Incentive Contracts and Extra-Role Behaviors: Evidence from Employee-Initiated Innovation

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Abstract

Incentive contracts for front-line employees generally specify explicit performance measures for the tasks included in their main responsibilities. Yet, organizations often encourage employees to engage in desirable (but not required) behaviors that extend beyond their assigned standard execution tasks. Using data from a manufacturing company that encourages their employees to engage in employee-initiated innovation, we examine how the design of incentive contracts for employees' standard execution tasks influences their propensity to submit innovation ideas. Consistent with theory, we show that high-powered incentives are associated with less innovation idea submissions. This effect is driven by ideas with broader scope than the employee's standard task. Our findings suggest that high-powered incentives increase the pressure to deliver on performance measures explicitly included in incentive contracts, thereby limiting the scope of employee-initiated innovation to task-specific suggestions. Our results contribute to the literature on the unintended consequences resulting from pay-for-performance compensation contracts.

Keywords: employee-initiated innovation, contract design, creativity, high-powered incentives, pay for performance

JEL Codes: M41, M52, M54, M55

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I. INTRODUCTION

Many organizations incentivize performance of front-line workers by offering compensation contracts that tie monetary payoffs to one or more output-based metrics related to standard execution tasks. At the same time, however, firms may encourage employees to engage in innovative and spontaneous behaviors that are beneficial to the firm, although not required by their contractual agreements. The literature refers to these additional activities as extra-role behaviors (Wright et al. 1993). Examples include activities that improve cooperation and collaboration, that protect the organization, its assets and its members from disaster, and constructive ideas for operational improvements (Katz 1964). The spontaneous and unplanned nature of these activities and the fact that they do not constitute a primary responsibility for the workers, who were hired and are paid to deliver on their standard task, give rise to important challenges with respect to incentivizing extra-role behaviors. In this study, we focus on one type of extra-role behavior—employee-initiated innovation (hereafter: EII).

Organizations often encourage employees at all levels to propose innovative ideas that rely on first-hand knowledge of their standard tasks and contribute to improving the firm's operations. Examples include ideas related to process improvements, cost reductions, productivity enhancements, and improvements in the work environment. EII differs from other innovation or creativity-based activities in organizations (e.g., R&D, Marketing) based on three characteristics: (1) idea proponents are not professional innovators, but rank-and-file workers whose main responsibility is to deliver on standard tasks; (2) innovation activities are appreciated by the organization but not required; (3) innovation activities arise unprompted from the initiative of rank-and-file employees. To reinforce a corporate culture supportive of EII, many firms invest in

dedicated information and knowledge management systems to collect, evaluate, and reward innovation initiatives proposed by employees.[1] However, incentivizing EII presents peculiar challenges as opportunities for innovation arise unplanned so that EII deliverables cannot be contracted upon ex-ante, EII activities are generally evaluated subjectively, and are rewarded via ex-post settlements depending on the value of the suggestion.

In this study, we examine how the design of incentive contracts based on the employee's standard execution task interacts with incentives to engage in EII. In particular, we leverage field data from a company that maintains a tracking system for EII, and examine whether differences in incentive contract structure are associated with differences in the likelihood to engage in EII. More precisely, we consider monetary incentives with varying degrees of pay-for-performance sensitivity in relation to the performance measure specified in the incentive contract: (1) a fixed pay structure, or low-powered incentives; and (2) a variable pay structure, or high-powered incentives.

Motivated by economic theory (Holmstrom 1989, Holmstrom and Milgrom 1991) we predict that high-powered incentives tied to the standard execution task are less likely to stimulate EII relative to low-powered incentives. High-powered monetary incentives may fixate employees on the specific performance measures based on which their compensation is contingent (i.e., prescribed standard task) and discourage other non-prescribed "extra-role" behaviors, such as EII (Wright et al. 1993). A variable pay structure that rewards the standard execution task is associated

[1] Notable examples include Toyota's iconic "Creative Ideas Suggestive System", or Whirlpool's "idea labs". For examples, refer to Morgan, J. "The 5 Types of Innovation for the Future of Work. Pt 1: Employee Innovation" (https://www.forbes.com/sites/jacobmorgan/2015/07/27/the-5-types-of-innovation-for-the-future-of-work-pt-1-employee-innovation/#3d8d489e7e20). In fact, some studies estimate that ideas proposed by rank-and-file employees are associated with significant cost reductions. See Wall Street Journal article at https://www.wsj.com/articles/SB10001424052970204774604576631063939483984

with greater opportunity costs of exerting effort on non-prescribed EII. Therefore, employees may be less inclined to engage in EII which is subject to greater payoff uncertainty.

EII ideas vary in the breadth of their scope. Employees motivated to participate in EII can choose to engage in innovation activities along a spectrum ranging from ideas narrowly focused on a particular standard task to ideas benefiting a broader set of constituents or processes in the organization. We predict that the standard task fixation introduced by high-powered incentive contracts limits the scope of EII primarily to ideas that are associated with improvements in their standard execution task and can, therefore, convert into future increased productivity and individual payoffs from the standard task compensation contract.

Our field setting provides a powerful setting to test our predictions. The operations of the firm are labor intensive, and employees are hired exclusively based on their expectation to perform their assigned standard execution task. Standard execution tasks are rewarded based on incentive contracts that can assume either one of the following three types: fixed pay, variable pay, or a combination of fixed and variable components. The variable component is based on output measures capturing employee performance with respect to their standard execution task. Management encourages employees at all organizational levels to submit ideas to improve firm productivity, quality, working conditions, or to reduce costs, with the prospect to receive a monetary reward upon positive evaluation by management.[2] Thus, our empirical inquiry relates to whether the employee's prescribed task incentive contract structure is associated with differences in (1) the employee's propensity to submit EII ideas, and (2) the scope of EII in relation to their standard execution task.

[2] The size of the monetary reward is not pre-determined and it varies depending on the expected benefit of the proposed idea. Almost all idea submissions are rewarded by management, and the reward amount ranges between 1 and 3 percent of the average worker's monthly salary depending on the usefulness of the proposed idea. We discuss the details of the reward system in Section III.

Our statistical analyses produce two main findings. First, consistent with our predictions, we find that, compared to fixed pay, variable pay contracts are associated with significantly lower employee propensity to engage in EII. Second, we leverage on the firm's classification of EII and group them into ideas pertaining to the employee's standard execution task (hereafter, narrow scope) versus ideas that extend beyond the employee's standard execution task (hereafter, broad scope). We find that employees rewarded with variable pay propose broad scope ideas significantly less than their fixed-pay colleagues, whereas employees' propensity to propose narrow scope ideas is not significantly different across the different types of incentive contracts. Our results are robust to accounting for potential differences in the task nature, and also to including control variables capturing employee characteristics that may affect an individual's propensity to engage in EII. In additional robustness tests, we also adopt an instrumental variable approach leveraging institutional details to address the concern that the assignment of contract types may be endogenously determined.

We further explore the impact of contract structure on outcomes related to the employee's standard execution task. Since innovation is not a primary responsibility for the workers in our setting, we examine whether EII activities associated with different contract structures might influence the achievement of productivity targets or production quality. We observe no material differences in the standard task-related outcomes that we can attribute to variation in the structure of incentive contracts or to the employee's innovation-related activity.

Taken together, our results suggest that high-powered incentives, by imposing high opportunity costs and increasing employee fixation on the standard execution task, can limit employee engagement in desired extra role behaviors such as EII, especially when these activities may benefit a broader set of constituents.

Our study complements the existing literature in the following ways. First, our findings add to the literature that documents potential downsides of monetary incentives that are tied to specific performance measures (i.e. pay-for-performance). Prior literature has associated high-powered incentive with dysfunctional behaviors (Larkin et al. 2012, Burgess et al. 2003), including short-termism (e.g. Cheng 2004; Bolton et al. 2006; Kothari et al 2009) and gaming (Baker et al 1988, Deller et al. 2018). Our results provide evidence of an additional downside of high-powered incentives, in that they hamper pro-social behaviors such as broad-scope EII, even with the introduction of additional incentives to motivate EII submissions. Second, we contribute to the literature on motivating employee-initiated innovation. Research has examined controls and incentive systems fostering employees' creativity, or "outside-the-box thinking" (see, for example, Kachelmeier et al 2008, Cheng 2004, Chen et al 2015). Many of these studies were performed in laboratory settings (Kachelmeier et al. 2019; Webb et al. 2013; Brueggen et al. 2018, Drake et al 1999), which limited the scope of their analyses of creativity to ideas closely related to the participant's assigned task or a pre-determined problem. We leverage on a field setting to expand the inquiry to wider range of EII activities, including the discovery of opportunities for innovation and ideas that benefit a broader set of constituents.

The remainder of the paper is organized as follows. In Section II, we provide an overview of the relevant literature and develop our main hypotheses. We describe our research setting and explain the suitability of our research site to address our research question empirically in Section III. Section IV describes our sample and data for our empirical tests, and Section V reports the results of our empirical tests. We validate the robustness of our results in Section VI. The last section concludes.

II. PRIOR LITERATURE ON INCENTIVE SYSTEMS FOR INNOVATION

Employee-initiated Innovation as an Extra-role Behavior

Most rank-and-file employees are hired to perform a set of defined operational tasks. Organizations rely on the dependability of employee performance on these tasks and reward them based on some measure of output quantity and quality (Katz 1964). If employees were only hired as "agents" to perform a standard execution task, organizational performance could be maximized by improving task design, and optimally allocating different dimensions of the task to different agents, each compensated based on performance on their assigned responsibilities (Holmstrom and Milgrom 1991). However, most executives concur that employee engagement that goes beyond what they are specifically hired for is essential to organizational success. Rather than considering employees to be "agents" that only work on prescribed tasks, organizations increasingly demand that their employees behave as "stewards" and act in the best interest of the organization even at the expense of their individual benefits (Davis et al. 1997; Segal and Lehrer 2012). Consistent with this view, Katz (1964) and Wright et al. (1993) emphasize the importance of employees' extra-role behaviors—desired activities that are not prescribed by explicit incentive contracts and do not pertain to the employees' assigned tasks, but are vital to the survival and profitability of the organization. Extra-role behaviors encompass different activities such as organizational citizenship behavior (Organ, 1988), and prosocial behavior (Brief & Motowidlo, 1986). We posit that employee-initiated innovation is an example of extra-role behavior.

Prior research on EII highlights how these initiatives, while encouraged and often times rewarded, are generated by employees without formal assignments by their superiors (Li, 2016). In general, these employees are not "full-time innovators", in that their primary responsibilities relate to standard execution tasks that require little, if any, creativity. Therefore, for these

employees pursuing innovation opportunities means going above and beyond their job descriptions (Birkinshaw and Duke, 2013, Hellmann and Thiele, 2011).

Incentives for Employee-initiated Innovation

Incentivizing EII *directly* presents peculiar challenges. In addition to being outside of the employees' explicit responsibilities, performance on EII cannot be contracted upon ex-ante because such opportunities arise unplanned (Hellmann and Thiele 2011). A number of prior studies examine management control measures to promote a culture of employee-initiated innovation (Drake et al. 1999; Grabner, 2014, Baumann and Stieglitz, 2014). Motivated by the notion that an innovative organizational culture starts at the top (Amabile, 1988), several studies explore the effectiveness of incentives for innovation at the executive level. For example, some studies recommend the inclusion of long-term oriented provisions and protections from early failure and from external pressure in the design of incentive systems (Cheng 2004; Chen et al. 2015;). Moreover, controlled experiments by Ederer and Manso (2013) and Ederer (2013), as well as empirical studies (Baranchuk et al, 2014; Holthausen et al, 1995; Lerner and Wulf, 2007) built on the analytical work by Manso (2011), support the use of stock options with long vesting periods, profit sharing, and golden parachutes as effective incentive mechanisms for innovation. Research also posits that the role of middle managers and front-line employees is critical for a successful culture of organizational innovation (Amabile, 1988, Baumann and Stieglitz et al. 2014; Holthausen et al., 1995) because they generate innovative ideas that are informed by their first-hand knowledge, skills, and experience. Yet, the use of stock options or protection devices such as golden parachutes are rarely observed in compensation contracts for rank-and-file employees.

A growing body of work examines levers to directly enhance front-line employee engagement in the innovation process. For example, Li (2016) studies how providing employees

with slack resources—more specifically, time—can stimulate engagement in EII. Furthermore, a number of studies use controlled laboratory experiments to examine the effectiveness of the provision of financial/non-financial incentives and goal setting as means to enhance innovation activity (Kachelmeier et al. 2008; Webb et al. 2013; Brueggen et al. 2018).[3] Given the difficulty of incentivizing *unplanned* employee behaviors like innovation using explicit incentive contracts, the goal of this study is to explore the design of incentive contracts for *planned* standard execution tasks as an alternative lever to influence *indirectly* the propensity to engage in EII activities. The idea would be to generate incentives by lowering the marginal opportunity cost of the innovation task instead of providing for direct rewards associated with the innovation task itself.

Standard Task Incentives and Employee-initiated Innovation

When their prescribed standard execution task absorbs almost all of employees' resources (i.e., time and effort) available at a given time, employees must decide how much of those resources they are willing to allocate to non-prescribed behaviors such as EII (Wright et al 1993). In other words, employees face a multitasking problem involving a standard task, for which metrics and compensation contracts can be defined ex-ante, and an extra-role, for which defining a performance measure ex-ante is not possible and potential rewards will be contracted ex-post (Hellmann and Thiele 2011). Economic theory suggests that, in multitasking settings, incentive compensation directs the allocation of employees' effort among their various tasks (Holmstrom

[3] Due to characteristics inherent to the research method, experimental studies are limited in the types of innovation or creative behavior they can observe. The design of experiments on creativity and innovation generally involves incentives to apply creativity to improve performance on a pre-determined routine task, such as a letter decoding exercise (Brueggen et al 2017; Drake et al. 1999), or explicitly associated with the generation of creative output, such as rebus puzzles (Brueggen et al 2017; Kachelmeier et al 2010; Kachelmeier et al. 2019). In practice, however, employee-initiated innovation encompasses a broader range of opportunities, often including operational activities that are not related to the task assigned to the employee (Unsworth 2001). Therefore, incentive systems and controls that are successful at encouraging creativity as observed in experimental settings may not directly translate to all other instances of creativity in the workplace. Our field setting allows us to complement the findings from prior literatures by examining employee-initiated innovation outcomes more broadly compared to prior experimental studies.

and Milgrom 1991). The cost of the incentive associated with a particular task depends on the mix of tasks that the individual employee is expected to perform and on the characteristics of the associated performance measures (Holmstrom 1989). In general, employees choose to allocate effort across activities that are measured with different degrees of sensitivity and precision and are associated with different weights in the compensation contract (Banker and Datar 1989; Feltham and Xie 1994). In particular, economic theory (Holmstrom and Milgrom 1991) posits that agents are more likely to allocate effort on aspects of performance that are less risky, easier to measure, and more directly tied to compensation payoffs.

Five fundamental differences between the characteristics of EII and standard execution tasks are likely to influence the employee's decision to allocate effort between them: (1) EII outcomes are riskier than those associated with the standard execution task in that opportunities for innovation arise unplanned and exhibit lower expected probability of success than standard execution tasks; (2) the reward for innovation is more uncertain compared to the standard execution task because it is contingent on developing an idea that management finds valuable, which is determined ex-post; (3) innovation may require different skills than those needed to perform the standard execution task; (4) the evaluation of an innovation proposal is in most cases subjective, whereas standard execution tasks are generally associated with objective performance metrics; and (5) innovation is encouraged by management, but not expected, as it is not a main responsibility contracted upon ex-ante with the employee (i.e. an extra-role behavior). Consequently, we posit that, as the incentive strength on the standard execution task measure increases (i.e. high-powered incentives), the opportunity cost of effort to engage in EII increases. We formulate the following hypothesis:

> **H1:** Compared to low-powered incentives, high-powered incentives are associated with lower likelihood of pursuit of EII.

Choice Between Types of Employee-initiated Innovation

EII can vary widely in their scope of applicability. Employees may leverage on their first-hand knowledge to develop improvement initiatives narrowly defined around their standard execution task (narrow scope EII).[4] Alternatively, they may propose ideas that offer broader applications and benefit a larger set of constituents (broad scope EII).[5] Prior research concurs that low-powered incentives are more conducive to exploration activities that may be unrelated to their standard execution task as opposed to exploitation of existing assets (Amabile 1993; Ederer 2013; Ederer and Manso 2013). We predict that employees rewarded with high-powered incentives for their standard task will exhibit lower engagement with broad scope EII than workers paid with low-powered incentive for the following reasons. First, narrow scope ideas are associated with lower search costs in that the employee can leverage knowledge and skills they already apply to their day-to-day activities. If high-powered incentives introduce greater opportunity costs of pursuing EII than low-powered ones, rational employees would minimize the incremental cost of innovation. Second, to the extent that narrow scope EII improves standard task productivity, the pay-for-performance link embedded in the standard task compensation contract provides opportunities for greater individual payoff potential. Therefore, we formulate our hypotheses as follows:

> **H2a:** Compared to low-powered incentives, high-powered incentives are associated with greater likelihood of pursuit of narrow scope EII.

> **H2b:** Compared to low-powered incentives, high-powered incentives are associated with lower likelihood of pursuit of broad scope EII.

[4] Examples include ideas that improve throughput, reduce production downtime, improve production flow, etc.
[5] Examples include overhead cost reduction initiatives, improvement of the general work environment, proposals for collaboration across departments, etc.

III. RESEARCH SETTING

Research Site

Our field data is obtained from a Chinese manufacturing firm that produces packaging materials and supplies. The firm maintains a stable client base such that its revenue stream is largely predictable. However, production orders exhibit seasonal fluctuations – the firm's busiest months of operations are in the summer and fall, driven by orders from their two major clients, whereas production is suspended in the winter months.[6] Due to the small margins typical of this industry, firm profits largely depend on its ability to maximize capacity utilization (through avoidance of quality defects and rework, reduction of machine downtime due to technical issues, etc.) and to improve cost efficiency.

The production process is organized into 11 phases, each constituting a department. Examples include the box-gluing department, the laminating department, the printing department, the storage and transportation department, etc. Employees within each department are assigned a primary task (i.e. standard task) that is crucial in maintaining the overall flow of the production process. The tasks assigned to each department differ in their nature, but are fairly comparable in terms of task complexity and can be measured using readily available performance metrics related to the volume of units processed or completed.

Incentive Contracts for Rank-and-File Employees

Employees are rewarded for their standard execution tasks based on explicit incentive contracts, whereby total compensation is determined by combinations of fixed and variable components. Contracts can assume one of three forms: (1) include only a fixed component (*Fixed*), (2) include only a variable component (*Variable*), or (3) include both a fixed and a variable

[6] This is a common practice observed in this industry and region.

component (*Mixed*). The variable component is determined based on the output measure that summarizes the individual's productivity in each department. Whereas employees under a *Fixed* contract are not subject to downside risk with respect to their monthly compensation, they do not enjoy any upside potential for greater performance on the standard execution task as variation in output volumes does not translate into payoff variation. Employees under a *Variable* contract, in contrast, enjoy unbounded incentive compensation, but are exposed to downside risk as their compensation has its floor at zero. Employees under a *Mixed* contract are guaranteed a minimum fixed amount at the end of each month, and can earn additional compensation based on the performance on their standard execution task.

Institutional characteristics of our research setting allow us to empirically examine the incentive role of the different contract types.[7] First, the bulk of the bargaining power in the hiring process rests with the firm, consistent with industry and regional norms. Accordingly, incentive contract negotiations at the time of hire are almost non-existent, and hired employees accept the contracts they are offered. Second, the type of contract offered to prospective employees largely depends on the role for which they are hired. For example, employees hired as managers are more likely to be offered a fixed contract, whereas a combination of contract structures is observed among front-line workers. In addition, the choice of contract assigned to new hires for non-management roles also depends on the time of the year in which a particular employee is added to the roster. During the busiest months of the year, the company is inclined to offer volume-based variable contracts to attract workers with the prospect of high wages. During idle times, when production volumes are low, management is inclined to offer fixed contracts, which offer

[7] In addition to the incentive role of contracts, a number of studies also propose that contracts are also associated with a sorting role in that employees with particular characteristics may self-select into a specific contract type (Kachelmeier and Williamson 2010). This is not the case in our setting.

prospective workers an expectation of a minimum guaranteed level of income. While the time of the year might influence the type of contract offered to the employee, it does not impact the likelihood of retention of the new hire. Moreover, in our sample period, we do not observe any within-worker change in employee contract type.[8]

Promotion of Employee-Initiated Innovation Activity

Due to the small margins and the labor-intensive nature of its main operations, the firm empowers its employees in all functions and at all levels of the organization to propose ideas that might improve efficiency, productivity, and profitability. Accordingly, in addition to the explicit compensation contract related to employees' standard execution tasks, the firm rewards the submission of feasible and beneficial employee-initiated innovation ideas. Not all submitted ideas are rewarded. Each idea submission is evaluated by management, and employees receive a monetary award only if management approves the idea as being *valuable* for the firm. The amount of the award is not pre-determined, but decided ex-post on a case-by-case basis. Additionally, there is no objective evaluation system for the submitted innovation ideas. Instead, management subjectively assesses how the submitted idea can potentially enhance overall firm performance. Approved ideas are rewarded with amounts ranging between 1% and 3% of the proponent's monthly pay.

Management classifies each submitted innovation idea into a pre-determined type. Innovation types, corresponding descriptions used to evaluate the submitted ideas, and examples of innovation ideas submitted by employees are provided in Appendix 1. In consultation with company management, we grouped the types into two broad categories based on their scope of applicability—task-specific and non-task-specific innovations. Task-specific innovations include

[8] Additionally, we do not observe any promotions during our sample period.

ideas that improve efficiency (e.g. speed, throughput, etc.), quality of the process (e.g. incidence of rework, defects, etc.), or standardization and streamlining of the production process (e.g. 5S initiatives). In contrast, non-task-specific innovations include suggestions that benefit the organization via improvements in activities other than the employees' standard execution tasks. Examples include initiatives that promote collaboration across teams or departments, improve the morale or culture of the organization, and ideas that increase automation, reduce costs, or improve the long-term sustainability of the organization. In our study, we leverage the categorization between task-specific and non-task-specific ideas to distinguish between narrow scope EII and broad scope EII, respectively.

IV. RESEARCH DESIGN

Data

Our sample includes monthly employee-level data from March 2014 to December 2016. There are 513 unique employees, for a total of 6,016 employee-month observations. In line with local business practices, the company operates its production lines ten or eleven months each year, with January and February corresponding to idle time. For each month in the sample period, we collect information on the number, type, and quality of all submitted innovation ideas. In addition, for each employee, we obtain data on the incentive contract type and demographic characteristics. A detailed description of the variables of interest for our analyses is provided below and summarized in Appendix 2.

Dependent Variables: Innovation and Innovation Type

We measure the employee's *propensity* to propose an innovation idea using an indicator variable $Submission_{i,t}$ which assumes value one if employee *i* submits an innovation idea in month *t*, and zero otherwise. To analyze innovation ideas based on the classification by type used by the

company (see Appendix 1), we construct indicator variables representing idea submissions for each innovation type, assuming, respectively, value one if employee *i* submitted an idea of the particular type in month *t*, and zero otherwise. There are three task-specific categories: ideas to improve standardization and streamlining of operating tasks ($Sub\_5S_{i,t}$), ideas improving the quality of the production process and lowering defects and rework ($Sub\_quality_{i,t}$), and ideas improving efficiency and throughput ($Sub\_efficiency_{i,t}$). Six non-task specific categories include ideas with long term benefits ($Sub\_lt_{i,t}$), ideas benefiting a group or a team ($Sub\_group_{i,t}$), ideas benefiting a different department ($Sub\_diffdep_{i,t}$), ideas aiming to reduce overhead costs ($Sub\_cost_{i,t}$), ideas to improve the technology, automation, and computerized systems of the firm ($Sub\_tech_{i,t}$), and ideas to improve team or group morale ($Sub\_morale_{i,t}$).

Table 1, Panel A provides descriptive statistics on the innovation-related variables. Innovation submissions occurred only in about 6% of our employee-month observations. Moreover, we observe that the vast majority of submitted ideas are evaluated to be viable by management—about 95% of the submitted ideas have subsequently been rewarded with a bonus. We proxy for the *quality* of the submitted innovation idea using the indicator variable $Approved_{i,t}$, which assumes value one if the innovation idea submitted by employee *i* in month *t* is considered to be viable and therefore is rewarded with a bonus, and zero if not. Additionally, as shown in Table 1, Panel B, only about 15% of the employees engage in innovation activities, suggesting a high concentration of innovation activity within a limited number of employees. We interpret the high approval percentage together with the low incidence of innovation submissions and the low percentage of "innovators" as a signal of employees being selective with respect to their engagement with innovation activities.

With respect to the different innovation types, we note a higher frequency of submission of innovation ideas aiming at reducing costs, improving efficiency, and promoting long term organizational outcomes. The ratio between submission and approval of the innovation idea is largely consistent across innovation categories.

Independent Variables: Contract Type

We proxy for the different types of compensation contracts with indicator variables $Fixed_i$, $Variable_i$, and $Mixed_i$, each assuming value 1 if employee is rewarded with the corresponding type of contract, and zero otherwise. In our setting, the type of contract constitutes an employee-level time-invariant characteristic.[9] As shown in Table 1, Panel C, about 58 percent (13 percent) [30 percent] of all employees are hired with a *Fixed* (*Variable*) [*Mixed*] contract.

Control Variables: Employee Characteristics

We control for employee individual characteristics that may be associated with the employee's propensity to engage in innovation-related activities (see Table 1, panel C). We include $DormEmp_i$, an indicator variable assuming value one if the employee lives in company-provided housing (dormitory), and zero otherwise. Workers living in the company dormitory are generally single. Reduced commitments to family obligations and commuting time might provide these workers with more time to engage in innovation-related activities outside their assigned standard tasks. Additionally, sharing common areas, such as cafeterias, exercise facilities, or leisure spaces might increase the opportunity to exchange ideas and develop innovations collectively. About 7 percent of all employees in our sample live in dormitory facilities.

[9] A concern might arise with respect to endogenous selections of contract type. That is, one could expect that contract structure might reflect, among other things, the propensity of the employee to generate innovative ideas. We determine that this is not the case by estimating a determinant model for the type of contract, and by implementing a 2SLS estimation of our main model using instrumental variables. Section VI describes the analyses and estimation results.

Next, we control for gender, using the indicator variable $Female_i$, which assumes value one if the employee is female, and zero otherwise. About 38 percent of all employees in our sample are female. Gender is likely associated with personality traits such as creativity, extroversion, confidence, selflessness, etc., which might impact the employee's propensity to propose innovation ideas (Kachelmeier et al 2008; Stoltzfus et al 2011).

Further, we control for employee age (Age_i) measured in number of years.[10] Age may correlate with an employee's experience level and knowledge base which may, in turn, impact the ability to identify opportunities and generate innovation ideas. The average employee in our sample is about 33 years old. We also control for *Tenure*, which measures the length of the contractual relation between the organization and the employee in years. On the one hand, employees that have been with the company for a longer time might have accumulated greater firm-specific institutional and technical knowledge which they can leverage to develop valuable innovation proposals. On the other hand, relatively new hires might be in touch with more recent technological developments, organizational solutions that they might have seen in other firms, or simply hold an unbiased view of the needs and processes of the operations, which might lead them to propose fresh innovation ideas. The average tenure in our sample is 1.8 years, and spans between a minimum value of 1 year to a maximum of 17.

We also control for the rank of the employee within the company. $Mgmt_i$ is an indicator variable assuming value one if the employee performs managerial functions, and zero otherwise. A managerial role within the company may be associated with better ability and/or experience, which may impact innovation-related activities. About 8 percent of all employees in our sample perform a management function.

[10] Age is measured at the beginning of our sample period and maintained constant over the months included in our sample.

Finally, we note that the site underwent a merger event at the beginning of 2014 (i.e. before the beginning of our sample period), which led to a change in the top management composition. The event was a friendly merger, and there were no drastic changes in the company's operations. The change in ownership, however, shifted the organizational culture toward a stronger focus on employee well-being, including the notion that a more stable income stream would allow for higher employee satisfaction resulting in greater organizational commitment. As a result, newly hired employees were more likely to be offered a fixed contract than incumbent ones. Pre-existing contracts of employees hired prior to the merger event were not modified. While interviews with the current management team indicated no explicit intent to select new hires based on their propensity to innovate, it is possible that changes in the employee selection criteria might confound our results. Therefore, we include $JoinAfterMerger_i$ as an additional control variable in all our models. This variable assumes value one if the employee was hired after the merger event and zero otherwise.

--- Insert Table 1 here ---

Table 2 reports the correlations between all variables of interest in this study. In line with our prediction, variable contracts and mixed contracts appear to be negatively correlated with innovation submissions, while fixed contracts are positively correlated with ideas submission. Additionally, female employees and younger ones are less likely to submit ideas, while employees with longer tenure and performing management roles are more likely to engage in innovation activities. Interestingly, employees that joined the company after the beginning of 2014 tend to innovate *less* than those that were already in the ranks at the time of the merger, consistent with post-merger management not explicitly selecting new hires based on their propensity to innovate.

--- Insert Table 2 here ---

V. EMPIRICAL RESULTS

Test of H1: Incentive Strength and Employee-Initiated Innovation

Table 3 provides estimation results of our tests of H1, which predicts that employees rewarded with high-powered incentives are less likely to engage in employee-initiated innovation activities. We formalize the following model:

$$Submission_{i,t} = \alpha + \beta_1 Variable_i + \beta_2 Mixed_i + \beta_3 JoinAfterMerger_i + \beta_4 DormEmp_i + \beta_5 Female_i + \beta_6 Age_i + \beta_7 Mgmt_i + \beta_8 Tenure_i + \sum_{t=1}^{k} \gamma_t Month_t + \varepsilon \quad (1)$$

We estimate Equation (1) using panel logistic regression (see Table 3). The dropped (base) case with respect to contract types is $Fixed_i$. We include month fixed effects to account for seasonality. Standard errors are clustered by department to account for the different nature of the standard tasks.[11] The coefficients reported in the column (1) of Table 3 correspond to the estimation without department fixed effects, while in column (2) we also include department fixed effects, to further control for department-level characteristics.

In both estimations of Eq. (1) reported in Table 3, the coefficients corresponding to our control variables are consistent across specifications. For example, employees who reside in company dormitory facilities, or who perform a management function exhibit a higher propensity to submit innovation ideas.[12] Age, gender, and tenure, however, are not significantly associated with the likelihood to submit ideas. Controlling for month and department fixed effects, the significantly negative coefficient on *Variable* (β_1= -0.903, p<0.10) suggests that employees under a variable pay contract are 71.1 percent less likely to submit innovation ideas compared to

[11] Our main tests involve estimations using panel data. While the contract type is defined at the employee level and it does not change over time (i.e. time-invariant employee characteristic), the characteristics of the operations in our field setting (seasonality, idle months, high productivity months) are likely to influence the likelihood of innovation activity differently in different months of operation. Nonetheless, we also estimate the model at the employee cross-sectional level which yield consistent results (untabulated).

[12] Repeating our estimations with $Approved_{i,t}$ as our dependent variable generates consistent results (untabulated).

employees rewarded with *Fixed* contracts.[13] The propensity to engage in EII is not statistically different between employees under *Mixed* contracts and *Fixed* pay employees.[14] Taken together, our results support H1 and are consistent with theoretical predictions that employees with high-powered incentives on the standard tasks are less likely to pursue EII activities.

--- Insert Table 3 here ---

Test of H2: Incentive Strength and Employee-Initiated Innovation Scope

To explore the relation between incentive strength and different types of EII activities, we estimate Eq. (1) by specifying different dependent variables corresponding to the categories of innovation utilized by management to classify proposed ideas. Estimation results are reported in Table 4. Differently from our predictions (H2a), we find no significant differences between *Fixed* and *Variable* contracts with respect to employees' propensity to engage in task-specific innovation activities. While variable-pay employees benefit from proposing innovation ideas that improve their individual task in ways that might convert in future increased payoffs, fixed-pay employees might also draw benefits from innovation initiatives with favorable cost/benefit trade-off. Fixed-pay employees can gain extra income through innovation ideas submissions and we should expect them to engage in activities that might, for example, reduce the effort required to perform their standard task.

With respect to non-task-specific innovation ideas (i.e. $Sub\_diffdep_{i,t}$, $Sub\_cost_{i,t}$, $Sub\_tech_{i,t}$), the coefficient associated with $Variable_i$ is significantly negative.[15] Relative to *Fixed*

[13] The coefficients are log of the odd ratio. To interpret the coefficients, we transform the log of the odds back to a probability: p = exp(0.903)/(1+exp(0.903)) = .711.

[14] We have no information about the relative weights of the fixed and variable component in mixed compensation contracts. We assume that if the fixed component is relatively large, employees under mixed contracts would behave more similarly to fixed pay employees, and more like variable pay employees if the relative weight of the variable component dominates the mix.

[15] We are not able to estimate our models when the dependent variable is *Sub_morale, Sub_lt,* and *Sub_group*. The reason is that there is no variation in the type of contract associated with proponents of these types of innovation ideas. More specifically, *Variable* contracts perfectly predict each of these dependent variables. In other words, in our setting,

contracts, *Mixed* contracts are significantly associated with a lower likelihood of submission of non-task-specific ideas benefiting other departments ($Sub\_diffdep_{i,t}$). These results support H2b and suggest that, compared to low-powered incentives, high-powered ones are more likely to increase the fixation on the performance measure included in explicit incentive contract to reward standard execution tasks and reduce employees' motivation to engage in broad scope EII.

--- Insert Table 4 here ---

Taken together, these results have significant implications for incentive contract design choices in organizations that intend to stimulate innovation activities among front-line employees who are predominantly engaged with core operations. In particular, the heavy focus on the standard execution task introduced by high-powered incentives can increase the opportunity cost of diverting effort to perform exploration activities and collaborations beyond the standard execution task prescribed in their contract.

VI. ROBUSTNESS TESTS

Endogeneity in Contract Assignment: An Instrumental Variables Approach

A potential concern that may limit the validity of our inferences arises from the possibility that the type of incentive contract may be endogenously determined based on the employee's propensity to produce innovative ideas. We address this concern in several ways. First, interviews with management confirm that contract assignment decisions are not deliberately based on employees' potential for innovation. Specifically, management emphasized that our research setting is a manufacturing site employing workers with relatively low levels of education, and that their main responsibilities involve tasks that are fairly standard and non-innovation related.

there are no instances in which innovation idea submissions related to improving morale, benefitting the long-term, and the collective group are proposed by employees under a variable contract. This further supports our prediction (H2b).

Moreover, they indicated that the variation observed in the structure of contract types largely depends on the timing of the hire during the year cycle as discussed earlier (see Section III). Second, we leverage this characteristic of our field setting to re-estimate the equations used in our main tests using an instrumental variable (IV) approach, by which we predict innovation behavior using a two-stage least square (2SLS) estimation adopting the time of hire as an instrument.

We construct two instruments using indicator variables to capture the time of hire within the annual operating cycle. *JoinBusy* assumes value 1 if employee *i* was hired during the busy months of the year, and 0 otherwise. *JoinIdle* assumes value 1 if employee *i* joined the firm during the months where the operating lines are not running, and 0 otherwise. We posit that the month of hire, while correlated with the type of contract offered to the prospective employee per management's description of their hiring practices, should not determine the employee's propensity to innovate. In other words, to qualify as a proper instrument, each of the two selected variables needs to satisfy a validity requirement by being correlated with the endogenous regressors—the contract type—and an exclusion restriction requirement, by being uncorrelated with the error terms in the innovation behavior regressions.

Table 5 reports our estimation results for each of the selected instruments – Panel A corresponds to *JoinBusy*, and Panel B to *JoinIdle*. In both cases we follow the same protocol. In the first stage (column (1)), we estimate a contract determinant model including the respective instrument as a predictor:

$$ContractType_i = \alpha + \beta_1 JoinAfterMerger_i + \beta_2 DormEmp_i + \beta_3 Female_i + \beta_4 Age_i + \beta_5 Mgmt_i + \beta_6 Tenure_i + \beta_7 Instrument_i + \varepsilon \quad (3)$$

where the dependent variable is an indicator variable *Variable (Fixed*) in Panel A (Panel B) assuming value one if the contract is a *Variable (Fixed*) contract, and zero otherwise. All other

variables are defined as previously described. We estimate Eq. (3) using logit regressions, including department fixed effects and clustering standard errors by department. Consistent with the change in hiring policy described in Section IV, the coefficient associated with $JoinAfterMerger_i$ is significant, indicating a preference for offering fixed contracts for new hires. Moreover, the significant coefficient associated with $Mgmt_i$ indicates that employees with manager functions are more likely to be awarded fixed pay contracts, consistent with industry norms.[16] None of the other employee-level characteristics available to us appear to be significant determinants of the contract type.

In Panel A, *JoinBusy* satisfies the validity requirement, as the associated coefficient is positive and significant ($\beta = 1.008$, $p<0.01$), confirming that employees who join the firm during busy months are more likely to be offered a *Variable* contract. In Panel B, the dependent variable for the first stage is the indicator variable *Fixed* which assumes value 1 if the contract is *Fixed*, and 0 if the contract is either *Mixed* or *Variable. JoinIdle* satisfies the validity requirement as the associated coefficient is positive and significant ($\beta = 1.012$, $p<0.10$) confirming that employees hired during times when production is idle are more likely to be offered a *Fixed* contract. The second stage (columns (2) and (3)), reports the estimation of Eq. (1), which predicts the likelihood of innovation ideas submission. In this specification, the variable representing *Variable* (*Fixed*) in Panel A (Panel B) assumes the instrumented value from the first stage regression. We control for *Mixed* to maintain consistency with our main analyses.[17] In Panel A (Panel B), we continue to find

[16] This is not surprising, given that *Variable* contracts generally assume the availability of accurate performance measures that can account for the agent's output. Whereas front-line employees at this company are assigned standard execution tasks for which output is readily measurable, management performance is difficult to assess based on volume-based performance measures, such that the incentive contracts of employees with manager functions are more likely to include a fixed component.

[17] We use Stata to perform all our estimations. The 2SLS procedure in Stata does not allow to instrument both variables ("*Variable* and *Mixed*" or "*Fixed* and *Mixed"*) in the second stage regression. Since our hypotheses are formulated to contrast low-powered and high-powered incentives, we chose to instrument *Variable (Fixed)* and control for *Mixed.*

that employees rewarded with *Variable* (*Fixed*) contracts are less (more) likely to submit innovation ideas compared to *Fixed* (*Variable*) contract employees (column (2)). However, our results are not robust in presence of department fixed effects (column (3)), likely due to the fact that different departments are more likely to hire in different periods of the annual cycle and that variation would therefore be already absorbed by the fixed effects.

We also conduct a weak instrument test,[18] and report the first-stage F-statistics on excluded instruments in columns 2 and 3. Sufficiently large *F*-statistics (i.e. *F* greater than 23 – see Olea and Pflueger (2013)) allow us to reject the null that the instruments are weak. In columns (4) and (5) we provide evidence of a satisfactory exclusion restriction, by showing that *JoinBusy* (*JoinIdle*) is not correlated with the error term of the estimation of Eq. (1).[19] Additionally, having two orthogonal instruments while having only one endogenous regressor (i.e. contract type) allows us to conduct an overidentification test to further determine if the instruments satisfy the exclusion restriction. The Hansen-Sargan *J*-statistic for the over-identification test has a *p*-value of 0.809, by which we reject the null hypothesis that both instruments are uncorrelated with the error term of the main regressions – additional evidence of successful exclusion restrictions. Collectively, our results reduce the endogeneity concern with respect to the relation between contract type and innovation.

--- Insert Table 5 here ---

However, estimations of the IV model dropping all observations corresponding to *Mixed* contracts provide consistent results (untabulated).

[18] The concern is that the standard errors on the IV estimates are likely to be much larger if the excluded instrumental variables are only weakly correlated with the endogenous regressors.

[19] We re-estimate the 2SLS estimation using a different specification of our instrumental variable. Specifically, we construct an ordinal variable (*JoinPeriod*) assuming value -1 if the employee is hired during busy months, value 0 if the employee joins the firm in regular production months, and value +1 if the employee is hired during idle months. Untabulated estimations provide equivalent results to those reported in Table 5.

Incentive Contracts and Standard Execution Task Outcomes

So far our analyses show that low-powered incentives are associated with greater employee engagement in broad scope EII. We have argued that low-powered incentives result in less fixation on the prescribed standard task specified in the incentive contract allowing employees to engage in alternative non-prescribed extra-role behaviors like EII. However, if such effects come at the cost of lower performance on the prescribed standard execution task, the trade-off between EII and performance on the standard execution task in presence of low-powered incentives could be unfavorable. To address this concern, we examine the relation between incentive contract type and two key performance outcomes related to the employee's standard execution task, namely the propensity to meet operational targets and the incidence of production quality issues. In our setting, each month, management flags individual employees as having met or not having met their assigned targets. We use this information to create an indicator variable $Met_{i,t}$ which assumes value one if employee *i* met or exceeded its budgeted output in month *t*, and zero otherwise. Additionally, management monitors employee contribution to production quality by tracing quality defects and complaints to the employees that participated in the production process that generated the quality issue. Relevant employees are flagged in the company's information system every time a complaint is filed. We construct an indicator variable ($BadQuality_{i,t}$), which assumes value 1 if employee *i* is flagged for quality issues in month *t* and zero otherwise. Table 6 reports the logit estimations of the following model:

$$Outcome_{i,t} = \alpha + \beta_1 Variable_i + \beta_2 Mixed_i + \beta_3 Submission_{i,t} + \beta_4 JoinAfterMerger_i + \beta_5 DormEmp_i + \beta_6 Female_i + \beta_7 Age_i + \beta_8 Mgmt_i + \beta_9 Tenure_i + \varepsilon \quad (2)$$

The dependent variable (*Outcome*) is substituted by each of our proxies measuring productivity and quality, respectively. The results show no significant differences between *Fixed* and *Variable*

contracts with respect to each of the selected standard task-related outcome. We find that *Mixed* contracts are associated with lower likelihood of meeting operational targets compared to *Fixed* contracts. Additionally, engagement in EII, proxied by the variable *Submission*, does not exhibit any significant relation with the likelihood of meeting expectations with respect to productivity and quality. Taken together, our results suggest that, while EII competes with standard tasks for the time and effort of workers, empowerment to engage in EII does not necessarily introduce an unfavorable tradeoff between operational outcomes associated with the primary responsibility of front-line employees.

--- Insert Table 6 here ---

VII. CONCLUSION

In this study, we empirically examine the relation between the design of incentive contracts relative to employees' standard execution tasks, and their propensity to engage in desirable, yet not prescribed, extra-role behaviors, such as employee-initiated innovation (EII). We obtained field data from a company that manages EII idea submissions and evaluation using a dedicated information system. We find theory-consistent evidence suggesting that employees rewarded for standard execution tasks with high-powered incentives exhibit a lower propensity to submit innovation ideas, compared to employees with low-powered incentives. High-powered incentives for well-defined standard tasks that have explicit links with monetary rewards increase the opportunity cost of engaging in activities that are associated with greater uncertainty in their outcomes and payoffs, and for which performance measures are difficult to define and contract upon ex-ante.

We further distinguish between different types of EII activities—task-specific ideas, reflecting suggestions directly related to the proposing employee's assigned standard execution

task, and non-task-specific ideas, related to improvement opportunities for organizational aspects unrelated to the execution task assigned to the proposing employee. We show that high-powered incentives are associated with significantly lower propensity to engage in ideas related to issues of broader scope extending beyond the employee's standard execution task. We infer that high-powered incentives may discourage innovation activity by increasing the fixation on the standard task so that, even when employees are motivated to engage in EII, they limit their effort to ideas that exhibit lower search costs and may convert into future higher individual payoffs through improved standard task productivity. Our findings highlight the potential for unintended consequences resulting from high-powered incentives: the limitation of non-prescribed EII activities to dimensions of the standard execution task and avoidance of innovation ideas that may benefit a larger set of constituents in the organization.

This research is subject to limitations that are common to many archival field studies. First, external validity concerns arise from the fact that we use information pertaining to a single organization, and our results might therefore be influenced by idiosyncratic characteristics of the field setting. Second, we are restricted by the contract types in use at the research site. While the observed contracts allow us to compare low-powered versus high-powered monetary incentives, alternative contract types, performance measures, or reward types (not observed in our setting) may be better suited to encourage EII activities. Third, we only have limited information about the internal mix of fixed and variable components of the mixed contracts, which prevents us to make strong inferences with respect to the consequences of adopting such a hybrid contract design. Despite these limitations, our study sheds new light on how the strength of incentives associated with prescribed standard execution tasks can influence the propensity to engage in non-prescribed extra-role behaviors. Prior research (Wright et al. 1993) had examined experimentally the relation

between goal difficulty, goal commitment, incentive structure, and helping coworkers (another important type of extra-role behavior), but had found no influence of the compensation design on the likelihood to engage in extra-role activities. Additionally, our finding that low-powered incentives are more likely to induce EII ideas of broader scope provides insights into the effectiveness of looser management control systems to foster pro-organizational employee behaviors. We encourage future research to further explore alternative management control tools and systems that can stimulate EII or other extra-role behaviors within organizations.

Appendix 1: Types of Employee-Initiated Innovations

Category	Type	Description	Examples	Variable
Non Task-Specific Innovation Ideas	Long-term	Ideas that enhance the long-term success of the company	"At this stage, our company does not have a complete proofing management standard. As a result, illegal operations often occur. We shall draft a formal proofing management standard that workers should follow."	*Sub_lt*
	Group	Ideas that promote collaboration	"Due to the building setup, the offset printing plant is now separated by the detention area of the outgoing products, resulting in poor communication and inconvenience. I hope that the outer wall can be removed so that the collaboration among the workers in the offset printing plant can be largely improved."	*Sub_group*
	Different Department	Ideas that benefit other departments	One employee from storage department suggests that "defective products in stock cannot be sold and may be used to print internal documents and labels."	*Sub_diffdep*
	Cost	Ideas that decrease overhead expenses	"There are two machines that are damaged for different reasons. We can assemble the good parts of one machine to the other. As a result, we only need to buy one new machine rather than two machines."	*Sub_cost*
	Technology	Ideas that enhance to company's computerized processes and automation	"The booster pump of the company's fire protection system is pressurized every 3-5 minutes due to the sensitivity of the pressure switch and the leakage of the pipeline, resulting in the pump being often damaged and the water pressure being insufficient. I suggest to add a timing device to the pump control circuit, which not only provides a higher water pressure in the pipeline, but also increases the pressurization interval to around 20 minutes."	*Sub_tech*
	Morale	Ideas that improve team/group morale	"We can celebrate office birthdays on a monthly basis. This is a way to gain employees' sense of belongings and increase employee satisfaction."	*Sub_morale*
Task-Specific Innovation Ideas	5S	Ideas that enhance the standardization process of the standard task	"I suggest to draw a paper diagram depicting the model, configuration and operation of the laminating machine."	*Sub_5s*
	Quality	Ideas that decrease the number of bad-quality (standard task) outputs	"There is no waste disposal area between the two templates in the middle of die cutting area, which increases the probability of defective projects. I suggest to add a 3mm waste disposal area in the middle of die cutting area, so that workers can verify each product during the process."	*Sub_quality*
	Efficiency	Ideas that enhance the speed of executing the standard task	""400 per roll" of material is currently used, resulting in too frequent machine shutdowns as materials need to be replaced. This results in wasting a lot of printing time. I suggest to order the "800 per roll" material instead."	*Sub_efficiency*

Appendix 2: Variables Definition

Innovation-related Variables	
Submission	Indicator variable assuming value 1 if the employee submits an innovation idea in month t, and zero otherwise
Approved	Indicator variable assuming value 1 if the employee submits an innovation idea that is approved and rewarded by management in month t, and zero otherwise
Sub_lt	Indicator variable assuming value 1 if the employee submits an innovation idea classified as "long-term" in month t, and zero otherwise
Sub_group	Indicator variable assuming value 1 if the employee submits an innovation idea classified as "group" in month t, and zero otherwise
Sub_diffdep	Indicator variable assuming value 1 if the employee submits an innovation idea classified as "different department" in month t, and zero otherwise
Sub_cost	Indicator variable assuming value 1 if the employee submits an innovation idea classified as "cost" in month t, and zero otherwise
Sub_tech	Indicator variable assuming value 1 if the employee submits an innovation idea classified as "technology" in month t, and zero otherwise
Sub_morale	Indicator variable assuming value 1 if the employee submits an innovation idea classified as "morale" in month t, and zero otherwise
Sub_5s	Indicator variable assuming value 1 if the employee submits an innovation idea classified as "5s" in month t, and zero otherwise
Sub_quality	Indicator variable assuming value 1 if the employee submits an innovation idea classified as "quality" in month t, and zero otherwise
Sub_efficiency	Indicator variable assuming value 1 if the employee submits an innovation idea classified as "efficiency" in month t, and zero otherwise
Contract-related Variables	
Variable	Indicator variable assuming value 1 if employee *i* is paid with a variable contract for their standard task, and zero otherwise
Mixed	Indicator variable assuming value 1 if employee *i* is paid with a mixed contract for their standard task, and zero otherwise
Fixed	Indicator variable assuming value 1 if employee *i* is paid with a fixed contract for their standard task, and zero otherwise
Employee Characteristics	
JoinAfterMerger	Indicator variable assuming value 1 if employee *i* joined the firm after the merger event, and zero otherwise
DormEmp	Indicator variable assuming value 1 if employee *i* lives in the company-sponsored accommodations, and zero otherwise
Female	Indicator variable assuming value 1 if employee *i* is a female, and zero otherwise
Age	Continuous variable capturing the age of employee *i* in years, calculated at the beginning of the sample period
Mgmt	Indicator variable assuming value 1 if employee *i* is a manger in the company, and zero otherwise
Tenure	Continuous variable capturing the tenure of employee *i* in years
Department	Categorical variable assuming values corresponding to each of the 11 departments in the site

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Table 1: Descriptive Statistics

Panel A: Panel Data

	N	mean	p50	st. dev.	min	p25	p75	max
Innovation-related Variables								
Submission	6016	0.060	0.000	0.238	0.000	0.000	0.000	1.000
Approved	6016	0.057	0.000	0.233	0.000	0.000	0.000	1.000
Sub_lt	6016	0.014	0.000	0.119	0.000	0.000	0.000	1.000
Sub_group	6016	0.009	0.000	0.094	0.000	0.000	0.000	1.000
Sub_diffdep	6016	0.003	0.000	0.055	0.000	0.000	0.000	1.000
Sub_cost	6016	0.046	0.000	0.210	0.000	0.000	0.000	1.000
Sub_tech	6016	0.005	0.000	0.068	0.000	0.000	0.000	1.000
Sub_morale	6016	0.002	0.000	0.041	0.000	0.000	0.000	1.000
Sub_5s	6016	0.007	0.000	0.083	0.000	0.000	0.000	1.000
Sub_quality	6016	0.007	0.000	0.085	0.000	0.000	0.000	1.000
Sub_efficiency	6016	0.017	0.000	0.129	0.000	0.000	0.000	1.000

Panel B: Cross-Sectional Data

	N	mean	p50	st. dev.	min	p25	p75	max
Innovation-related Variables								
SubmissionE	513	0.154	0.000	0.361	0.000	0.000	0.000	1.000
ApprovedE	513	0.152	0.000	0.359	0.000	0.000	0.000	1.000
Sub_ltE	513	0.014	0.000	0.116	0.000	0.000	0.000	1.000
Sub_groupE	513	0.031	0.000	0.174	0.000	0.000	0.000	1.000
Sub_diffdepE	513	0.023	0.000	0.151	0.000	0.000	0.000	1.000
Sub_costE	513	0.109	0.000	0.312	0.000	0.000	0.000	1.000
Sub_techE	513	0.031	0.000	0.174	0.000	0.000	0.000	1.000
Sub_moraleE	513	0.012	0.000	0.108	0.000	0.000	0.000	1.000
Sub_5sE	513	0.047	0.000	0.211	0.000	0.000	0.000	1.000
Sub_qualityE	513	0.049	0.000	0.216	0.000	0.000	0.000	1.000
Sub_efficiencyE	513	0.078	0.000	0.268	0.000	0.000	0.000	1.000

Panel C: Employee-Level Data

	N	mean	p50	st. dev.	min	p25	p75	max
Contract-related Variables								
Variable	513	0.127	0.000	0.333	0.000	0.000	0.000	1.000
Mixed	513	0.296	0.000	0.457	0.000	0.000	1.000	1.000
Fixed	513	0.577	1.000	0.495	0.000	0.000	1.000	1.000
Employee Characteristics								
JoinAfterMerger	513	0.719	1.000	0.450	0.000	0.000	1.000	1.000
DormEmp	513	0.068	0.000	0.252	0.000	0.000	0.000	1.000
Female	513	0.382	0.000	0.486	0.000	0.000	1.000	1.000
Age	510	33.081	31.354	10.620	16.000	24.375	41.059	66.720
Mgmt	513	0.076	0.000	0.265	0.000	0.000	0.000	1.000
Tenure	513	1.816	1.000	1.319	1.000	1.000	2.091	17.000

Notes: Table 1 reports the summary statistics for all variables used in the empirical tests. All variables are defined in Section V. Panel A reports the descriptive statistics corresponding to our complete panel data sample. In Panel A, Innovation-related variables are defined as indicator variables assuming value 1 if the employee has submitted at least one innovation idea of the indicated kinds during the month and zero otherwise, and the indicator variable *Approved* assumes value 1 if any idea submitted by the employee has been approved during the month and zero otherwise. Panel B reports the descriptive statistics relative to our data collapsed to the cross-sectional employee-level. In Panel B, Innovation-related variables are defined as indicator variables assuming value 1 if the employee has submitted at least one innovation idea of the indicated kinds during our sample period and zero otherwise (the suffix "*E*" in the variable label indicates the term "*ever*"), and the indicator variable *ApprovedE* assumes value 1 if any idea submitted by the employee has ever been approved during our sample period and zero otherwise. Panel C reports the descriptive statistics related to employee characteristics, including their contract type and demographic information.

Table 2: Correlations

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
1. Submission	1.0000								
2. Sub_lt	0.4780***	1.0000							
3. Sub_group	0.3756***	0.4609***	1.0000						
4. Sub_diffdep	0.2162***	0.1718***	0.2207***	1.0000					
5. Sub_cost	0.8703***	0.5427***	0.4064***	0.2050***	1.0000				
6. Sub_tech	0.2699***	-0.0083	0.0453***	-0.0037	0.1591***	1.0000			
7. Sub_5s	0.3309***	-0.0102	0.0555***	-0.0046	0.0669***	0.1996***	1.0000		
8. Sub_quality	0.3387***	-0.0104	0.0952***	0.0667***	0.1944***	0.1948***	0.1100***	1.0000	
9. Sub_efficiency	0.5183***	0.0057	0.0558***	0.0400***	0.4180***	0.1802***	0.0972***	0.3363***	1.0000
10. Sub_morale	0.1610***	-0.0049	0.0826***	-0.0022	0.1656***	0.0572***	-0.0034	-0.0035	0.0579***
11. Variable	-0.1068***	-0.0696***	-0.0547***	-0.0244*	-0.1011***	-0.0167	-0.0251*	-0.0132	-0.0337***
12. Mix	-0.0449***	0.0482***	0.0080	-0.0129	-0.0404***	-0.0349***	-0.0083	-0.0149	-0.0543***
13. Fixed	0.1292***	0.0212	0.0409***	0.0317**	0.1205***	0.0429***	0.0285**	0.0236*	0.0734***
14. JoinAfterMerger	-0.0951***	-0.0746***	-0.0540***	-0.0148	-0.0834***	-0.0348***	-0.0467***	-0.0336***	-0.0484***
15. DormEmp	0.0007	0.0721***	0.0182	0.0020	0.0115	-0.0020	-0.0135	0.0068	-0.0166
16. Female	-0.0244*	0.0433***	0.0267**	0.0050	0.0120	-0.0458***	-0.0562***	-0.0223*	-0.0336***
17. Age	-0.0474***	-0.0246*	-0.0248*	-0.0348***	-0.0562***	0.0235*	0.0637***	-0.0202	-0.0550***
18. Mgmt	0.2293***	0.1255***	0.0848***	0.0577***	0.1897***	0.0507***	0.0941***	0.0450***	0.1233***
19. Tenure	0.0617***	0.0772***	0.0328**	0.0071	0.0689***	0.0033	0.0150	0.0035	0.0223*

	10	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*
10. Sub_morale	1.0000								
11. Variable	-0.0234*	1.0000							
12. Mix	-0.0208	-0.2933***	1.0000						
13. Fixed	0.0373***	-0.6289***	-0.5588***	1.0000					
14. JoinAfterMerger	-0.0301**	-0.4520***	0.1929***	0.2352***	1.0000				
15. DormEmp	-0.0174	0.4595***	0.0608***	-0.4481***	-0.3817***	1.0000			
16. Female	-0.0250*	0.2091***	-0.0849***	-0.1123***	-0.0565***	-0.0957***	1.0000		
17. Age	0.0038	0.3157***	-0.0132	-0.2632***	-0.2289***	0.1409***	0.1606***	1.0000	
18. Mgmt	-0.0044	-0.1914***	-0.1633***	0.2988***	-0.1850***	-0.1243***	-0.1839***	0.0287**	1.0000
19. Tenure	0.0071	0.3751***	-0.1638***	-0.1921***	-0.7691***	0.3827***	0.0079	0.2816***	0.1971***

Table 3: Contract Type and Innovation Activities

	(1) *Submission*	(2) *Submission*
Variable	-2.585***	-0.903*
	(-3.97)	(-1.95)
Mixed	-1.047**	-0.060
	(-2.08)	(-0.13)
JoinAfterMerger	-0.879*	-0.546
	(-1.78)	(-1.17)
DormEmp	1.596**	1.120**
	(1.98)	(2.51)
Female	0.356	-0.195
	(0.78)	(-0.73)
Age	-0.020	-0.011
	(-1.12)	(-0.54)
Mgmt	1.487***	0.899**
	(3.36)	(2.15)
Tenure	-0.016	-0.120
	(-0.27)	(-1.26)
Intercept	-2.717***	-4.685***
	(-4.90)	(-9.42)
N	5833	5833
pseudo R^2	0.180	0.321
Month FE	Yes	Yes
Department FE	No	Yes

Notes: Table 3 reports the coefficients estimated for Eq. (1) using logit regression. *Fixed* is the base (dropped) case. Estimations in column (2) include department fixed effects. All estimations include month fixed effects and cluster standard errors by department. Two-tailed statistical significance is indicated as follows: * = $p<0.10$; ** = $p<0.05$; *** = $p<0.01$.

Table 4: Contract Type and Innovation Scope

	Task-Specific Innovations			Non-Task-Specific Innovations		
	(1)	(2)	(3)	(4)	(5)	(6)
	Sub_5s	*Sub_quality*	*Sub_efficiency*	*Sub_diffdep*	*Sub_cost*	*Sub_tech*
Variable	-0.827	-0.612	0.466	-12.366***	-1.575*	-1.647**
	(-1.09)	(-0.71)	(1.04)	(-10.66)	(-1.70)	(-2.46)
Mixed	0.588	-0.343	-0.216	-12.269***	-0.362	0.000
	(0.97)	(-0.38)	(-0.39)	(-7.54)	(-0.54)	(.)
JoinAfterMerger	-1.585	-1.360*	-0.761**	1.091*	-0.271	-1.015
	(-1.04)	(-1.65)	(-2.55)	(1.69)	(-0.48)	(-1.08)
DormEmp	-0.542	0.637	0.022	14.918***	1.911**	0.767
	(-1.47)	(1.06)	(0.06)	(11.05)	(2.29)	(0.69)
Female	-2.359**	-0.155	-0.118	-0.745	0.054	-1.237
	(-1.97)	(-0.26)	(-0.46)	(-0.66)	(0.17)	(-1.25)
Age	0.076**	-0.003	-0.040	-0.091*	-0.013	0.052**
	(2.12)	(-0.08)	(-1.61)	(-1.70)	(-0.62)	(2.12)
Mgmt	1.804**	0.463	1.219**	1.615	0.579	0.411
	(2.57)	(0.53)	(2.48)	(1.09)	(1.54)	(0.47)
Tenure	-0.224	-0.229	-0.118	0.086	-0.058	-0.105
	(-0.45)	(-1.28)	(-1.24)	(1.03)	(-0.73)	(-0.22)
Intercept	-6.493***	-4.261***	-4.231***	-2.249	-7.488***	-3.891***
	(-8.76)	(-4.50)	(-8.10)	(-1.11)	(-9.62)	(-4.91)
N	2849	3146	4571	546	5656	1185
pseudo R^2	0.294	0.129	0.276	0.129	0.410	0.131
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Department FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Table 4 reports the coefficients estimated for Eq. (1) using the propensity to produce innovation ideas for each individual category of innovation. All estimations include month and department fixed effects, and cluster standard errors by department. The estimation of Eq. (1) using *Sub_lt*, *Sub_group*, or *Sub_morale* as dependent variables is not possible, as *Variable* perfectly predicts the outcome of interest in that no employee subject to a variable pay contract submits any innovation ideas in those three categories during our sample period. Two-tailed statistical significance is indicated as follows: * = $p<0.10$; ** = $p<0.05$; *** = $p<0.01$.

Table 5: Instrumental Variable Test

Panel A: Instrument *JoinBusy*

	First Stage	Second Stage		Exclusion Restriction	
	(1)	(2)	(3)	(4)	(5)
DV	*Variable*	*Submission*	*Submission*	*Submission*	*Submission*
Variable		-11.549**	-4.658	-2.599***	-0.918**
		(-2.39)	(-1.31)	(-3.97)	(-1.98)
Mixed		-3.748**	-1.883	-1.047**	-0.047
		(-2.44)	(-1.21)	(-2.04)	(-0.10)
JoinAfterMerger	-2.488***	-3.360**	-1.612	-1.107**	-0.628
	(-2.97)	(-2.48)	(-1.50)	(-2.04)	(-1.47)
DormEmp	1.714	5.037**	1.778	1.752**	1.180**
	(1.50)	(2.53)	(1.63)	(1.98)	(2.46)
Female	0.481	1.374**	0.293	0.377	-0.174
	(0.38)	(2.39)	(0.85)	(0.81)	(-0.66)
Age	0.042	0.072*	0.009	-0.019	-0.010
	(1.30)	(1.84)	(0.79)	(-1.01)	(-0.53)
Mgmt	-1.595	-2.111	-0.125	1.489***	0.899**
	(-1.35)	(-1.55)	(-0.24)	(3.47)	(2.15)
Tenure	0.063	-0.245**	-0.125*	0.001	-0.109
	(0.40)	(-1.98)	(-1.90)	(0.01)	(-1.15)
JoinBusy	1.008***			-0.517	-0.187
	(2.70)			(-1.11)	(-0.51)
Intercept	-2.002*	-0.603	-0.331	-2.541***	-4.625***
	(-1.94)	(-1.08)	(-0.19)	(-4.21)	(-7.92)
Weak Instrument Test (F-statistic)		139.98	229.25		
N	419	5866	5833	5833	5833
pseudo R^2	0.508			0.185	0.321
Month FE		Yes	Yes	Yes	Yes
Department FE	Yes	No	Yes	No	Yes

Panel B: Instrument *JoinIdle*

	First Stage	Second Stage		Exclusion Restriction	
	(1)	(2)	(3)	(4)	(5)
DV	*Fixed*	*Submission*	*Submission*	*Submission*	*Submission*
Fixed		4.808***	0.299	2.523***	0.903*
		(4.81)	(0.12)	(4.06)	(1.94)
Mixed		3.199***	0.323	1.507	0.849*
		(4.63)	(0.23)	(1.46)	(1.79)
JoinAfterMerger	1.259**	-1.458***	-0.298	-0.859	-0.546
	(2.48)	(-4.87)	(-0.39)	(-1.62)	(-1.17)
DormEmp	-2.967*	2.272***	0.449	1.716*	1.130**
	(-1.65)	(5.27)	(0.58)	(1.91)	(2.30)
Female	0.596	0.582***	-0.117	0.389	-0.192
	(1.33)	(4.30)	(-0.47)	(0.83)	(-0.72)
Age	-0.014	0.018**	-0.004	-0.017	-0.010
	(-0.64)	(2.06)	(-0.47)	(-0.90)	(-0.55)
Mgmt	3.439***	-0.235	0.502	1.544***	0.902**
	(3.19)	(-0.81)	(1.36)	(3.48)	(2.24)
Tenure	0.075	-0.096**	-0.068	-0.045	-0.121
	(0.37)	(-2.08)	(-1.24)	(-0.92)	(-1.30)
JoinIdle	1.012*			0.824	0.044
	(1.77)			(1.39)	(0.08)
Intercept	-1.434**	-5.991***	-2.731**	-5.481***	-5.601***
	(-2.48)	(-6.21)	(-2.04)	(-5.45)	(-8.01)
Weak Instrument Test (F-Statistic)		235.90	340.91		
N	422	5866	5833	5833	5833
pseudo R^2	0.386			0.188	0.321
Month FE		Yes	Yes	Yes	Yes
Department FE	Yes	No	Yes	No	Yes

Notes: Table 5 reports the coefficients of the 2SLS estimation of Eq. (1). Panel A reports estimations adopting as instrument *JoinBusy*, an indicator variable assuming value 1 if the month in which employee *i* is hired is a busy month, and 0 otherwise. Panel B reports estimations adopting as instrument *JoinIdle*, an indicator variable assuming value 1 if the month in which employee *i* is hired is an idle month, and 0 otherwise. In both panels, column (1) reports the estimation results of the first stage, while columns (2) and (3) report the results of the second stage estimation, where variable *Variable (Fixed*) in Panel A (Panel B) assumes instrumented values from the first stage, and we control for *Mixed* to maintain consistency with our main tests. Column (2) does not include department fixed effects, while column (3) does. Columns (4) and (5) provide evidence of satisfactory exclusion restrictions for each instrument and differ by the inclusion of department fixed effects (present in column (5) but not in column (4)). All estimations include month fixed effects and are cluster standard errors by department. The Sargan J statistic for the over-identification test has a *p*-value of 0.809, based on which we are unable to reject the null hypothesis that both instruments are not correlated with the error term of the main regressions, further satisfying the exclusion restriction. Two-tailed statistical significance is indicated as follows: * = p<0.10; ** = p<0.05; *** = p<0.01.

Table 6: Contracts Type and Standard Execution Tasks

	(1) *Met*	(2) *Met*	(3) *Met*	(4) *BadQuality*	(5) *BadQuality*	(6) *BadQuality*
Variable	-0.045		-0.042	-0.554		-0.553
	(-0.19)		(-0.18)	(-1.42)		(-1.42)
Mixed	-0.340***		-0.340***	0.065		0.065
	(-2.67)		(-2.71)	(0.60)		(0.59)
Submission		0.207	0.211		0.134	0.117
		(0.83)	(0.84)		(0.78)	(0.76)
JoinAfterMerger	0.173	0.236	0.171	-0.007	0.175	-0.005
	(0.46)	(0.67)	(0.46)	(-0.02)	(0.38)	(-0.01)
DormEmp	0.354	0.285	0.353	0.206	0.105	0.205
	(0.88)	(0.71)	(0.87)	(0.98)	(0.36)	(0.98)
Female	0.181*	0.175*	0.182*	-0.576	-0.592	-0.573
	(1.76)	(1.77)	(1.78)	(-1.12)	(-1.30)	(-1.11)
Age	-0.006	-0.006	-0.006	0.008	0.006	0.008
	(-0.43)	(-0.41)	(-0.42)	(0.90)	(0.64)	(0.90)
Mgmt	0.282	0.266	0.268	-0.061	0.053	-0.068
	(1.40)	(1.32)	(1.28)	(-0.10)	(0.11)	(-0.12)
Tenure	-0.165	-0.131	-0.167	0.057	0.046	0.058
	(-1.04)	(-0.91)	(-1.04)	(0.39)	(0.28)	(0.39)
Intercept	-3.957***	-4.176***	-3.937***	-2.562***	-2.709***	-2.563***
	(-4.16)	(-4.20)	(-4.11)	(-5.66)	(-5.06)	(-5.66)
N	5799	5799	5799	5672	5672	5672
pseudo R^2	0.072	0.071	0.072	0.139	0.134	0.139
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Department FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Table 6 reports the coefficients of Eq. (2) estimated using logit regression and adopting different dependent variables representing important organizational outcomes. Respectively, columns (1-3) report the estimation of Eq. (2) using the dependent variable $Met_{i,t}$, an indicator variable assuming value 1 if employee *i* met or exceeded her assigned target in month *t* and zero if the employee *i* missed the target; Columns (4-6) reports the estimation of Eq. (2) using the dependent variable $BadQuality_{i,t}$, an indicator variable assuming value 1 if the activity for which employee *i* is responsible was associated with a quality complaint in month *t* and zero otherwise. All estimations include month fixed effects and department fixed effects and cluster standard errors by department. Two-tailed statistical significance is indicated as follows: * = p<0.10; ** = p<0.05; *** = p<0.01