tenure decision 1 to 2 months before the end of their second contract (48 months after joining the company). For consistency, we define "relative month zero" in Figure 1—and throughout the analysis—as 2 months before the end of the second contract. Typically, at relative month -1, workers remain unaware of their tenure outcome; by relative month 0, they are likely informed; by relative month 1, the decision has been fully communicated; and by relative month 2, workers sign open-ended contracts. The vertical dashed line at month 0 marks the tenure announcement, dividing the pre- and post-tenure periods.

Panel (a) in Figure 1 displays the raw productivity trends surrounding the tenure announcement. The solid line represents the logarithm of daily wage residuals (after adjusting for calendar date fixed effects), while the dotted line indicates the linear productivity prediction derived from the pre-tenure experience–productivity relationship (estimated over relative months –9 to –1).

In the pre-tenure period, the actual productivity (solid line) closely tracks the predicted trend (dotted line), suggesting that productivity is well predicted by accumulated experience before the tenure announcement. On average, productivity increases by approximately 3.6 percent over the nine-month period preceding tenure. However, immediately after tenure is granted (relative month 0), a noticeable shift occurs: the observed productivity consistently falls below the trajectory predicted by the pre-tenure trend. The persistent gap between the actual and projected productivity suggests a potential decline in worker effort or efficiency

following tenure, consistent with the hypothesis that workers exert extra efforts before tenure and job security may reduce incentives for sustained high performance.

To further quantify the post-tenure decline in daily output, we implement the following event study regression:

$$Y_{it} = \sum_{m=-9, m\neq -1}^{m=12} \beta^m T_{m(it)} + \delta_i + \gamma_t + \epsilon_{it}, \tag{7}$$

where Y_{it} is the log daily output for worker i on a calendar date t. $T_{m(it)}$ is an indicator that takes the value 1 if date t falls in relative month m for worker i, where the relative month is defined with respect to the tenure announcement month (as detailed earlier in this section). The coefficients β^ms are our primary parameters of interest, capturing the dynamic effects of tenure on worker productivity. To account for time-invariant individual characteristics and innate ability, we include individual fixed effects, δ_i. Additionally, we incorporate calendar date fixed effects, γ_t, to control for factory-level output fluctuations, such as demand shocks, weekday-weekend variations, and other temporal factors. Standard errors are clustered at the individual level.

Similar to the approach in panel (a), the analysis sample is restricted to workers who successfully attain tenure. This allows us to compare their daily outputs before and after tenure, using the month immediately preceding the tenure announcement as the reference period. A key concern with this identification strategy is the mechanical collinearity between the relative month (with respect to tenure announcement) and the workers' experience in the factory.

We cannot directly include a linear time trend in Equation (7) to address this concern because doing so would conflate the tenure effects with the baseline productivity trends. However, this concern is mitigated by two factors: 1) Workers in our sample have already been employed in the factory for approximately six years, by which point their productivity is likely to have

stabilized, with only marginal increases expected thereafter; and 2) There is no theoretical basis to expect a sudden shift in the experience-productivity relationship precisely at the 70-month mark in the absence of a tenure announcement.

To further address this concern, we employ the method proposed by Bhuller et al. (2013), Goodman-Bacon (2021*a*), and Goodman-Bacon (2021*b*) to account for the impact of experience by controlling for pre-tenure trends. Specifically, we estimate linear pre-trends using data from relative months -9 to -1, extrapolate these trends into the post-tenure period, and subtract the projected trend from all data points. This approach isolates the tenure effects from the underlying productivity trends unrelated to tenure. The dotted line in panel (a) of Figure 1 visualizes the estimated pre-trend, which reflects the relationship between experience (in months) and output after controlling for calendar date fixed effects to account for factory-level daily fluctuations.

The results of the event study estimations are summarized in panel (b) of Figure 1. Consistent with the raw data presented in panel (a), we observe an immediate drop in output following the tenure announcement. The magnitude of this effect grows over time, starting at 2% - 3% right after tenure announcement and increasing to 7% - 10% within 6–12 months post-tenure. When comparing the post-tenure period as a whole (months 1 to 12) with the pre-tenure period (months -9 to -1), we find that output declines by approximately 4.99% after tenure announcement, statistically significant at the 1% level.[7]

We also predict that the tenure effect observed in China will not be present in the Vietnam factory, where 100% of workers completing their second FTCs are promoted to OECs. This 100% tenure rate is likely be attributed to two factors: 1) the factory is still in an expansion phase and aims to retain more workers, and 2) the labor market conditions in Vietnam are more

[7]Month 0 is excluded from the post-tenure period because the tenure outcome is announced 1–2 months before the end of the second contract. As a result, the tenure outcome may not have been fully communicated to all workers by relative month 0, defined as 2 months before the end of the second contract.

favorable for workers, driven by increasing labor demand due to the growing manufacturing sector. We analyze the Vietnam plant dataset using the same methodology. As illustrated in Figure A.3, we find no significant changes in worker productivity after obtaining tenure. This suggests that when employees perceive tenure as a guaranteed outcome rather than a reward to strive for, OECs no longer serve as a strong incentive for workers to increase their effort

4.2. Robustness Checks

Some additional concerns warrant discussion. First, we subtract the projected pre-trend to account for the experience–productivity relationship, raising the concern that our findings may be driven entirely by this upward pre-trend. To address this, we re-estimate Equation (7) without adjusting for the pre-trend. Panel (a) of Figure 2 presents the resulting event study estimates, which are largely consistent with the main results shown in Figure 1.

A second concern is that the sample in the event study is unbalanced across different relative months, and thus the dynamic effects observed could reflect composition changes rather than true productivity responses. To address this, we construct a balanced panel covering 13 months from relative month -6 to 6 and re-estimate our main specification on this restricted sample, which accounts for 31.54% of the observations in our primary analysis.[8] Panel (b) of Figure 2 presents the results, revealing a more immediate and pronounced post-tenure output decline compared to the main findings. This suggests that the primary results are mainly driven by true productivity responses, and if anything, compositional changes modestly dampen the estimated effects shown in Figure 1.

[8]The 50.76% of sample loss arises because our production data end in July 2021; thus, for workers who joined after March 2017, we lack productivity data 6 months post-tenure. Similarly, 8.35% sample loss arises because the production data begin in January 2019; thus, for workers who joined before August 2015, we lack productivity data 6 months pre-tenure. 3.98% of the sample is lost because the workers did not work continuously for 13 months. Moreover, 5.36% of tenured workers in our analysis sample leave the company within 6 months of tenure. We avoid defining the balanced panel over relative months -9 to 12 due to severe attrition, which would retain only 10% of the original sample.

Another concern arises from the staggered rollout of tenure announcements across workers who begin their employment at different times. To address potential bias in staggered rollout estimations with heterogeneous treatment effects, we employ two alternative methods other than OLS. Panel (c) of Figure 2 presents the results. The hollow triangles represent the previous OLS estimates as a reference, the hollow diamonds reflect the estimates obtained using the method proposed by De Chaisemartin and d'Haultfoeuille (2020), and the solid red points show the estimates derived from the method proposed by Callaway and Sant'Anna (2021). As evidenced by the figure, the three estimators yield qualitatively similar trends, and the average treatment effects that pool the post-tenure period are also comparable to the OLS results, with estimated effects of -0.068 (p-value = 0.003) using De Chaisemartin and d'Haultfoeuille (2020), -0.043 (p-value = 0.103) using Callaway and Sant'Anna (2021), and -0.045 (p-value = 0.003) for the OLS results.

One potential concern is that the observed results could be influenced by the contract renewal itself, irrespective of the transition to tenure. As theoretically predicted by Iossa and Rey (2014), workers might exert increased effort immediately prior to contract renewal. As a placebo test, we redefine the relative months with respect to the renewal of the second fixed-term contract (which does not confer tenure). Panel (d) of Figure 2 shows no comparable decline after renewing this contract, suggesting that it is specifically the transition to an open-ended contract that underlies the observed effects, rather than the mere act of contract renewal.

4.3. Potential Channels behind the Output Decline

Our findings on post-tenure productivity declines are based on days during which employees were actively working, potentially understating the total effect if absenteeism increases once job security is secured. For instance, workers may be more likely to refuse to work on weekends

after obtaining tenure. To address this possibility, we analyze daily attendance patterns by adding observations for days on which employees were absent. As reported in Column (2) of Table 1, there is no statistically significant decline in attendance following tenure attainment, indicating that the observed productivity drop arises from lower output on days worked rather than from higher non-attendance.

Another possibility is that the observed output decline could be driven by task assignments from the line manager rather than a reduction in workers' own effort. For instance, managers might assign tenured workers to more challenging tasks or a broader range of task types, thereby lowering daily output. To explore this, we employ detailed task-level output data in Columns (3) and (4). Column (3) examines the average difficulty of daily tasks, and Column (4) analyzes the concentration of tasks using a monthly Herfindahl-Hirschman Index (HHI). In both cases, we find no statistically significant impact of tenure on these task assignment measures, suggesting that the productivity decline is not driven by managerial task reallocation.

It is also plausible that managers might reassign tenured workers to teams with relatively inexperienced colleagues, potentially reducing tenured workers' output due to partial output interdependence. To examine this, we use the average coworker experience (days) within each production line as the dependent variable in Column (5) of Table 1. The statistically insignificant positive coefficient does not support the hypothesis that tenured employees are systematically grouped with newer workers, indicating that this factor does not account for the observed post-tenure productivity decline.

4.4. Heterogeneous Treatment Effect

We examine the heterogeneous treatment effect to explore the mechanism underlying the job security effect. As discussed in our conceptual framework, the induced effort response is expected

to be stronger for workers with limited outside employment options. We measure the ease of finding a comparable job using two proxies. The first is the worker's educational attainment, less-educated workers face greater difficulty securing new employment. The second is the worker's migration status, migrant workers whose hometown is different from their workplace place a higher value on job security. In contrast, local workers experience lower reallocation costs and benefit from higher social capital, which can facilitate job transitions . Additionally, we anticipate that the labor market conditions in migrant workers' hometowns can explain the differential impact on the tenure effect.

Panel (a) of Figure 3 compares the effort gap between low-skilled and high-skilled workers, where high skill is defined as having at least a high school diploma. Consistent with our hypothesis, the effort gap is primarily driven by low-skilled workers, who face greater challenges in securing alternative employment if dismissed. Panel (b) examines workers based on their place of origin: those who grew up in the city where the factory is located, those from the same province, and those from other provinces. Similarly, we find that the effort gap is most pronounced among migrant workers. We further investigate this heterogeneity by focusing on migrant workers and testing our predictions regarding the role of outside options.

Migrant workers with stronger employment prospects in their hometowns experience less job insecurity. To quantify local labor demand, we use online job postings from a leading recruitment platform in China, normalizing job postings by the city's resident population in 2020.[9] We restrict the analysis to the top 100 cities based on total job postings, which account for 95% of all listings. Workers are grouped into quintiles based on the job posting density in their hometowns, and we estimate the job security effect for each group. The results in Panel (c) of Figure 3 indicate that the job security effect is strongest in regions with the lowest job availability (bottom 20th percentile) and diminishes as labor market opportunities improve. In

[9]The 2020 population census provides the baseline population figures.

Figure A.2 we also show the robustness check with the labor demand over labor supply as our group variable and the results do not change much. A similar pattern emerges when classifying workers by the average wage in low-skill industries in their hometowns, as shown in Panel (e). These wage estimates are derived from the China National Tax Return Data, which covers all cities and industries with higher weight on large firms.[10] Using firm-level wage data, we compute city-level average wages in low-skill industries and find results consistent with those based on job postings.

We also conduct placebo tests with job postings and average wage in high skill industries in Panel (d) and (f) with demand and average wage in high skill industries and the patterns in Panel (c) and (e) disappear.

5. Conclusions

This study provides novel insights into the productivity dynamics associated with the transition from fixed-term contracts (FTCs) to permanent contracts (OECs) by examining worker behavior in a piece-rate setting. Our analysis, based on high-frequency production data from a Chinese garment factory, reveals a significant decline in productivity following the attainment of permanent status, a pattern that is not observed in a comparable Vietnamese facility where tenure is guaranteed. This suggests that the uncertainty surrounding the transition to permanent employment plays a critical role in motivating workers to exert extra effort under FTCs.

The productivity drop observed after tenure is consistent with the hypothesis that workers exert extra efforts while on FTCs to secure long-term job security, especially when they have fewer outside options. This effect is more pronounced among workers with lower educational levels, migrant workers, and those from regions with weaker labor market conditions. By

[10]The survey is a stratified sample that gives higher weight for large firms and conducted by the department of finance and tax authority. They double check firms answer with the internal tax return data.

focusing on the same individuals before and after their tenure decision, we are able to offer a clear causal interpretation of the incentive effects tied to FTCs, distinct from other confounding factors such as job complexity or changes in work resources.

Our study contributes to the broader literature on labor contracts by highlighting a previously underexplored channel through which FTCs can affect firm-level productivity: the incentive to secure permanent employment. While existing research has emphasized the role of FTCs in screening, sorting, and providing flexibility, our findings suggest that tenure uncertainty can also function as an incentive mechanism, influencing worker behavior in a way that directly impacts productivity.

Overall, our results have important implications for understanding the role of labor contract policies in shaping worker incentives, particularly in industries where productivity is tightly linked to individual performance. By focusing on tenure uncertainty, we offer a deeper understanding of how fixed-term employment arrangements influence worker effort and firm outcomes.

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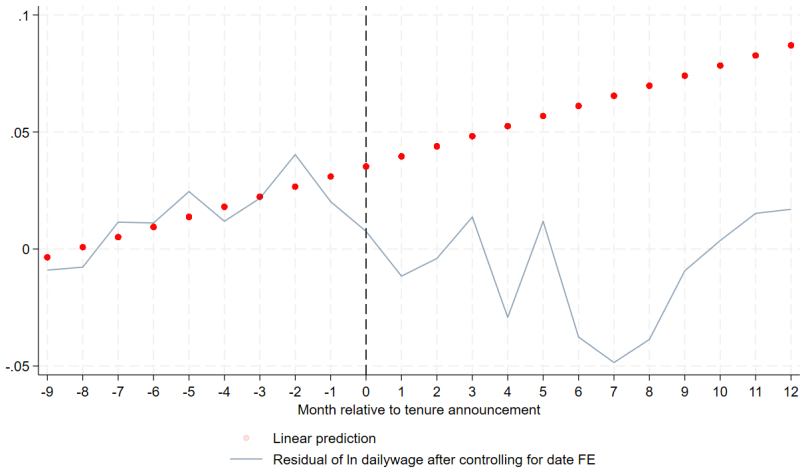
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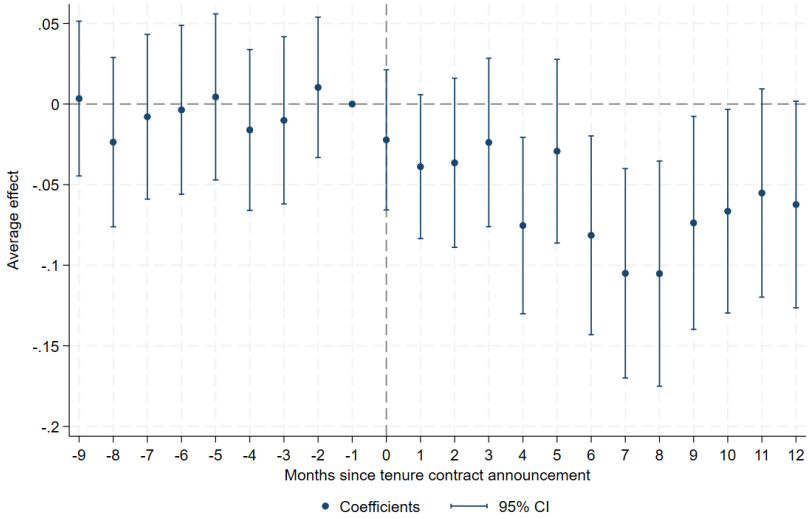
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Figure 1: Worker Productivity before and after Tenure

(a) Residualized ln Daily Wage and Predicted Trend of ln Daily Wage by Experience

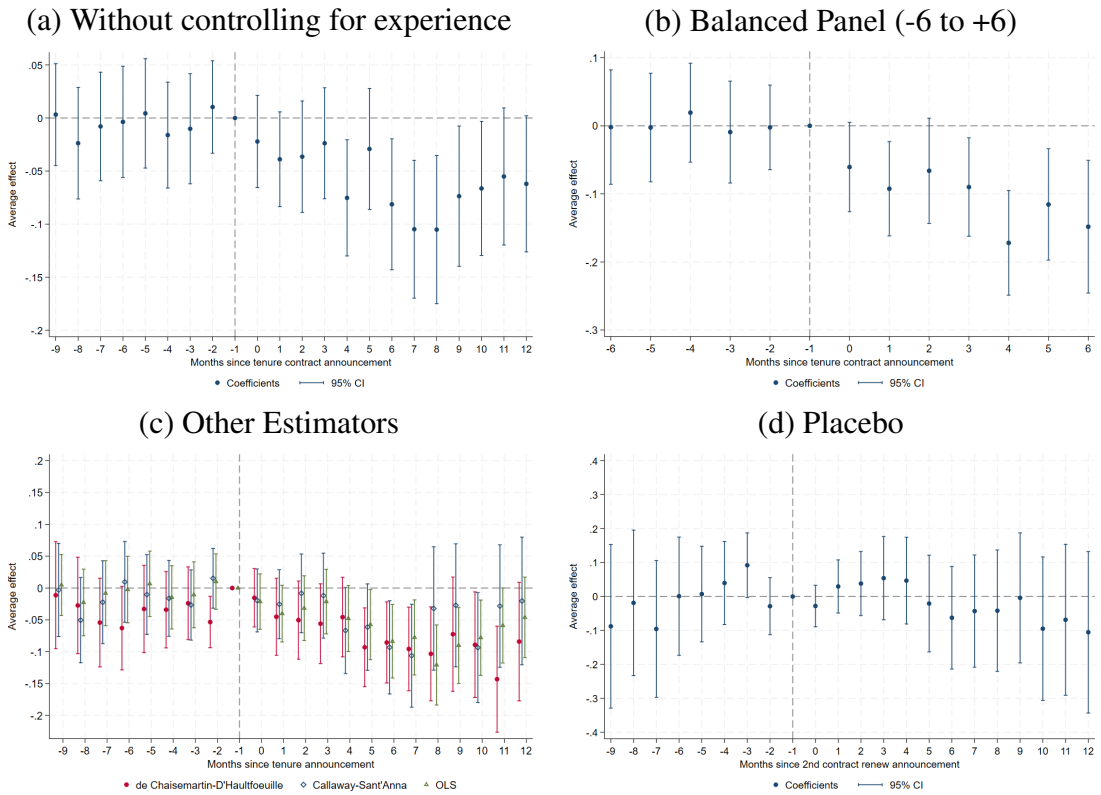


(b) Event Study



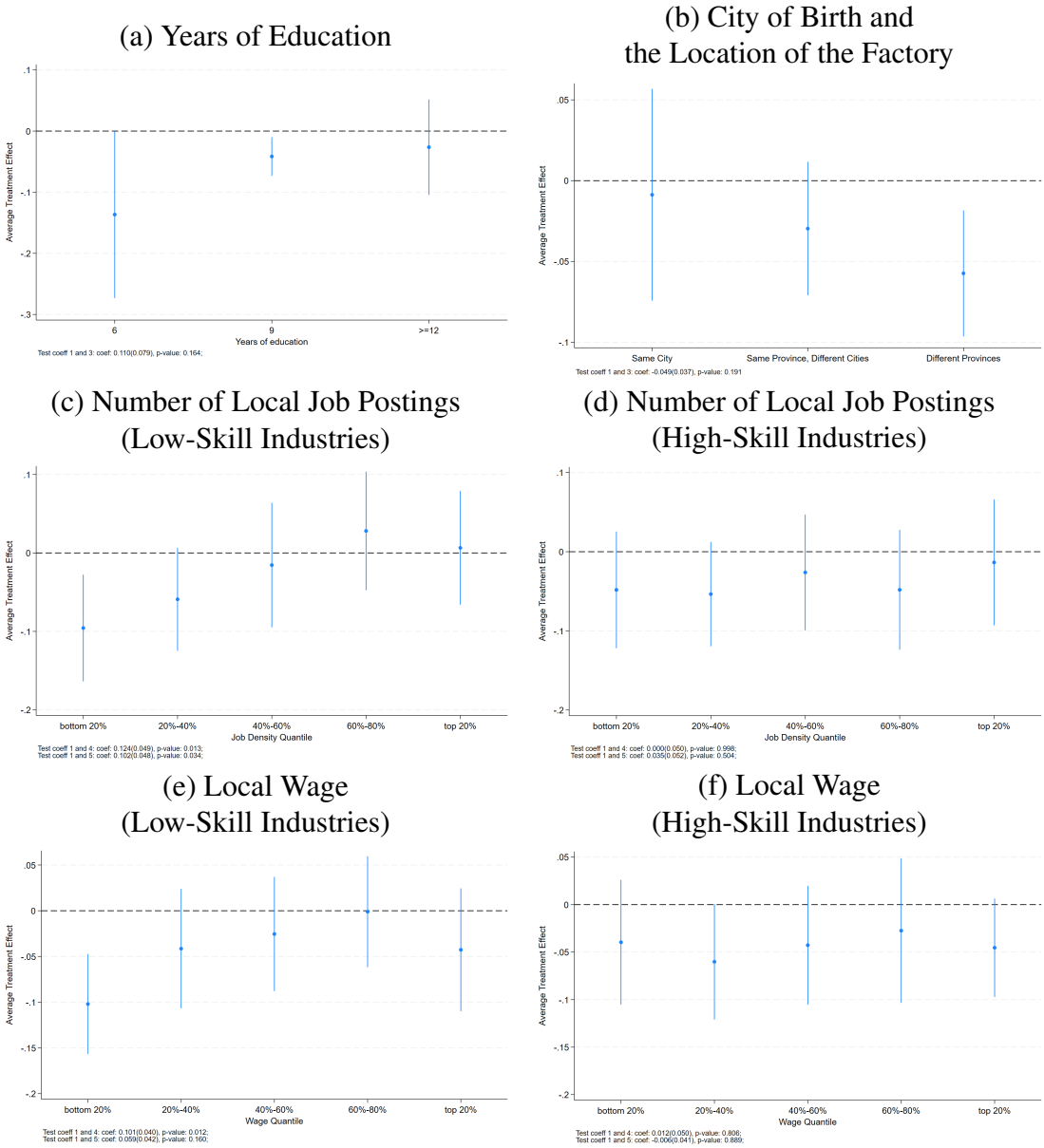
Notes: The sample restricts to workers who were tenured only. Suppose that we call the residual of ln daily wage after controlling for calendar date FE *res*. In panel (a), the blue line represents *res*. Red dots are the linear prediction of *res* by experience based on the observations from relative month -9 to -1, where the experience of workers is defined by relative month + 9. In panel (b), Month 2 is 30 days after the tenure starts. Month 1 is 30 days before the tenure starts, when the tenure is announced according to HR. Month 0 is ambiguous, since workers can be informed earlier. Panel (b) controls for individual fixed effects, calendar date fixed effects and pre-tenure experience trend. Standard errors are clustered at the individual level.

Figure 2: Robustness and Placebo



Notes: The samples for all 4 panels restrict to only workers who were tenured. For panel (a)-(c), month 2 is 30 days after the tenure starts. Month 1 is 30 days before the tenure starts, when the tenure is announced according to HR. Month 0 is ambiguous, since workers can be informed earlier. For panel (d), month 2 is 30 days after the second fixed-term contract starts. Month 1 is 30 days before the second contract starts, when the renewal is announced according to HR. Panel (b) excludes those who didn't work continuously from month -6 to +6 and obtains a balanced sample for month -6 to +6. The balanced sample contains 31.54% observations of the full sample. All 4 panels control for individual fixed effects, calendar date fixed effects and pre-tenure experience trend. Standard errors are clustered at the individual level.

Figure 3: Heterogeneity by Worker Outside Options



Notes: The samples for all 6 panels restrict to only workers who were tenured. For panel (c) and (d), we employ a job-post dataset at city-week level from 2018 to 2022. We take advantage of the degree requirement from the job posts and perform a more-specific match with the workers, since the education level of the workers are accessible. In panel (c) and (e), we restrict to a set of low-skill industries, including manufacture, service, agriculture, and transportation. In panel (d) and (f), we restrict to a set of high-skill industries, including IT, consulting, banking, aerospace, biotechnology and medical services. We re-scale the number of local job postings at the workers' cities of birth one year before tenure announcement by the city resident population in 2020. For panel (e) and (f), we employ a national tax survey data in 2016 and obtain the per capita wage of the local low-skill industries, including manufacture, service, agriculture, and transportation. All the quantiles are divided at the individual level. All 4 panels control for individual fixed effects, calendar date fixed effects and pre-tenure experience trend. Standard errors are clustered at the individual level.

Table 1: Other Outcomes

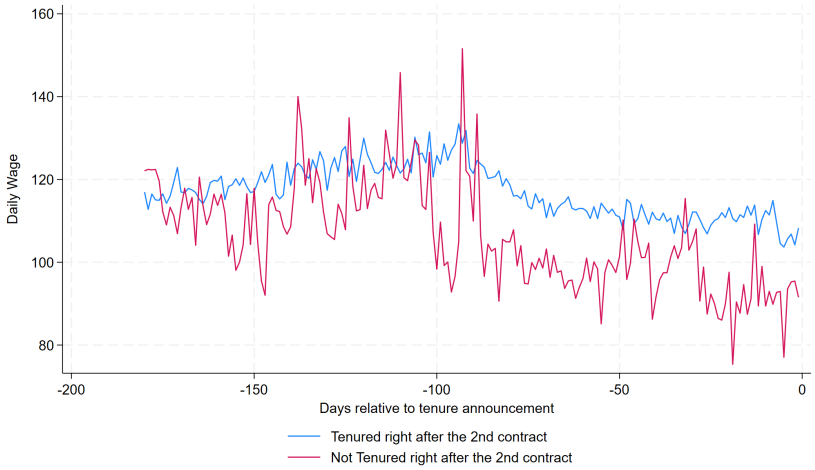
VARIABLES	(1) ln Daily Output	(2) Attendance	(3) Coworkers' Experience (Days)	(4) Monthly HHI	(5) Task Difficulty
ATT	-0.045***	0.001	3.463	-0.000	0.006
	(0.015)	(0.005)	(7.030)	(0.010)	(0.030)
Observations	283,963	371,373	283,963	11,791	11,791
R-squared	0.268	0.870	0.864	0.286	0.683
Individual FE	Yes	Yes	Yes	Yes	Yes
Date FE (or Year-Month FE)	Yes	Yes	Yes	Yes	Yes
Dependent Variable Mean	4.634	0.765	887.052	0.372	2.410

Notes: Columns (1)-(5) each present results from a separate OLS regression. Column (2) uses a sample where the dataset has been supplemented with workers' non-attendance dates, while columns (1), (3)-(5) use samples where observations exist only if the worker was present at work on that day or relative month. The supplemented non-attendance records are filled in only for the period between each worker's earliest and latest working dates. Both samples restrict to workers who were tenured only. $Attendance_{it}$ is a dummy variable that equals 1 when worker i is present at work on date t and 0 otherwise. The $Difficulty_{im}$ is defined as the average task difficulty for worker i in relative month m, weighted by the time spent on each task, which is calculated by multiplying standard time by output. The HHI_{im} is defined as the task hhi for worker i in relative month m, where the ratio of each task is calculated by dividing the time spent on that task by the total working time in that month. The $Experience_{it}$ is defined as the average experience of worker i's co-workers on date t, where co-workers are the ones who work on the same production line as worker i on date t. All regressions control for individual fixed effects and the pre-tenure experience trend. Columns (1)-(3) control for calendar date fixed effects, and (4)-(5) control for calendar year-month fixed effects. Robust standard errors clustered at the individual level are shown in parentheses. *** significant at the 1 percent level; ** significant at the 5 percent level; * significant at the 10 percent level.

A. Appendix

Figure A.1: Comparison of Productivity

(a) 6 Months before Tenure Announcement

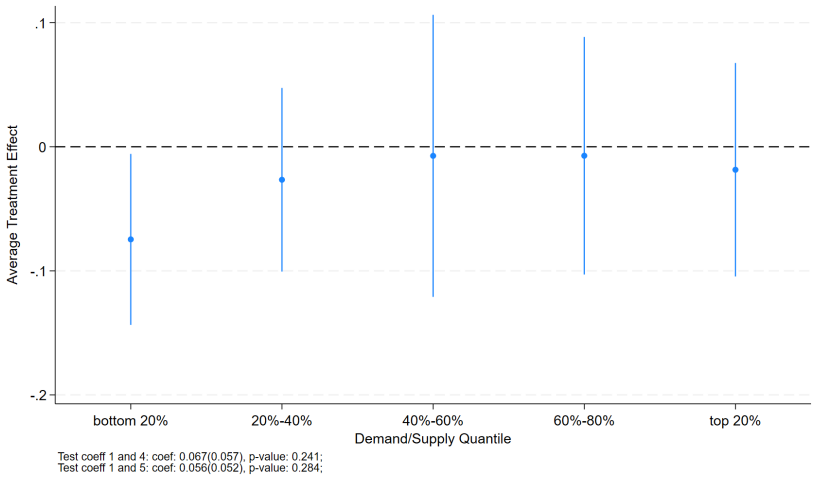


(b) 2 Months before Tenure Announcement



Notes: Panel (a) and (b) present the comparison of productivity between the workers who were tenured right after the second fixed-term contract (586 workers) and those who were not (104 workers). Panel (a) presents the comparison 6 months before tenure announcement, while panel (b) zooms in to 2 months before tenure announcement.

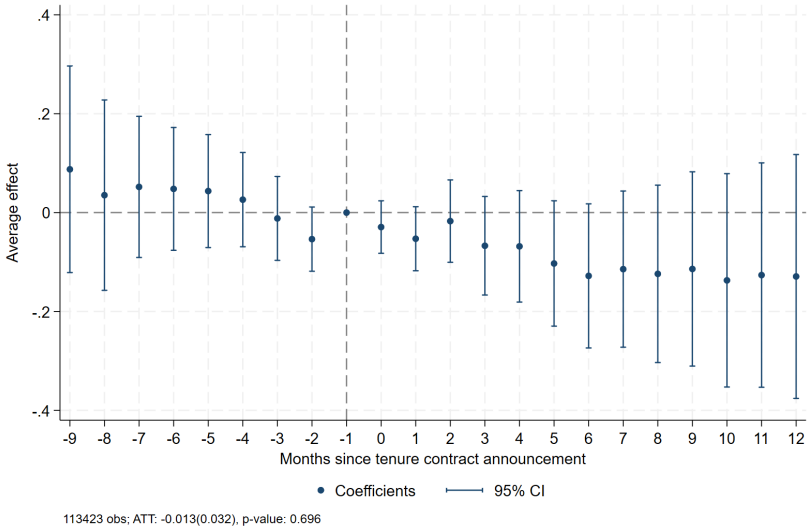
Figure A.2: Heterogeneity: Local Job Demand/Supply of Low-Skill Industries



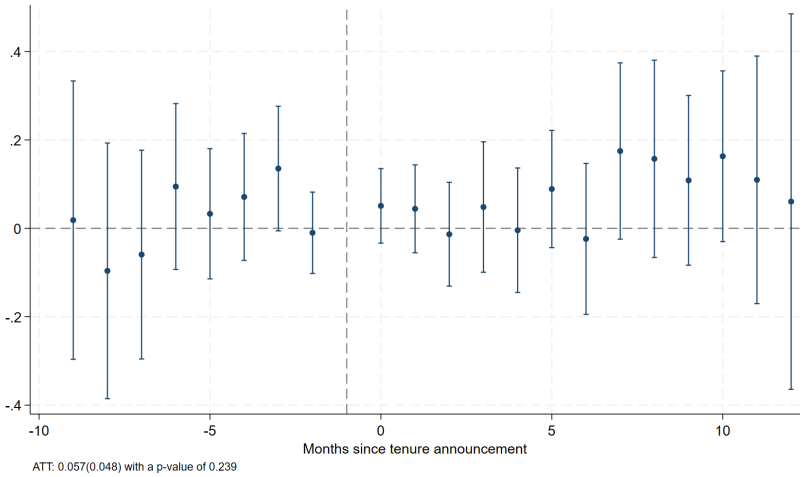
Notes: The sample restricts to workers who were tenured only. We employ a job-post dataset along with a job-applicant dataset at city-week level from 2018 to 2022. We restrict to a set of low-skill industries including manufacture, agriculture, service and transportation. We divide the number of local job postings at the workers' cities of birth by the number of local job applicants one year before tenure announcement and obtain a demand/supply ratio. The quantiles are divided at the individual level. The panel controls for individual fixed effects, calendar date fixed effects and pre-tenure experience trend.

Figure A.3: Results from Vietnam Plant

(a) Event Study



(b) CS-DID



Notes: The sample restricts to workers who were tenured 2 years after joining the factory only. Month 2 is 30 days after the tenure starts. Month 1 is 30 days before the tenure starts, when the tenure is announced according to HR. Month 0 is ambiguous, since workers can be informed earlier. Panel (a) and (b) control for individual fixed effects, calendar date fixed effects and pre-tenure experience trend. Standard errors are clustered at the individual level.