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Permanence and Performance: Temporary Contracts and Worker Effort

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Abstract

Can the prospect of permanent employment motivate worker effort under temporary contracts? We use daily production records from a Chinese garment factory where conversion to permanent contracts leaves piece rates and core tasks unchanged. Among workers who successfully convert, daily output falls by about 5 percent on average in the nine months after the conversion announcement. The decline is larger for workers with weaker outside options. A sister plant in Vietnam, where conversion was universal after two years of service, shows no comparable decline. These findings suggest that uncertainty about obtaining permanent employment induces additional effort under temporary contracts.

Keywords: temporary contracts, permanent contracts, employment protection, incentives, labor productivity

JEL classification: J41, M50, M54

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1. Introduction

Job security is a valued attribute of employment and a potential reward for current performance. Firms assess applicants using screening tools and managerial judgment (Hoffman, Kahn and Li, 2018) and continue to learn about worker productivity from performance on the job (Farber and Gibbons, 1996; Altonji and Pierret, 2001; Lange, 2007). Temporary contracts and probationary appointments provide time for this learning before firms offer permanent employment, particularly where employment protection makes such commitments costly to reverse (Bertola, 1990; Booth, Francesconi and Frank, 2002; Marinescu, 2009; Boeri, 2011). However, the prospect of conversion to a permanent contract may also shape the incentives of workers on temporary contracts. When observed performance influences the conversion decision, those who value job security may exert more effort than they would choose on the basis of current pay alone. How much additional effort does the prospect of permanent employment induce?

Identifying this incentive effect is difficult. Comparisons between temporary and permanent workers confound incentives with differences in ability, experience, and selection into permanent employment. Even when the same workers can be followed through contract conversion, permanent appointments often coincide with changes in compensation, responsibilities, and access to resources. A decline in a particular performance measure therefore need not imply a decline in effort. An academic who assumes additional administrative or supervisory duties after tenure, for example, may publish less without working less.

We study the incentive created by the prospect of permanent employment using detailed personnel records and daily production data from a Chinese garment factory. Workers are paid by the piece, and their piece rates and core responsibility of sewing garments remain unchanged after conversion. They also receive no additional production resources upon obtaining

a permanent contract. We follow the same workers around conversion and use detailed records of task assignments and coworkers to examine whether changes in task allocation or coworker composition account for the output response. This setting allows us to study changes in individual production around the transition to permanent employment while holding the piece-rate schedule and core production responsibilities fixed.

Under China's Labor Contract Law, continued employment beyond two consecutive fixed-term contracts (FTCs) generally requires an open-ended contract (OEC), subject to statutory conditions. At this Chinese plant, about 82 percent of workers who complete their second FTC obtain an OEC. Workers who eventually secure permanent employment have higher productivity before the conversion decision than those who do not. The combination of incomplete conversion and higher prior productivity among successful workers is consistent with performance playing a role in securing permanent employment.

The piece-rate setting provides a useful benchmark for interpreting workers' behavior. In a static model, a worker chooses output to equate the marginal cost of production with the payment for an additional unit (Lazear, 2000). If higher output also improves the probability of obtaining a permanent contract, effort yields an additional return through its effect on future employment. Workers may then exert more effort than they would choose on the basis of current piece-rate earnings alone. Once permanent status is confirmed, the incentive to influence the conversion decision disappears, even though the piece rate continues to reward production. This reasoning therefore predicts a decline in output when workers learn that they will receive a permanent contract.

Workers hired on different dates reach the conversion decision at different points in calendar time. We exploit this staggered timing to estimate the effect of conversion on individual productivity using the imputation estimator of Borusyak, Jaravel and Spiess (2024). The analysis

follows workers who eventually obtain permanent contracts and measures changes in daily output around the month in which they are informed that they will receive an OEC. We refer to this event as the conversion announcement. Focusing on the announcement aligns the analysis with the resolution of uncertainty about permanent status.

We estimate an average decline of about 5 percent in daily output during the nine months following the conversion announcement. Output falls by about 3 percent in the announcement month, with the decline deepening to 7–10 percent seven to nine months later. The negative pattern persists under the alternative estimators of Callaway and Sant'Anna (2021) and de Chaisemartin and D'Haultfœuille (2026). Thus, output falls even though workers continue to receive the same payment for each additional unit they produce.

Detailed production records allow us to examine whether changes in the organization of work account for this decline. Task allocation can affect worker productivity even when broad job responsibilities remain unchanged (Adhvaryu, Kala and Nyshadham, 2022). We find no evidence that the decline is driven by workers being assigned more difficult tasks, performing a broader range of tasks, or being paired with more junior colleagues. Together with the unchanged piece rates and production resources, these findings support an interpretation in which workers reduce productive effort after permanent employment is confirmed.

An unusual feature of our setting is the opportunity to compare the Chinese plant with a sister plant in Vietnam operated by the same firm. The two plants share the same layout and organizational structure, and all senior managers at the Vietnamese plant were transferred directly from the Chinese plant. Vietnam also generally requires conversion to an OEC when employment continues beyond two consecutive FTCs. At the Vietnamese plant, every worker who completed a second FTC during our sample period received an OEC, reflecting the high cost of replacing workers there (see Section 2.4). The two plants therefore differ in the observed

risk of failing to obtain permanent employment among workers reaching the end of their second contract.

We find no systematic decline in daily output around conversion announcements in Vietnam. This contrast is consistent with the proposed mechanism: the incentive to influence a conversion decision should be weaker when workers expect permanent employment regardless of their current performance. The comparison provides suggestive evidence that uncertainty about obtaining permanent status contributes to the additional effort observed in China.

The incentive to secure a permanent contract should also depend on the value of the job relative to workers' outside options. When alternative employment opportunities are less attractive, obtaining permanent employment is more valuable, strengthening the incentive to exert additional effort before conversion.[1] Consistent with this prediction, post-announcement output declines are larger among workers with lower educational attainment, migrant workers, and workers from cities with fewer employment opportunities—groups that plausibly face weaker outside options. These patterns are consistent with Lazear, Shaw and Stanton (2016), who find that workers exert greater effort when local labor market conditions are worse.

Our findings contribute to three strands of research. First, we contribute to research on dynamic incentives within employment relationships. Deferred compensation, promotion schemes, and career concerns can shape effort over a worker's career (Lazear, 1981; Lazear and Rosen, 1981; Malcomson, 1984; Gibbons and Murphy, 1992; Holmström, 1999; Dewatripont, Jewitt and Tirole, 1999). A close conceptual antecedent is Landers, Rebitzer and Taylor (1996), who theoretically show how the prospect of partnership can induce law-firm associates to work longer hours than they would choose based on current compensation alone. We examine a

[1]This mechanism parallels efficiency-wage models, in which the threat of job loss disciplines effort more strongly when workers have less attractive alternatives (Shapiro and Stiglitz, 1984; Cappelli and Chauvin, 1991). Here, however, the relevant risk is non-conversion rather than dismissal. Because workers face the same piece-rate schedule, differences in outside options operate through effort rather than pay.

related incentive in a setting where workers seek permanent employment while their piece rates and core tasks remain unchanged. This allows us to isolate the incentive created by the prospect of job security from changes in current compensation or job responsibilities.

Second, we contribute to research on temporary contracts, employment protection, and their effects on productivity and worker behavior. Prior work examines dismissal costs and firm performance (Autor, Kerr and Kugler, 2007; Martins, 2009), accident risk under fixed-term contracts (Guadalupe, 2003), unpaid overtime among temporary workers (Engellandt and Riphahn, 2005), and teacher absences following changes in dismissal rules (Jacob, 2013). In closely related work, Ichino and Riphahn (2005) document increased absenteeism at an Italian bank when probation ends and employment protection begins. We complement this evidence with individual production data around the announcement of permanent status. Unchanged piece rates and core tasks, detailed assignment data, and a comparison with a sister plant allow us to provide direct evidence on workers' incentives to secure permanent employment.

Third, we connect the incentive effects of prospective job security to research on workers' preferences over job attributes. Studies of flexibility, working conditions, and employment security infer these preferences from stated or experimentally elicited job choices (Mas and Pallais, 2017; Wiswall and Zafar, 2018; Maestas et al., 2023; Datta, 2026). We complement this approach by examining production choices within an ongoing employment relationship. Our evidence thus shows how a valued job attribute can shape effort before workers obtain it and highlights the importance of the path to permanent employment for understanding the productivity consequences of employment protection.

2. Institutional Background

2.1. Labor Contract Law in China

China's Labor Contract Law, which took effect in 2008 and was amended in 2012, restricts the repeated use of fixed-term contracts (FTCs). Under Article 14, renewal after two consecutive FTCs with the same employer generally requires an open-ended contract (OEC), subject to statutory eligibility conditions and unless the employee requests another FTC. The completion of the second FTC therefore marks a key point at which continued employment normally entails conversion to permanent status.

Conversion to an OEC strengthens job security by removing contract expiration as a route to separation. To dismiss an OEC worker unilaterally, an employer must establish a statutory ground, such as a serious violation of workplace rules, and comply with the applicable procedural requirements. Workers can challenge an unlawful dismissal through the labor dispute resolution system and seek reinstatement together with recovery of wages lost during the dispute. If the worker does not seek reinstatement, or if continued performance of the contract is no longer possible, the employer must instead pay compensation equal to twice the applicable statutory severance amount.

This potential punitive compensation and the associated legal framework significantly increase the cost of firing OEC workers. Consequently, OEC workers face a substantially lower risk of job loss than FTC workers, for whom contract non-renewal requires no justification. The disparity in employment security between these two statuses creates a powerful incentive for workers to secure permanent contracts, with the pre-tenure period serving as a screening phase for the firm and a signaling phase for the worker.

2.2. Production Environment

The garment manufacturer we study is headquartered in eastern China. Our main analysis focuses on its Chinese plant, a major production site for a leading global fashion brand. The factory is one of the region's largest garment exporters, shipping products to more than 20 countries and regions. Production consists of three stages: cutting, sewing, and finishing. We focus on the sewing workshops, where output can be measured directly at the individual level.

The Chinese plant has four sewing workshops, each overseen by a supervisor and comprising approximately ten production lines. A typical line employs around 30 workers and is managed by a line manager, who assigns daily tasks and adjusts assignments as production progresses. Each line generally produces a single garment style until its production quota is met.[2] Workers operate at fixed workstations, where their output is automatically collected and recorded.

Although workers are organized into production lines, the factory's use of multi-piece flow limits the mechanical interdependence of individual output. Under single-piece flow, each garment or component moves to the next workstation as soon as an operation is completed. A slowdown at one station can therefore leave downstream workers waiting for inputs and constrain upstream workers as completed pieces accumulate. Such interdependence can cause a change in one worker's productivity to affect output elsewhere on the line, complicating the measurement of individual responses to incentives.

The factory instead transfers output in batches and maintains inventories of partly completed garments between workstations, known as work-in-process (WIP) buffers. These buffers accommodate temporary differences in production rates across stations, reducing the extent to which delays elsewhere on the line constrain an individual worker's output. Line managers can also alleviate bottlenecks by reassigning workers across tasks. Together, inventory buffers

[2]During peak seasons, some lines produce multiple styles simultaneously, although this is uncommon.

and flexible task assignments reduce mechanical dependencies within a line, making individual output more informative about a worker's own response to incentives.

2.3. Contracts and Compensation

Workers in our sample initially received a one-year FTC, followed by a three-year renewal. Near the end of the second FTC, the human resources department assessed each worker's eligibility for conversion to an OEC, based primarily on production records and supplemented by managers' assessments of work attitude and safety compliance. Workers were informed of the conversion decision approximately one to two months before their contracts expired. About 82.3% of sewing workers who completed their second FTC received an OEC (or "tenure"). Among these workers, average daily output before the conversion decision was 17.4% higher than among those who completed their second FTC but were not converted.

Workers' total earnings consist of piece-rate wages, team bonuses, a housing subsidy, and a full-attendance bonus.[3] Frontline sewing workers earn an average of CNY 5,164 (about USD 755) per month. Piece-rate wages account for approximately 60–70% of total earnings, making individual output the main determinant of pay. The piece rate for each task is identical across workers and does not vary with tenure status; the housing subsidy and full-attendance bonus likewise remain unchanged upon conversion to an OEC.

2.4. Sister Plant in Vietnam

The firm also operates a relatively new sister plant in Vietnam. The two plants share the same layout and organizational structure, and all senior managers at the Vietnamese plant were transferred directly from the Chinese plant. The wage structure is the same, although piece rates

[3]Line managers determine team bonuses and may use them to compensate for productivity losses arising from collaboration or unforeseen events. For example, a worker reassigned to unfamiliar tasks during a teammate's sick leave may receive additional compensation for the resulting loss of efficiency.

are approximately 50% lower in Vietnam. Like China, Vietnam generally requires conversion to an OEC when employment with the same employer continues beyond two consecutive FTCs. Each FTC at the Vietnamese plant lasts one year, so workers reach the point of conversion after two years of employment.

A key difference is that every worker at the Vietnamese plant who completed a second FTC during our sample period received an OEC. Local labor market conditions help explain this pattern. The plant's location in a city on the Vietnam–China border facilitates imports of raw materials, most of which come from China, while proximity to an international shipping port facilitates exports of finished garments. However, the local labor supply is relatively limited, making workers harder to recruit and more costly to replace than in Vietnam's major industrial centers.

Given these replacement costs and the plant's ongoing expansion, management does not use conversion to select among workers completing a second FTC. To the extent that workers anticipate this practice, they should have less incentive to exert additional effort to influence the conversion decision. Our main analysis focuses on the Chinese plant, where conversion is selective. In Section 7, we examine productivity around conversion at the Vietnamese plant, where all workers completing a second FTC receive an OEC.

3. Data

We use the firm's personnel and detailed daily production records. The production records cover January 2019 through July 2021, and the personnel records were last updated in May 2023. The personnel records include workers' gender, birth year, birthplace where available, education, hire date, contract status, and departure date if applicable. We restrict the analysis to workers in

the sewing workshops who eventually transition from an FTC to an OEC.[4] The resulting sample comprises 459 workers at the Chinese plant and 340 at the Vietnamese plant. More than 90% are female, and most have a middle school or high school education (Appendix Table A.1). At the Chinese plant, 61% of sample workers are migrants from other provinces.[5]

We construct a worker-day panel from task-level production records. For each task, we observe its piece rate, a difficulty score and a standard time per piece assigned by the industrial engineering department, and the machine used; each task involves at most one machine. The records report the number of pieces each worker completes each day on each task, such as sewing left sleeves for a particular garment style. Workers perform an average of 2.3 distinct tasks per day.

Because the records do not report time spent on individual tasks, we cannot measure task-level output per hour. We instead measure daily output in monetary units by multiplying the number of pieces completed on each task by its regular piece rate and summing across all tasks performed by the worker that day. When expressed in Chinese yuan, this measure is substantially higher at the Chinese plant than at the Vietnamese plant (Appendix Table A.1), largely reflecting higher piece rates but also higher productivity in China.

Two features of this measure merit clarification. First, although the firm pays twice the regular piece rate for Saturday production, we use regular rates throughout so that the Saturday premium does not mechanically increase measured output.[6] Second, daily output reflects both output per hour and hours worked, both of which may respond to incentives. Workers within each workshop follow the same daily shift schedule. In the main analysis, we residualize log daily output using line-by-day fixed effects, which absorb variation in scheduled working time

[4]The sample includes workers whose OEC begins after the production records end in July 2021, whom we identify from personnel records updated in May 2023.
[5]Birthplace data are unavailable for workers at the Vietnamese plant, but most workers are from the province in which the plant is located.
[6]Workers at the firm normally work on Saturdays.

and other production conditions common to workers on the same line and day.

4. A Simple Model of Effort under Temporary Contracts

We present a simple model of how the prospect of permanent employment creates effort incentives beyond current pay for workers on temporary contracts. The firm commits to a conversion standard, which workers observe before choosing effort. Appendix B solves the worker's and firm's problems by backward induction and provides the full derivations.

A worker of type $k \in \{H, L\}$ produces output $y = a_k e + \varepsilon$, where e denotes effort, a_k captures the productivity of effort, with $a_H > a_L > 0$, and ε is a mean-zero output shock with density $g(\cdot)$. A newly hired worker on a temporary contract is high type with probability λ. Workers know their own type, while the firm observes output but not effort or type. Workers receive a piece rate $w > 0$ and incur effort cost $\gamma e^2/2$, where $\gamma > 0$. The firm offers an OEC if output meets the conversion standard $\bar{y}$. Under an OEC, retention no longer depends on output, so a type-k worker chooses the piece-rate benchmark effort, $e_k^P = wa_k/\gamma$.

At this effort level, the discounted value of the worker's expected piece-rate earnings net of effort costs is $V_k^P = w^2 a_k^2/[2\gamma(1-\beta)]$, where $\beta \in (0,1)$ is the discount factor. If she falls short of the conversion standard, the match ends and she receives V_k^O, the exogenously given lifetime value of her outside option. The gain from receiving an OEC is therefore $\Delta_k \equiv V_k^P - V_k^O$.

While on the temporary contract, the worker can influence the probability of obtaining this gain through her choice of effort. Under the uniqueness and second-order conditions stated in Appendix B, optimal effort before conversion, e_k^T, satisfies

$$e_k^T - e_k^P = \frac{\beta a_k}{\gamma} g(\bar{y} - a_k e_k^T)\Delta_k.$$

The additional return to effort depends on both the value of permanent employment and the extent to which performance affects conversion.

Although this expression is not a closed-form solution for the effort gap, since e_k^T also appears inside the density term, it yields three important predictions. First, workers exert additional effort when permanent employment is more valuable than the outside option, $\Delta_k > 0$, and performance is pivotal for conversion, $g(\bar{y} - a_k e_k^T) > 0$. Second, holding the conversion standard and other worker characteristics fixed, a weaker outside option increases this effort premium. Third, the premium disappears when conversion is independent of effort. More generally, it becomes small when additional effort has little effect on the conversion probability. These predictions concern the incentive to influence the conversion decision, which ends once a binding decision is announced.[7]

Appendix B also characterizes the firm's optimal conversion standard. The firm balances current output and the value of retained workers against replacement costs. At an interior optimum satisfying the stated regularity conditions, higher replacement costs lead to a more lenient standard. Effort need not vary monotonically with the standard, but incentives become weak when the standard is sufficiently lenient that additional performance has little effect on conversion. This provides a rationale for examining differences in effort responses across plants with different conversion practices.

[7]The model abstracts from the interval between the conversion announcement and the OEC start date. The announcement removes the additional incentive if subsequent performance can no longer affect conversion.

5. Permanent Employment as an Incentive

5.1. Output around Contract Conversion

Our goal is to measure changes in daily output around the month in which workers are informed that they will receive an OEC. Because hiring dates differ, conversion decisions occur at different points in calendar time. Before estimation, we residualize log daily output using line-by-day fixed effects estimated from the full set of production records. This removes variation common to workers on the same production line and day, including shared changes in working hours and production conditions. We then estimate

$$Y_{it} = \beta D_{it} + \delta_i + \gamma_t + \varepsilon_{it}, \tag{1}$$

where Y_{it} denotes worker i's residualized log daily output on calendar date t, and D_{it} equals one from the beginning of the worker's announcement month (defined below) onward. Worker fixed effects, δ_i, absorb time-invariant worker characteristics, while calendar-day fixed effects, γ_t, absorb shocks common to all workers on a given date.

Workers are typically informed of the conversion decision one to two months before their OEC begins. We therefore define event month 0 as the calendar month two months before the OEC start month, corresponding to the beginning of the usual announcement window. Conversion decisions are typically fully communicated by event month 1, and OECs take effect in event month 2. Throughout the analysis, we refer to event month 0 as the announcement month. We include all workers who eventually obtain an OEC and have pre-announcement production observations, and use observations through event month 9.

To accommodate staggered treatment timing and heterogeneous effects, we estimate equa-

tion (1) using the imputation estimator of Borusyak, Jaravel and Spiess (2024), hereafter BJS. The estimator first fits the untreated-outcome model using pre-announcement worker-day observations and uses the estimated worker and calendar-day fixed effects to impute untreated potential outcomes after the announcement. The difference between observed and imputed output yields a treatment-effect estimate for each treated worker-day. We aggregate these differences to obtain the pooled post-announcement average treatment effect on the treated, β. Standard errors are clustered at the worker level.

For the event study, we aggregate the worker-day treatment-effect estimates by post-announcement event month to trace the evolution of the output response. For the pre-announcement months, the standard BJS procedure estimates pre-trend coefficients using a separate two-way fixed-effects regression among not-yet-treated observations, with pre-announcement event-month indicators and the same fixed-effect structure as in the imputation model.[8]

Figure 1 presents the dynamic response of daily output around the announcement of permanent employment. None of the pre-announcement coefficients is statistically distinguishable from zero. Output falls by about 3 percent in the announcement month, with the decline deepening to 7–10 percent seven to nine months later, consistent with a gradual reduction in effort after workers learn that they will receive permanent contracts. Column (1) of Table 1 reports a pooled BJS estimate of -0.052, statistically significant at the 1 percent level and corresponding to an average decline in daily output of about 5 percent.

We assess robustness to alternative estimators. Columns (2)–(4) of Table 1 report estimates from conventional two-way fixed-effects OLS and the methods of Callaway and Sant'Anna

[8]We normalize pre-announcement coefficients relative to event month 1 and pool months 9 and earlier. This only re-normalizes BJS's test with eight leads and leaves the joint test unchanged. Post-announcement estimates are instead measured relative to workers' average pre-announcement output, so the two sets of coefficients do not share a common baseline (Roth, 2026).

(2021) and de Chaisemartin and D'Haultfœuille (2026), corresponding to average declines in daily output of approximately 3.5–4.3 percent. All are statistically significant at the 5 percent level. Appendix Figure A.1 presents the corresponding event-study estimates. Although the timing and magnitude of the initial response vary across methods, all four estimators yield predominantly negative post-announcement effects that become larger later in the event window.

We also examine whether heightened concerns about job security during the COVID-19 pandemic drive the results for China. Reestimating the event study using only observations before January 23, 2020, yields a larger post-announcement decline (Appendix Figure A.2, panel (a)), indicating that pandemic-related job insecurity does not account for the main finding. However, this result should be interpreted with caution, as the pre-COVID-19 sample spans only about 13 months, leaving estimates at longer horizons based on relatively few workers.

The output estimates capture the intensive margin of production, conditional on recorded attendance. We therefore also examine whether the announcement affects daily attendance.[9] Column (1) of Table 2 shows an estimated decrease in attendance of 0.1 percentage points, with a standard error of 0.4 percentage points. The estimate is small and statistically indistinguishable from zero. One possible explanation is that prolonged unauthorized absence is easily observable and provides a contractually defensible ground for dismissal without statutory severance even under an OEC, leaving workers little scope to adjust along the attendance margin.

5.2. Alternative Explanations for the Output Decline

Production workers continue to perform the same core tasks after receiving an OEC. We nevertheless examine whether changes in coworker composition or task assignments alter their responsibilities in ways that could explain the decline in output.

[9]We define attendance as positive output on at least one task during the day. The sample excludes days when the entire factory is closed, including Sundays, public holidays, and additional days off around Chinese New Year. The mean attendance rate is 96 percent.

First, managers may draw on workers' firm-specific knowledge after conversion by assigning them to lines with less experienced coworkers. Additional mentoring responsibilities could reduce their own output even without a decline in effort. Using average coworker experience within each production line, measured in days, as the dependent variable, we obtain a positive but statistically insignificant estimate (Column (2) of Table 2). We therefore find no evidence of systematic reassignment toward less experienced coworkers after conversion.

Second, managers may assign workers more difficult tasks or a broader mix of tasks after conversion. Such changes could reduce output through greater task demands, switching costs, or task-specific learning even if effort remained unchanged. We measure task breadth using a monthly Herfindahl–Hirschman index (HHI) of each worker's standard-time-weighted output shares across task categories, where categories are defined by the combination of task difficulty and machine used.[10] The estimates for the monthly HHI and average task difficulty, reported in Columns (3) and (4) of Table 2, are small and statistically indistinguishable from zero.

Taken together, these results provide no evidence that changes in coworker composition, task breadth, or task difficulty account for the decline in output after the OEC announcement.

6. Outside Options and the Output Decline

The model predicts a stronger effort response among workers with weaker outside options. When alternative employment opportunities are limited or less attractive, workers face a higher cost of job loss and therefore place greater value on the employment protection provided by an OEC. They should consequently exert more effort while on an FTC, generating a larger decline in productivity after the conversion announcement. We test this prediction using three proxies for outside options: education, migration status, and labor market conditions in workers'

[10] A lower HHI indicates a more diverse task mix.

hometowns.

More educated workers are likely to qualify for a broader set of alternative jobs, while workers born in the same province as the factory may face lower relocation costs and benefit from stronger regional networks (Munshi, 2003; Barwick et al., 2023). Panel (a) of Figure 2 shows that the post-announcement decline is largest among workers with at most primary school education, whose output falls by approximately 9%. The decline is about 5% among workers with middle school education and close to zero among those with a high school education or above. All three pairwise differences across education groups are statistically significant at the 1 percent level. Panel (b) shows a similar pattern by place of origin: output falls by approximately 6% among workers born outside the factory's province, compared with about 2% among workers born within the province. The difference of 4.1 percentage points between the two groups is also statistically significant at the 1 percent level.

We next examine whether the decline is larger among workers from cities with fewer employment opportunities. We proxy hometown labor demand using job-posting data from Zhaopin, a major Chinese online recruitment platform whose data have been used in previous research (Kuhn and Shen, 2013). Because online recruitment is less prevalent in smaller cities, we restrict the analysis to workers born in the 100 cities with the most Zhaopin postings in 2018. These cities account for approximately 95% of postings in our data and 55% of workers at the Chinese plant. For each worker, we measure hometown job-posting density as the number of postings in her city of birth during the year preceding the conversion announcement divided by the city's 2020 population, and assign workers to quartiles of this measure.

Panel (c) of Figure 2 shows an estimated output decline of approximately 5.1% among workers in the lowest quartile of hometown job-posting density. The decline is about 3.4% in the second quartile and 2.0–2.5% in the two highest quartiles. The point estimates therefore suggest

smaller declines where hometown employment opportunities are more abundant, although the differences between the lowest quartile and the third and fourth quartiles are not statistically significant at conventional levels ($p = 0.117$ and $p = 0.275$, respectively). Taken together with the results by education and migration status, these patterns provide suggestive support for the model's prediction that weaker outside options strengthen the incentive to secure permanent employment.

7. Conversion Standard and Worker Effort

The model in Section 4 predicts that the incentive to exert additional effort before receiving an OEC depends on whether performance is pivotal for conversion. When the conversion standard is sufficiently lenient, conversion becomes nearly universal, leaving little scope for additional effort to affect the probability of receiving an OEC. The model therefore predicts little or no additional pre-conversion effort and, consequently, little or no post-announcement decline in output in such settings.

The sister plant in Vietnam provides a useful setting in which to examine this prediction. As discussed in Section 2.4, the two plants have similar production environments and the same organizational structure. However, due to high replacement costs, the Vietnamese plant maintains a policy of granting an OEC to every worker who completes a second FTC.

Figure 3 presents the corresponding event-study estimates for the Vietnamese plant, with event months defined as in Section 5. The estimates indicate no systematic decline in daily output after the announcement. The pooled BJS estimate is positive, at 0.037 (standard error 0.026), and statistically indistinguishable from zero.[11] These findings are consistent with the model if

[11] Appendix Table A.2 reports qualitatively similar results using alternative estimators. Restricting the Vietnam event study to observations before January 23, 2020, likewise yields no systematic negative post-announcement pattern (Appendix Figure A.2, panel (b)).

workers perceive conversion as nearly certain and therefore see little scope for additional effort to affect the decision.

The contrast between the two plants suggests that the post-announcement decline in China is not a general feature of transitioning to an OEC. The decline is consistent with workers exerting additional effort when conversion is selective, while the absence of a comparable decline in Vietnam is consistent with weaker incentives when conversion is effectively guaranteed. Because the plants also differ in labor market conditions, piece rates, and stage of development, we view this comparison as supporting evidence rather than a causal test of the effect of conversion standards.

8. Conclusions

This paper examines how the prospect of permanent employment affects worker effort. Using daily production records from a Chinese garment factory, we find that workers who receive permanent contracts reduce output after learning that their conversion has been approved, despite unchanged piece rates and core production tasks. The decline reaches 7–10 percent seven to nine months after the announcement and is larger among workers with plausibly weaker outside employment opportunities. At a sister plant in Vietnam, where every worker completing a second temporary contract during our sample period received a permanent contract, we find no systematic decline around the announcement. Together, these findings suggest that workers exert additional effort when performance can influence their chances of securing permanent employment.

The results highlight an incentive role for job security that operates before a permanent contract is granted. When current performance can influence access to a valuable continuing employment relationship, the prospect of permanence provides a return to effort beyond current

earnings. This incentive can be substantial even under piece-rate compensation and is stronger when workers have less attractive outside options. Evaluating employment protection therefore requires attention not only to its effects after protection is granted, but also to the incentives created by the process through which workers obtain it. A broader assessment must weigh these incentive effects against workers' exposure to employment risk and potential consequences for match quality and investment in skills. Our findings show that prospective job security can be an important source of incentives within the employment relationship.

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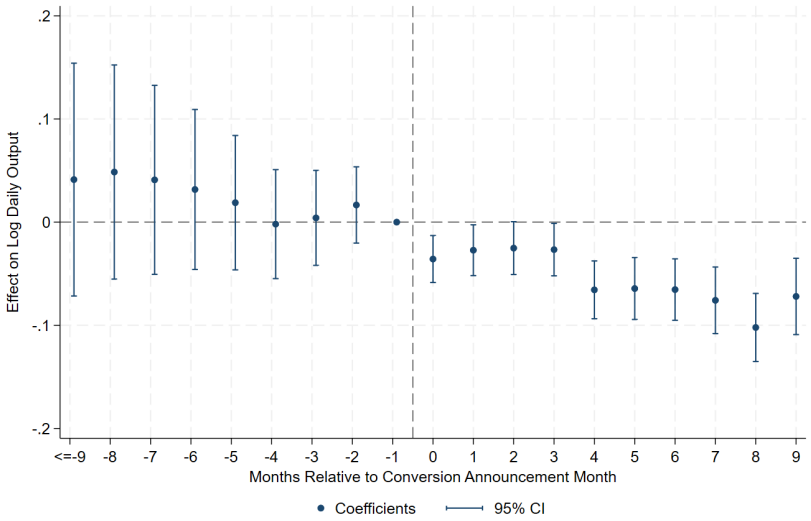
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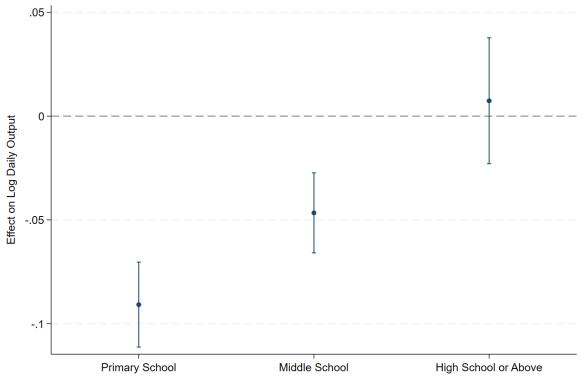
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Figure 1: Event-Study Estimates around Contract Conversion (China Plant)

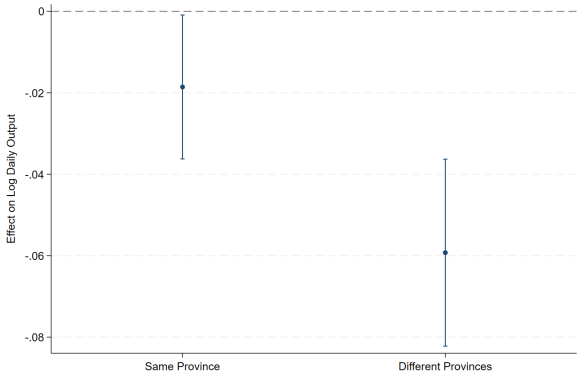


Notes: The figure presents event-study estimates of the effect of contract conversion announcement on log daily output for the plant in China. The sample is restricted to workers who transition from a fixed-term contract to an open-ended contract (OEC). Workers are typically informed of the conversion decision one to two months before their OEC begins. Therefore, we define event month 0 as two months before the worker's OEC begins. At event month -1, workers have not yet been informed of the conversion decision. At event month 0, they are likely to have been informed; by event month 1, workers have been informed of the decision; and at event month 2, their OECs begin. Before estimation, log daily output is residualized using line-by-day fixed effects estimated from the full set of production records. Coefficients for event month 0 and later are estimated using the imputation estimator of Borusyak, Jaravel and Spiess (2024) (BJS). Following the pre-trend procedure recommended by BJS, coefficients for the earlier event months are estimated separately using a two-way fixed-effects regression on untreated observations, with event month -1 as the omitted reference period. Event months -9 and earlier are pooled into a single indicator, labeled ≤ -9. Both the imputation model and the pre-period regression include worker and calendar-day fixed effects. Standard errors are clustered at the worker level.

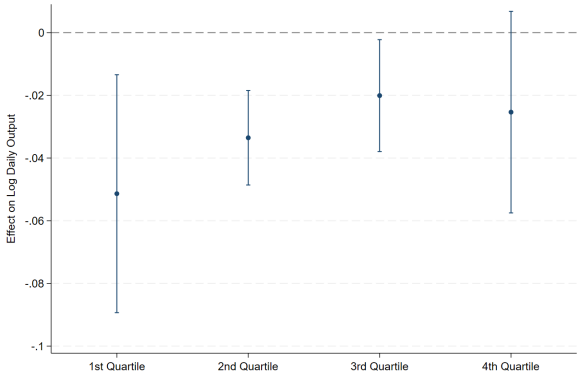
Figure 2: Heterogeneity by Workers' Outside Options



(a) Educational Attainment



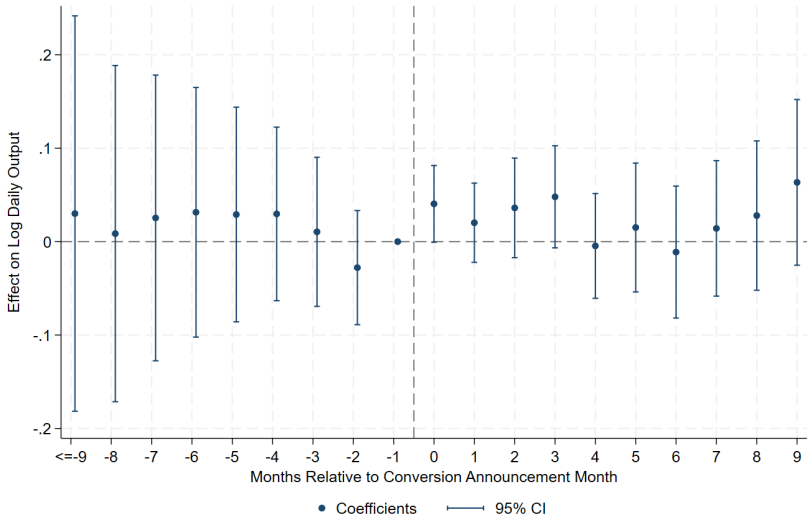
(b) Province of Birth Relative to the Factory



(c) Hometown Labor Demand

Notes: The figure reports the post-announcement productivity effect estimated separately across subgroups that proxy the quality of workers' outside options. Estimates are obtained using the imputation estimator of Borusyak, Jaravel and Spiess (2024) on the relevant subsample of workers who transition from a fixed-term contract to an open-ended contract. Each marker plots the average post-announcement treatment effect for one subgroup, with its 95% confidence interval. Before estimation, log daily output is residualized using line-by-day fixed effects estimated from the full set of production records. The imputation model includes worker fixed effects and calendar-day fixed effects. Panel (a) groups workers by education level: primary school, middle school, and high school or above. Panel (b) groups workers according to whether their province of birth is in the factory's province or in another province. Panel (c) groups workers into quartiles of hometown labor demand, calculated as the total number of postings across all industries in their city of birth during the year preceding the conversion announcement divided by the city's 2020 population. The first quartile contains workers from cities with the lowest job-posting density, whereas the fourth quartile contains workers from cities with the highest job-posting density. Standard errors are clustered at the worker level.

Figure 3: Event-Study Estimates around Contract Conversion (Vietnam Plant)



Notes: The figure presents event-study estimates of the effect of contract conversion announcement on log daily output for the plant in Vietnam. The sample is restricted to workers who transition from a fixed-term contract to an open-ended contract (OEC). Workers are typically informed of the conversion decision one to two months before their OEC begins. Therefore, we define event month 0 as two months before the worker's OEC begins. At event month -1, workers have not yet been informed of the conversion decision. At event month 0, they are likely to have been informed; by event month 1, workers have been informed of the decision; and at event month 2, their OECs begin. Before estimation, log daily output is residualized using line-by-day fixed effects estimated from the full set of production records. Coefficients for event month 0 and later are estimated using the imputation estimator of Borusyak, Jaravel and Spiess (2024) (BJS). Following the pre-trend procedure recommended by BJS, coefficients for the earlier event months are estimated separately using a two-way fixed-effects regression on untreated observations, with event month -1 as the omitted reference period. Event months -9 and earlier are pooled into a single indicator, labeled ≤ -9. Both the imputation model and the pre-period regression include worker and calendar-day fixed effects. Standard errors are clustered at the worker level.

Table 1: Average Effects on Daily Output (China Plant)

	Dep. var.: Log Daily Output			
	(1)	(2)	(3)	(4)
Post Announcement	-0.052***	-0.035***	-0.043**	-0.042**
	(0.011)	(0.011)	(0.018)	(0.018)
Observations	262,587	265,298	11,271	10,283
Method	BJS (2024)	TWFE	CSDID (2021)	dCDH (2026)

Notes: This table reports pooled post-announcement average treatment effects on the treated (ATT) using four estimators. The sample is restricted to workers who transition from a fixed-term contract (FTC) to an open-ended contract (OEC). The outcome is log daily output, residualized before estimation using line-by-day fixed effects estimated from the full set of production records. *Post Announcement* equals one from the worker's announcement month onward. Columns (1)–(4) report estimates using the imputation estimator of Borusyak, Jaravel and Spiess (2024) (BJS), conventional two-way fixed-effects OLS (TWFE), the estimator of Callaway and Sant'Anna (2021) (CSDID), and the estimator of de Chaisemartin and D'Haultfœuille (2026) (dCDH), respectively. BJS and TWFE use worker-day observations while CSDID and dCDH use worker-month observations. The TWFE sample contains 265,298 worker-day observations, while BJS excludes 2,711 observations for which untreated potential outcomes cannot be imputed, leaving 262,587 observations. The CSDID sample contains 11,271 worker-month observations, while dCDH excludes 988 observations because valid switcher-control comparisons require sufficient pre- and post-treatment support and available not-yet-treated controls, leaving 10,283 observations. Standard errors clustered at the worker level are reported in parentheses. ***, **, and * denote statistical significance at the 1, 5, and 10 percent levels, respectively.

Table 2: Changes in Attendance, Coworker Experience, and Task Assignment

Dep. var.:	(1) Attendance	(2) Coworker Experience	(3) Monthly HHI	(4) Task Difficulty
Post Announcement	-0.001	4.289	-0.000	-0.003
	(0.004)	(4.989)	(0.008)	(0.023)
Observations	273,885	263,250	10,854	10,854
Dependent Variable Mean	0.961	882.938	0.370	2.399

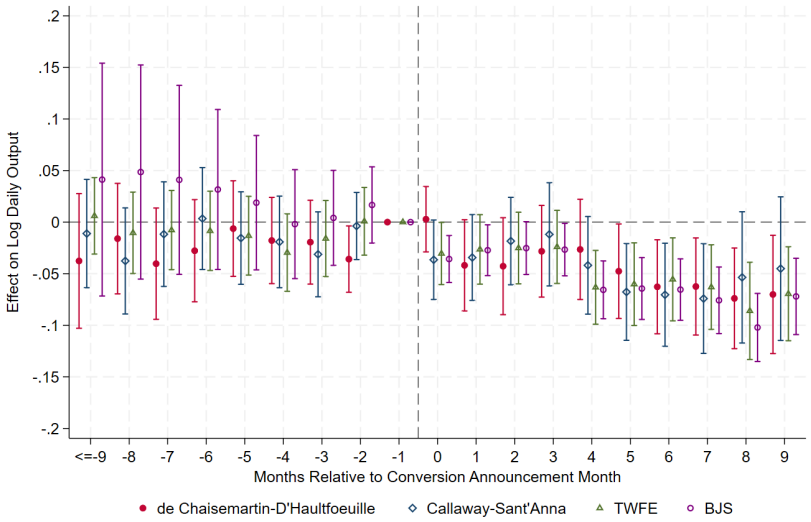
Notes: This table examines whether the decline in output after the OEC announcement is accompanied by changes in attendance, coworker composition, or task assignments. The sample is restricted to workers at the Chinese plant who transition from a fixed-term contract to an open-ended contract. *Post Announcement* equals one from the worker's announcement month onward. Estimates are obtained using the imputation estimator of Borusyak, Jaravel and Spiess (2024). Column (1) examines attendance. The sample adds zero-output observations for nonattendance days between each worker's entry into and departure from the factory and excludes days when the entire factory is closed, including Sundays, public holidays, and additional days off around Chinese New Year. Attendance equals one if the worker records positive output on that date and zero otherwise. Column (2) uses the worker-day production sample and measures coworkers' average experience at the factory, in days, among workers on the same production line and date. Columns (3) and (4) use a worker-month panel. Monthly HHI is a Herfindahl–Hirschman index of task concentration within each event month. Task categories are defined by the combination of difficulty and machine type, and task shares are based on standard-time-weighted output; a higher HHI indicates greater specialization. Task Difficulty is the average difficulty of assigned tasks within the event month, using standard-time-weighted output as weights. All specifications include worker fixed effects. Columns (1) and (2) include calendar-day fixed effects, while Columns (3) and (4) include calendar-year-month fixed effects. Standard errors clustered at the worker level are reported in parentheses. ***, **, and * denote statistical significance at the 1, 5, and 10 percent levels, respectively.

Online Appendix for

Permanence and Performance: Temporary Contracts and Worker Effort

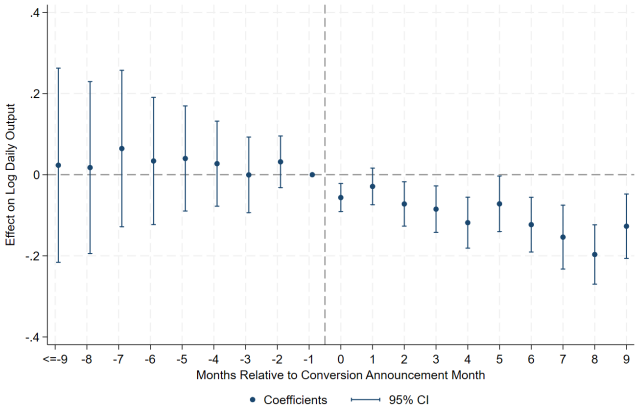
Appendix A. Additional Figures and Tables

Figure A.1: Event Study Using Alternative Estimators (China Plant)

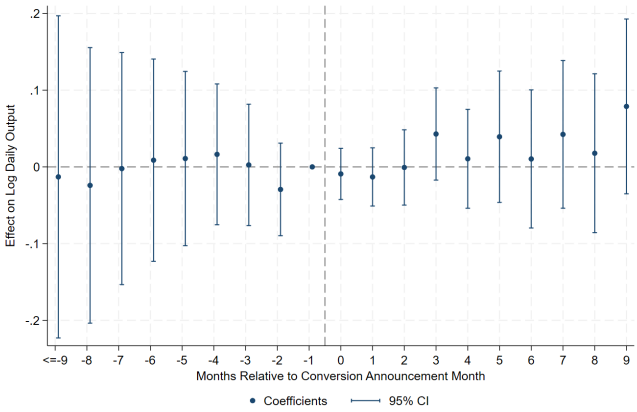


Notes: The figure compares event-study estimates from the estimator of de Chaisemartin and D'Haultfœuille (2026) (solid red points), the estimator of Callaway and Sant'Anna (2021) (hollow blue diamonds), conventional two-way fixed-effects OLS (hollow green triangles), and the estimator of Borusyak, Jaravel and Spiess (2024) (hollow purple circles). The sample is restricted to workers who transition from a fixed-term contract to an open-ended contract, with event month 0 denoting the announcement month. For all estimators, the leftmost estimate, labeled ≤ -9, pools event months -9 and earlier. Before estimation, log daily output is residualized using line-by-day fixed effects estimated from the full set of production records. All specifications include worker and calendar-time fixed effects. The corresponding pooled post-announcement average treatment effects are reported in Table 1. Standard errors are clustered at the worker level.

Figure A.2: Event Study: Pre-COVID-19 Sample



(a) China Plant



(b) Vietnam Plant

Notes: The figure presents event-study estimates of changes in log daily output around the OEC announcement for the plants in China and Vietnam. The sample is restricted to workers who transition from a fixed-term contract to an open-ended contract (OEC) and to observations before January 23, 2020, thereby excluding the period potentially affected by the COVID-19 pandemic. Workers are typically informed of the conversion decision one to two months before their OEC begins. We therefore define event month 0 as two months before the OEC start month, corresponding to the beginning of the usual announcement window. Workers have not yet been informed in event month -1, conversion decisions are typically communicated during event months 0 and 1, and OECs begin in event month 2. Before estimation, log daily output is residualized using line-by-day fixed effects estimated from the full set of production records. Coefficients for event month 0 and later are estimated using the imputation estimator of Borusyak, Jaravel and Spiess (2024) (BJS). Pre-announcement coefficients are estimated separately using a two-way fixed-effects regression on untreated observations, with event month -1 as the omitted reference period. Event months -9 and earlier are pooled into a single indicator, labeled ≤ -9. Both the imputation model and the pre-period regression include worker and calendar-day fixed effects. Standard errors are clustered at the worker level.

Table A.1: Summary Statistics

	China Plant			Vietnam Plant		
Variable	Mean	S.D.	N	Mean	S.D.	N
Female	0.93	0.25	459	0.90	0.30	340
Age	36.02	6.94	459	29.31	7.05	340
Primary School	0.06	0.24	457	0.13	0.34	320
Middle School	0.84	0.37	457	0.48	0.50	320
High School or Above	0.10	0.30	457	0.39	0.49	320
Same Province	0.39	0.49	459	–	–	–
Daily Output	116.15	54.21	265,298	41.48	19.05	75,320

Notes: This table reports means and standard deviations for the main regression sample. *Female* is an indicator equal to one for female workers. *Same Province* is an indicator equal to one if a worker was born in the city where the Chinese plant is located or elsewhere in the same province. Daily Output is measured in Chinese yuan (CNY) for both plants. Output at the Vietnamese plant is converted from Vietnamese dong (VND) to CNY using an exchange rate of 1 CNY = 3,500 VND, which remained relatively stable over the sample period from 2019 to 2021.

Table A.2: Average Effects on Daily Output (Vietnam Plant)

	Dep. var.: Log Daily Output			
	(1)	(2)	(3)	(4)
Post Announcement	0.037	0.015	0.040	0.040
	(0.026)	(0.025)	(0.032)	(0.032)
Observations	63,531	75,319	3,546	2,641
Method	BJS (2024)	TWFE	CSDID (2021)	dCDH (2026)

Notes: This table reports pooled post-announcement average treatment effects on the treated (ATT) for the Vietnamese plant using four estimators. The sample is restricted to workers who transition from a fixed-term contract (FTC) to an open-ended contract (OEC). At the Vietnamese plant, every worker who completed a second FTC during the sample period received an OEC. The outcome is log daily output, residualized before estimation using line-by-day fixed effects estimated from the full set of production records for the Vietnamese plant. *Post Announcement* equals one from the worker's announcement month onward. Columns (1)–(4) report estimates using the imputation estimator of Borusyak, Jaravel and Spiess (2024) (BJS), conventional two-way fixed-effects OLS (TWFE), the estimator of Callaway and Sant'Anna (2021) (CSDID), and the estimator of de Chaisemartin and D'Haultfœuille (2026) (dCDH), respectively. BJS and TWFE use worker-day observations while CSDID and dCDH use worker-month observations. The full worker-day sample contains 75,320 observations. BJS excludes 11,789 observations for which untreated potential outcomes cannot be imputed, leaving 63,531 observations, while TWFE excludes one singleton observation, leaving 75,319. The CSDID sample contains 3,546 worker-month observations, while dCDH excludes 905 observations because valid switcher-control comparisons require sufficient pre- and post-treatment support and available not-yet-treated controls, leaving 2,641 observations. Standard errors clustered at the worker level are reported in parentheses. ***, **, and * denote statistical significance at the 1, 5, and 10 percent levels, respectively.

Appendix B. Solving the Model

This appendix provides the derivations underlying the predictions in Section 4. We solve the model by backward induction. The firm first chooses a conversion standard. After observing this standard, workers choose effort during the fixed-term contract period. Output is then realized, and the firm applies the conversion rule. The firm chooses the conversion standard while taking into account how workers respond to that standard.

B.1. Basic Setup and Timing

There are two worker types, $k \in \{H, L\}$, which differ in the productivity of effort, a_k, with $a_H > a_L > 0$. A newly hired worker on a fixed-term contract is high type with probability λ. The worker observes her own type, whereas the firm observes neither type nor effort. Output during the fixed-term contract period is

$$y = a_k e + \varepsilon,$$

where e is effort and ε has CDF $G(\cdot)$, density $g(\cdot)$, and mean zero.

The sequence of events is as follows. First, the firm chooses a conversion standard $\bar{y}$. Second, after observing $\bar{y}$, a type-k worker on a fixed-term contract chooses effort $e_k^T(\bar{y})$. Third, output is realized and the conversion rule is applied. A worker whose output satisfies $y \geq \bar{y}$ receives an open-ended contract (OEC) and subsequently chooses effort under permanent contract status. Otherwise, the match ends, and the firm opens a new fixed-term position, incurring replacement cost C. The worker receives the outside option with lifetime value V_k^O.

We solve the model in three steps. We first solve for effort under an open-ended contract. We then solve for the effort of a worker on a fixed-term contract, given the conversion standard. Finally, we solve for the firm's choice of the conversion standard, taking workers' effort responses into account.

B.2. Effort under Permanent Employment

Once a worker receives an open-ended contract, current effort no longer affects the probability of retention. A worker of type k on an open-ended contract therefore chooses effort e to maximize

the per-period payoff

$$\max_{e \geq 0} \left\{ w a_k e - \frac{\gamma}{2} e^2 \right\},$$

where w is the piece rate and γ is the effort cost parameter. The first-order condition is

$$w a_k - \gamma e = 0.$$

Thus, effort under permanent employment is

$$e_k^P = \frac{w a_k}{\gamma}.$$

The worker's per-period utility is

$$U_k^P = w a_k e_k^P - \frac{\gamma}{2}(e_k^P)^2 = \frac{w^2 a_k^2}{2\gamma},$$

and the discounted continuation utility under the OEC, measured at the beginning of the OEC period, is

$$V_k^P = \frac{U_k^P}{1-\beta}.$$

For the firm, expected per-period profit from a worker of type k is

$$m_k^P = (p - w) a_k e_k^P,$$

where p is the output price. The firm's continuation value from such a worker is therefore

$$J_k^P = \frac{m_k^P}{1-\beta} = \frac{(p-w) a_k e_k^P}{1-\beta} = \frac{w(p-w) a_k^2}{\gamma(1-\beta)}.$$

B.3. Effort under Fixed-Term Contracts for a Given Conversion Standard

We next solve for the worker's effort during the fixed-term contract, taking the firm's conversion standard $\bar{y}$ as given. A type-k worker who chooses effort e obtains an OEC with probability

$$R_k(e, \bar{y}) = \Pr(y \geq \bar{y} \mid k, e) = 1 - G(\bar{y} - a_k e).$$

Let

$$\Delta_k \equiv V_k^P - V_k^O$$

denote the net continuation-value gain from receiving an OEC at the firm rather than taking the outside option. The lifetime value of a fixed-term worker of type k is

$$V_k^T(e;\bar{y},V_k^O) = wa_k e - \frac{\gamma}{2}e^2 + \beta\left[R_k(e,\bar{y})V_k^P + \big(1-R_k(e,\bar{y})\big)V_k^O\right].$$

Using the definition of Δ_k, this value can be written as

$$V_k^T(e;\bar{y},V_k^O) = wa_k e - \frac{\gamma}{2}e^2 + \beta\left[V_k^O + R_k(e,\bar{y})\Delta_k\right].$$

Substituting the threshold conversion probability gives

$$V_k^T(e;\bar{y},V_k^O) = wa_k e - \frac{\gamma}{2}e^2 + \beta\left[\big(1-G(\bar{y}-a_k e)\big)V_k^P + G(\bar{y}-a_k e)V_k^O\right].$$

Define

$$z_k(e,\bar{y}) \equiv \bar{y} - a_k e.$$

The first-order condition for fixed-term effort is

$$H_k(e,\bar{y},V_k^O) \equiv wa_k - \gamma e + \beta a_k g(z_k(e,\bar{y}))\Delta_k = 0. \tag{B.1}$$

We assume that the worker's effort problem during the fixed-term contract has a unique interior solution. For the local comparative statics below, we impose the second-order condition at this solution:

$$H_{k,e}(e_k^T,\bar{y},V_k^O) = -\gamma - \beta a_k^2 g'\big(z_k(e_k^T,\bar{y})\big)\,\Delta_k < 0.$$

A stronger sufficient condition for uniqueness is that this inequality hold for every feasible level of effort, in which case the worker's objective is globally strictly concave in effort. Under the maintained uniqueness assumption, equation (B.1) characterizes the worker's effort choice,

$$e_k^T(\bar{y},V_k^O).$$

The Effort Gap. Using the first-order condition under an open-ended contract, $wa_k - \gamma e_k^P = 0$, and evaluating the fixed-term first-order condition at e_k^T, we obtain

$$\gamma(e_k^T - e_k^P) = \beta a_k g(\bar{y} - a_k e_k^T)\Delta_k. \tag{B.2}$$

If an OEC is more valuable than the outside option, $\Delta_k > 0$, and performance is pivotal for conversion, $g(\bar{y} - a_k e_k^T) > 0$, the right-hand side of equation (B.2) is positive. Therefore,

$$e_k^T > e_k^P.$$

This gives the first model prediction: when obtaining an open-ended contract is valuable, workers exert more effort under a fixed-term contract than after conversion to an open-ended contract.

Equation (B.2) should not be interpreted as a closed-form expression for the effort gap, because e_k^T also appears inside the density term $g(\bar{y} - a_k e_k^T)$. The comparative statics below therefore use the implicit function theorem.

Outside Options. We next examine how fixed-term effort varies with the worker's outside option. This comparison holds the firm's conversion standard fixed.

Differentiating equation (B.1) with respect to V_k^O, while holding $\bar{y}$ fixed, gives

$$H_{k,e} \frac{\partial e_k^T}{\partial V_k^O} + H_{k,V^O} = 0.$$

Since

$$H_{k,V^O} = -\beta a_k g(\bar{y} - a_k e_k^T),$$

we have

$$\left. \frac{\partial e_k^T}{\partial V_k^O} \right|_{\bar{y}} = -\frac{H_{k,V^O}}{H_{k,e}} = \frac{\beta a_k g(\bar{y} - a_k e_k^T)}{H_{k,e}} < 0, \tag{B.3}$$

where the inequality follows from $H_{k,e} < 0$. Effort under an open-ended contract,

$$e_k^P = \frac{w a_k}{\gamma},$$

does not depend on V_k^O. Therefore,

$$\left. \frac{\partial (e_k^T - e_k^P)}{\partial V_k^O} \right|_{\bar{y}} < 0.$$

A better outside option reduces the incentive to exert additional effort before the contract-conversion decision and therefore narrows the effort gap between fixed-term and open-ended employment. Conversely, workers with weaker outside options value conversion more and exert greater effort while on a fixed-term contract. The model therefore predicts a larger decline in

productivity after conversion for workers with weaker outside options.

This is a fixed-standard comparative static. A change in outside options could also affect the firm's optimal conversion standard in a full equilibrium. The prediction used in the empirical analysis only requires the fixed-standard comparison in equation (B.3).

The Conversion Margin. The marginal effect of effort on the probability of conversion is

$$\frac{\partial R_k(e, \bar{y})}{\partial e} = a_k g(\bar{y} - a_k e).$$

This expression shows that the strength of the conversion incentive depends on the density at the conversion margin, rather than on the level of the conversion standard itself. Intuitively, when the density is high at the margin, a small increase in effort shifts a relatively large mass of possible output realizations from below to above the standard. If g is unimodal with a unique mode at zero, the marginal conversion incentive is greatest when expected output is close to the conversion standard, $\bar{y} \approx a_k e_k^T$, and becomes small when the conversion margin lies in either tail of the shock distribution.

This also implies that the relationship between the conversion standard and effort is not generally monotone. Differentiating equation (B.1) with respect to $\bar{y}$ gives

$$\frac{\partial e_k^T}{\partial \bar{y}} = -\frac{\beta a_k g'(\bar{y} - a_k e_k^T)\Delta_k}{H_{k,e}}.$$

Since $H_{k,e} < 0$, the sign of this derivative depends on $g'(\bar{y} - a_k e_k^T)$. Thus, the model does not predict that a higher or lower standard always increases effort. The relevant prediction is instead that fixed-term effort is high when performance is pivotal for conversion.

When conversion is nearly certain and its probability responds little to effort, the effort premium is small. If conversion is guaranteed independently of effort, the premium is zero and

$$e_k^T = e_k^P.$$

B.4. The Firm's Choice of the Conversion Standard

We now turn to the firm's problem. The firm chooses the conversion standard after taking into account how workers respond to that standard.

For a given standard $\bar{y}$, write

$$e_k^T(\bar{y}) \equiv e_k^T(\bar{y}, V_k^O),$$

$$z_k(\bar{y}) \equiv \bar{y} - a_k e_k^T(\bar{y}),$$

and

$$R_k(\bar{y}) \equiv 1 - G(z_k(\bar{y})), \qquad q_k(\bar{y}) \equiv G(z_k(\bar{y})).$$

Here $R_k(\bar{y})$ is the probability that a type-k worker is retained, and $q_k(\bar{y})$ is the probability that the worker is replaced.

Let $\pi_H = \lambda$ and $\pi_L = 1 - \lambda$. The expected current-period profit from a fixed-term worker under standard $\bar{y}$ is

$$M(\bar{y}) = \sum_{k \in \{H,L\}} \pi_k (p - w) a_k e_k^T(\bar{y}).$$

The expected continuation value from retained workers is

$$B(\bar{y}) = \sum_{k \in \{H,L\}} \pi_k R_k(\bar{y}) J_k^P.$$

The unconditional replacement probability is

$$q(\bar{y}) = \sum_{k \in \{H,L\}} \pi_k q_k(\bar{y}).$$

Let $J^T(\bar{y}, C)$ denote the firm's valuation of a fixed-term worker when it uses conversion standard $\bar{y}$. The Bellman equation is

$$J^T(\bar{y}, C) = M(\bar{y}) + \beta \left[B(\bar{y}) + q(\bar{y}) \big(J^T(\bar{y}, C) - C \big) \right].$$

Solving for $J^T(\bar{y}, C)$ gives

$$J^T(\bar{y}, C) = \frac{M(\bar{y}) + \beta B(\bar{y}) - \beta C q(\bar{y})}{1 - \beta q(\bar{y})}. \tag{B.4}$$

The firm chooses

$$\bar{y}^*(C) \in \arg\max_{\bar{y}} J^T(\bar{y}, C).$$

For an interior optimum, differentiating equation (B.4) with respect to $\bar{y}$ gives

$$M'(\bar{y}^*) + \beta B'(\bar{y}^*) + \beta q'(\bar{y}^*)\big(J^T(\bar{y}^*, C) - C\big) = 0. \tag{B.5}$$

This condition summarizes the firm's tradeoff. The first term captures the incentive effect: changing the standard affects effort under fixed-term contracts and hence current output. The second captures the screening effect: changing the standard affects which workers receive open-ended contracts and therefore the value of the permanent workforce. The third captures the replacement margin: changing the standard affects the probability that the firm must replace the current worker and restart the process with a new fixed-term worker.

The firm chooses the conversion standard, while taking into account the workers' best responses $e_k^T(\bar{y})$.

B.5. Replacement Costs and Leniency

Finally, we examine how replacement costs affect the firm's conversion standard. Let

$$J^*(C) \equiv J^T(\bar{y}^*(C), C), \qquad q^*(C) \equiv q(\bar{y}^*(C)).$$

By the envelope theorem applied to the value function in equation (B.4),

$$\frac{dJ^*(C)}{dC} = -\frac{\beta q^*(C)}{1 - \beta q^*(C)}.$$

Thus, the value of replacing the current worker,

$$J^*(C) - C,$$

satisfies

$$\frac{d}{dC}\big(J^*(C) - C\big) = -\frac{1}{1 - \beta q^*(C)} < 0.$$

A higher replacement cost lowers the value of rejecting the current worker and hiring a new fixed-term worker.

To obtain the comparative static for the conversion standard, define the left-hand side of the

first-order condition in equation (B.5) as

$$S(\bar{y}, C) \equiv M'(\bar{y}) + \beta B'(\bar{y}) + \beta q'(\bar{y})\big(J^T(\bar{y}, C) - C\big).$$

The first-order condition can therefore be written as

$$S(\bar{y}^*(C), C) = 0.$$

Suppose the optimum is interior, the second-order condition holds,

$$S_{\bar{y}}(\bar{y}^*, C) < 0,$$

and a stricter standard raises the probability of replacement at the margin:

$$q'(\bar{y}^*) > 0.$$

Holding $\bar{y}$ fixed, equation (B.4) implies

$$\frac{\partial J^T(\bar{y}, C)}{\partial C} = -\frac{\beta q(\bar{y})}{1 - \beta q(\bar{y})}.$$

Therefore,

$$S_C(\bar{y}^*, C) = \beta q'(\bar{y}^*)\left[\frac{\partial J^T(\bar{y}^*, C)}{\partial C} - 1\right] = -\frac{\beta q'(\bar{y}^*)}{1 - \beta q(\bar{y}^*)} < 0.$$

By the implicit function theorem,

$$\frac{d\bar{y}^*(C)}{dC} = -\frac{S_C(\bar{y}^*, C)}{S_{\bar{y}}(\bar{y}^*, C)} < 0.$$

Under these regularity conditions, a higher replacement cost leads the firm to choose a more lenient conversion standard.

These conditions are substantive. Without them, the relationship between replacement costs and the conversion standard need not be globally monotone because the standard also affects worker effort. The robust implication is that a higher replacement cost reduces the value of replacing the current worker. A lower conversion standard follows when the firm's objective is locally single-peaked and a stricter standard increases the probability of replacement.

An extreme case is a plant where replacement is sufficiently costly, or where rapid expansion

requires retaining nearly all workers who complete the fixed-term contract period. In such a setting, conversion to an open-ended contract is effectively guaranteed. Performance is no longer pivotal for obtaining permanent employment, and the model predicts no decline in productivity after conversion.