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Incentives, Peer Pressure, and Behavior Persistence

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Incentives, Peer Pressure, and Behavior Persistence

Abstract:

Organizations often introduce temporary incentive programs with a view of establishing long lasting behaviors. Monetary payoffs are awarded upon achievement of team goals, which measure the success of the initiative. In this study I explore whether and how organizational behavior modifications introduced via temporary incentive programs persist beyond the incentive period. In many cases, achieving team goals requires the cooperation of members of the organization external to the team and not eligible to receive the monetary award. In this study I compare the persistence of behavior modifications between subjects rewarded with a monetary award with subjects that are exposed uniquely to peer pressure. Using hand hygiene performance data from a California hospital, I find that monetary incentive are associated with higher likelihood and greater magnitude of performance improvements during the incentive period, but are relatively short lived, while implicit incentives facilitate a longer persistence of the organizational behavior modification.

Keywords: Organizational Behavior Modification, Peer Monitoring, Persistence of Performance Improvements, Crowding Out, Implicit Incentives, Compensation, Healthcare.

JEL Codes: I12, M4, M12, M14, M52

Data availability: The data used in this study is subject to a confidentiality agreement and cannot be shared without express consent of the hospital's legal representatives.

Incentives, Peer Pressure, and Behavior Persistence

1 - Introduction

Organizations often formalize specific initiatives to incentivize the adoption of new behaviors, or to stimulate performance improvements of existing practices. These initiatives generally specify individual or team-based targets, deadlines, and rewards. While achieving the stated targets by the stated deadlines determines the success of the initiative, in many cases the expectation is that the behaviors or performance improvements will continue in the long term. In this study I explore whether and how incentivized behaviors persist beyond the duration of the initiative.

Persistent modification of organizational behavior leverages on environmental contingencies reinforcing the desired behavior (Stajkovic and Luthans 1997). Human behavior is a function of its contingent consequences. Reinforcement theory identifies monetary rewards, social recognition, and performance feedback as the three main channels through which organizations can reinforce behaviors (Skinner 2014). Identifying effective motivators of organizational behavior modification is critical for the success of the initiative and the persistence of the improvements.

Monetary payoffs conditional on the achievement of identified targets serve the role of aligning the objectives of principal and agent by remunerating the agent for the cost of performing activities that would, otherwise, reduce their utility, as well as for the risk incurred by the agent in performing those actions (Stiglitz 1974; Sappington 1991). A large body of literature provides empirical evidence of a positive relation between incentives and performance, and posits that incentives are a necessary condition for the observation of such activities. However, one of the downsides of monetary incentive programs is that they create explicit links between

behaviors that serve the interests of the organization and monetary values (pay for performance). The exchange of actions for money becomes transactional. Researchers have observed that, sometimes, linking monetary incentives to behaviors that would be, otherwise, adopted or performed on a voluntary basis, has the undesired effect of reducing the performance of those behaviors. This phenomenon, known in the literature as the *crowding-out* effect of explicit incentives on intrinsic motivation (Kreps 1997; Deci 1971; Fehr and Gachter 2001; Gneezy et al. 2011) also implies that, once the transactional link has been established, in absence of the monetary incentive, the desired behavior will no longer be observed.

Setting targets at the team level generates implicit incentives that operate via social pressure and mutual monitoring among team members (Arya et al. 1997; Sedatole et al. 2016), team identity (Towry 2003; Jeon 1996), and coordination (Rankin 2004). Team-level goals, on the other hand, are likely to introduce free-riding (Holmstrom 1982; Towry 2003). Whether monetary rewards are also set at the team level (Jeon 1996; Rankin 2004), or maintained at the individual level (Sedatole et al. 2016), prior research assumes that all team members that are accountable for the achievement of team goals are also eligible to receive the award. It is yet to be shown whether implicit incentives would operate when team goals are defined, but not all team members are eligible to receive a reward. Situations of this kind are not uncommon in practice. The success of an implementation or a process improvement initiative is often dependent on the cooperation of individuals or organizational functions external to the team – or even the organization - driving the initiative. Examples include information systems implementations, where the success of the initiative depends on the cooperation of functional managers and operators outside of the implementation team; or the adoption of new quality compliance standards (e.g. ISO), which may require the cooperation of firm's suppliers.

Feedback processes provide information to the agent about the mapping between their actions and outcomes, thus inducing Bayesian updates that inform subsequent choices of actions (van Houwelingen and van Raaij 1989). The motivational power of feedback operates via individuals' self-reflection processes, whereby any discrepancy between the expectation and feedback is evaluated, and, subsequently, acted upon (Stajkovic and Luthans 2001). Additionally, rewards associated with the performance of desired behaviors cause neural representations that bolster individual motivation toward pursuing goals (Kelley and Berridge 2002).

This study is based on the analysis of hand hygiene performance data from a California hospital specialized in joint replacements (herein: JRH[1]). Hand hygiene is a critical factor in the prevention of nosocomial infections (Haas and Larson 2007; Sax et al. 2009; Gould et al. 2008). A reduced incidence of infections is correlated with fewer complications, lower readmission rates, and lower risk of malpractice litigation (Hyman and Silver 2004; Guinan et al. 2005). Many studies in healthcare settings report that the rate of compliance with hand hygiene standards is lacking, despite considerable communication and reinforcement by hospitals and healthcare oversight organizations, including the World Health Organization (WHO), the Center for Disease Control (CDC), the Joint Commission, and the Center for Medicare and Medicaid Services (CMS) (Dunn-Navarra et al. 2011; Haas and Larson 2007; Sax et al. 2009; Pittet 2001; Pincock et al. 2012).

Hand hygiene is measured by the degree of compliance with the practice of sanitizing one's hands when entering and exiting a patient care area (e.g. a hospital room). Healthcare

[1] JRH is a fictitious acronym indicating "Hospital for Joint Replacements". The actual name of the organization is protected by a confidentiality agreement and cannot be disclosed without explicit permission of the hospital's legal representatives.

workers are generally aware of the importance of this practice, which is in line with general organizational goals, and facilitated by the presence of sanitizer dispensers in many locations within the facility. Reported reasons for non-compliance include personnel's sensitivity to the chemicals included in the sanitizer, inconvenient locations of hand washing facilities, competing demands on healthcare workers' time, and self-assessments of riskiness of different types of patient contact (Whitby et al. 2006). Prior literature has documented significant variation in the success of interventions incentivizing hand hygiene practices (Grant and Hofmann 2011; Staats et al. 2016; Pittet et al. 2000). These studies, however, measure the effectiveness of the initiatives based on hand hygiene performance *while* the incentive mechanism is operating. Whether the documented initiatives generate persistent organizational behavior modifications is an open empirical question.

JRH's management stresses the importance of good hand hygiene practices by sharing research findings and statistical results about the relation between hand hygiene and infection prevention, as well as publishing periodic reports on internal hand hygiene performance. In 2015 the management team at JRH introduced a temporary incentive program focused on the improvement of three key metrics related to the CMS star rating, with a purpose of "boosting" the level of performance on such metrics. These included hand hygiene, quietness of the environment, and effectiveness of communication about medications. The management team set specific goals for each measure and established a lump sum monetary incentive payable to each employee at the end of the incentive period upon achievement of the stated goals. Because physicians practicing at JRH are not employees of the hospital, they are not eligible to receive

the reward.[2] However, performance on all three metrics is measured and reported at the organization level. Therefore, all healthcare workers – physicians included – are accountable to deliver results. Individual level data are collected only with respect to hands hygiene. The availability of more granular data, the higher objectivity in the measurement, and the influence on organizational outcomes, including infection rates, readmissions, and malpractice litigation, informed my choice to limit this study to the analysis of hands hygiene performance.[3]

Results of statistical tests reveal that, on average, healthcare workers at JRH improved their hands hygiene performance during the incentive period, and increased performance persisted even after the removal of the monetary incentive. Interestingly, physicians, who were not eligible to receive monetary rewards (i.e. they were subject uniquely to peer pressure) exhibited longer improvement persistence than their bonus-eligible colleagues, indicating that peer pressure has lasting effects on organizational performance. Whether subjects responded favorably to the introduction of the incentive in line with traditional economic predictions or, conversely, in accordance to crowding out theory, decreased their performance upon introduction of the incentive, significantly influences the persistence of the behavior after the removal of the incentive. That is, when managers introduce temporary incentive programs with the expectation of permanent organizational behavior modifications, the observed short term reaction to the incentive is an early indicator of the long term success of the initiative.

[2] The State of California prohibits hospital employment of physicians. Source: https://oig.hhs.gov/oei/reports/oei-01-91-00770.pdf

[3] The measurement of quietness of the environment and communication about medication is based on nonmandatory surveys complied by patients in the 90 days after discharge. Limitations of these metrics include variation in the timeliness of the response, respondent self-selection, and respondent bias. Hand hygiene is measured via direct observation by independent observers. Details of hand hygiene measurement procedures are reported in section 3 of this paper.

This study contributes to the literature on incentive effectiveness, and, in particular, to the debate about differential effects of explicit and implicit motivators for organizational modification behavior. First, my results provide further empirical evidence in support of the efficacy of temporary monetary incentive programs as motivators of persistent organizational behavior modification (Stajkovic and Luthans 2001). However, my findings contrast prior literature (Stajkovic and Luthans 2001) by showing how, while monetary incentives are more likely to produce results in the short term, peer pressure and horizontal monitoring are associated with a higher likelihood and magnitude of persistent behavior modifications. Second, this work contributes to the study of crowing-out consequences of incentive mechanisms, by documenting empirical effects of short term crowding-out on long term performance. Third, this study offers a contribution to the literature on hand hygiene practices in healthcare, by exploring the effectiveness of monetary incentives on individual and organizational compliance rates and persistence. Finally, this study offers a contribution to practice, by highlighting features of incentive design that can generate persistent performance improvements.

The remainder of this paper is organized as follows. Section 2 presents a review of the extant literature relevant for this study, and develops the main hypotheses. Section 3 describes the field settings, the data, and the statistical model used to for hypothesis testing. Section 4 presents the results of statistical testing and develops inferences. The last section concludes.

2 - Prior literature and hypotheses development

Despite a long tradition of academic research on incentives, consensus is still lacking as to whether monetary incentives are effective motivators for desired organizational behaviors. Standard agency theory posits that, when ownership and control are separated in an organization, explicit incentives, together with monitoring activities, are essential to align goals between the

agent and the principal, and to influence the agent to make choices in the best interest of the principal (Jensen and Meckling 1976; Sappington 1991; Stiglitz 1974). The agent's utility function is typically strictly concave and monotonically increasing in income, and decreasing in effort (Fehr and Gachter 2001). This conjecture is based on the assumption that an agent (*homo economicus*) will act primarily to contribute to their own economic self-interest. Monetary incentives will therefore increase the attractiveness of the required actions and reduce the disutility associated with making choices in the best interest of someone else. Neoclassical economic theory, however, does not share this view, and posits that agents derive utility not only from maximizing their wealth, but also from contributing to organizational goals (Simon 1991). Furthermore, psychologists and behavioral economists provide theoretical arguments and empirical evidence of detrimental effects of tangible incentives on intrinsic motivation and, consequently, on performance (see Deci et al. (1999) for a review). Nonetheless, the institution of monetary incentive programs in organizations remains a very common practice.

Monetary incentive programs observed in practice present a large variation in terms of structure, duration, amount and frequency of the reward, and goal specificity. This study focuses on incentive programs that are temporary and focused on a specific, quantifiable goal. That is, a one-time monetary reward is paid upon accomplishment of a stated goal. It is not uncommon for organizations to institute temporary focused incentive programs to facilitate the implementation of new practices or to boost performance of existing ones. In these cases, the role of the incentive program is to motivate desired behaviors, as well as to enhance the salience of the required tasks, especially when communication initiatives are insufficient to affect behavioral patterns (Verplanken and Wood 2006). Temporary monetary incentive programs are subject to two major sources of criticism. First, the monetary nature of the incentive raises concerns in terms of

crowding-out effects on intrinsic motivation (Deci 1971; Gneezy et al. 2011). Second, the temporary nature of the reward appears to be at odds with the expectation of maintaining the new practices or new levels of performance beyond the duration of the incentive period (Greene and Podsakoff 1978; Gneezy et al. 2011).

The introduction of an incentive program changes the nature of the contract between the employee and the organization. Possible consequences include a price effect and a crowding-out effect. On the one hand, the promised award imposes a higher marginal cost on shirking and increases the marginal benefit of performing (Frey and Jegen 2001). On the other hand, the introduction of extrinsic rewards generates psychological effects that might crowd-out agents' intrinsic motivation, leading to lower levels of effort and worse performance (Kreps 1997). The notion of crowding-out refers to the phenomenon by which the introduction of extrinsic rewards linked to the performance of a certain activity reduces the "attractiveness" of such activity in the eyes of the agent. Researchers supporting this theory propose two main explanations. First, the introduction of the reward shifts the individual's perception of locus of control from the individual to an external entity. Consequently, individuals experiences a contraction in their freedom of choice, as their behavior becomes driven by the reward instead of being driven by intrinsic motivation (Deci 1971). This, in turn, influences individuals' self image by changing the motivation of the activity from "doing good" to "doing well" (Gneezy et al. 2011). Second, the association of the behavior with the reward introduces a monetary valuation of the behavior. The amount of the reward conveys information about the importance of the behavior (i.e. the organization is willing to pay to ensure that the behavior is performed), as well as its "undesirability" for the agent (i.e. a high amount might indicate the counterweight to a very difficult or inconvenient task) (Gneezy et al. 2011). If the valuation of the required effort is

considered to be lower than the expected threshold (i.e. the value that the individual attributes to their voluntary cooperation), the exchange will be considered to be unfair, thus impacting negatively the probability for the principal to receive the desired behavior (Fehr and Gachter 2001). The effectiveness (i.e. obtaining the desired behavior) of an explicit incentive program depends on whether the relative price effect prevails over the crowding-out effect.

When incentive programs are temporary, whether the incentivized behavior will persist after the end of the incentive period is an open empirical question. Gneezy et al. (2011) posit that the removal of an explicit incentive is likely to exacerbate the crowding out effect. This is because, once agents update their beliefs with respect to the drivers of their behaviors and consider the exchange as a market transaction, they are likely to perceive the removal of the incentive as breach of contract, thus justifying their withholding of the behavior previously incentivized. In contrast, Stajkovic and Luthans (2001) find that monetary rewards associated with focused organizational behavior modification interventions are effective and superior to routine pay-for-performance contractual forms. In their view, focused incentive programs convey greater clarity about the importance of the behavior and the way it will be measured. Holmstrom and Milgrom (1991) posit that agents are more likely to allocate effort to the tasks that are more easily measured. The increased salience of the task and clarity about its measurability are likely to attenuate the crowding out effect. I therefore formalize the following hypothesis:

H1: A temporary monetary incentive program generates organizational behavior modifications that persist beyond the removal of the incentive.

The monetary award is, in general, contingent on the achievement of specific targets. A substantial body of literature studies different combinations between targets and awards stated at the individual or team level. When targets are set at the team level, implicit incentives emerge

from peer pressure and horizontal monitoring. As previously mentioned, social recognition is one of three motivation mechanisms for organizational behavior modification (Skinner 2014). Social recognition operates as a regulatory mechanism for behavioral choices through a mechanism of forethought. That is, individuals self-regulate their behavior on the basis of anticipated consequences of their actions. Positive reactions by relevant others to past become incentives for future actions (Stajkovic and Luthans 2001). Team goals generate implicit incentives through mechanisms such as team identity (Jeon 1996; Towry 2003), coordination (Rankin 2004), and reputation (Arnott and Stiglitz 1991). Whether team-level goals require corresponding team-level rewards is subject to debate in the literature. Arya et al. (1997) recommend tying the compensation of each team member to team performance goals in order to curb free-rider behaviors via peer monitoring activities. Jeon (1996) suggests that equal sharing of team-level rewards, independently from individual contributions to the team output, is the most efficient incentive design solution for team settings. Rankin (2004) finds that, while team incentives facilitate collaboration, individual incentives generate higher individual performance. Sedatole et al. (2016) break the correspondence between team goals and team incentives, and find that team incentives are not necessary, if team members are rewarded at the individual level and their performance depends significantly from the cooperation of others. Whether peer pressure is an effective motivator even in absence of monetary incentives (individual or at the team level) is an open empirical question.

Stajkovic and Luthans (2001) find that peer pressure is a weaker motivator than monetary incentives. Gneezy et al. (2011) mention self-image, trust and adherence to social norms as key elements of individuals' utility functions. Similarly to monetary incentives, peer pressure might change the behavior's locus of control. Individuals might choose to perform certain activities

because they are asked or expected to do so. Differently than monetary incentives, peer pressure does not explicitly *quantify* a monetary value of an activity, thus attenuating the transactional nature of the exchange, and reducing the likelihood of a material discrepancy between the expected and the manifested value of the action. Consequently, I posit that implicit incentives are likely to attenuate the consequences of crowding-out and to generate more persistent organizational behavior modifications, as stated in the following hypothesis:

H2: Organizational behavior modifications driven by peer pressure are more persistent than modification driven by monetary incentives.

To test the hypotheses formulated above, I used field data from a California for profit orthopedic hospital (herein: JRH).[4] The next section describes the field settings, the data, and presents the research design.

3 – Data and Research Design

3.1 – Field settings

The study involves data from a natural quasi-experiment in a healthcare setting. In the fall of 2015 the management team at JRH introduced a temporary incentive program to improve performance on a selected set of measures that were both aligned with the overall mission of the hospital to provide quality healthcare services, and included in the metrics reported as part of their star-rating, a public assessment of healthcare providers instituted by the Center for Medicare and Medicaid Services (CMS) as part of the Affordable Care Act.[5] The culture at JRH

[4] JRH designed and implemented the experiment prior to our contact. My statistical analyses are therefore based on archival data provided by the hospital.

[5] The CMS star-rating is calculated based on data collected via HCAHPS surveys (http://www.hcahpsonline.org/home.aspx), as well as hospitals' self reported data. Cluster analyses are performed on a composite measure including up to 64 indicators. Star ratings are assigned to each cluster, where 5 stars represent the best performing hospitals, while 1 star is

had always been one of excellence, quality, and continuous improvement. JRH had been rated with 5 stars (the highest possible rating) in the past, but recent assessments were showing a decline in performance relative to their peers. JRH's management identified key metrics needing improvement: hand hygiene, quietness of the environment, and communication about medication.

Performance on quietness of the environment and communication about medication is assessed based on HCAHPS survey results[6], and presented important limitations with respect to the purpose of this study. First, HCAHPS responses are subject to the limitations typical of any survey instrument, including respondent bias, partial recall, low respondent rate, etc. Second, HCAHPS data is reported uniquely at the organization level. Hand hygiene data, in contrast, is measured at the individual level and then aggregated to the organization level for reporting to CMS. A robust body of research provides evidence of important causal relations between hand hygiene and infection prevention (Sax et al. 2009; Haas and Larson 2007; Gould et al. 2008; Pessoa-Silva et al. 2007; Lankford et al. 2003; Pittet et al. 1999), and an official document issued by the Joint Commission in 2009 details best practices for hand hygiene adherence to recommended standards.[7] Furthermore, the performance on this particular behavior is completely under control of the organization members and not subject to stochastic factors that could influence its measurement.

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assigned to the hospitals in the lower end of the distribution. Additional information at https://www.medicare.gov/hospitalcompare/Data/Data-Updated.html# .

[6] See http://www.hcahpsonline.org/home.aspx for detailed information on HCAHPS survey methodology, scope, and availability of data to the public.

[7] Source: https://www.jointcommission.org/sustaining_and_spreading_improvement_in_hand_hygiene_compliance/

Hand hygiene performance is measured as the degree of compliance with the practice of sanitizing hands when entering and exiting a patient care area. That is, healthcare workers are supposed to *gel-in* and *gel-out* using sanitizer dispensers available throughout the facility every time they enter or exit a location where they might have contact with a patient. Performance data are collected via randomized audits performed by independent secret shoppers undisclosed to the hospital members. Baseline data referring to the two months prior to the incentive period indicated an average performance of 91% overall, with some departments rating as low as 86%. Goals were set at the organization level, with a threshold goal of 92% and a stretch goal of 95%. While hand hygiene performance is reported at the hospital level, it is measured at the individual level. All members of the organization contribute to the organization-level performance, including both clinicians, administrative, and support staff. A one-time bonus of $2,500 would be paid to each employee upon achievement of the stretch goal by the end of the next fiscal quarter (Q2)[8]. While all members of the organization were accountable for the improvement in hand hygiene performance, only JRH employees were eligible for the payment of the incentive (see Table 1). By California laws, physicians cannot be employees of a hospital. Therefore, while physicians' performance was included in the organization level measurement of hand hygiene, physicians would not receive any award related to goal achievement.

As part of their regular operations, prior to the introduction of the incentive program, JRH management produced a quarterly scorecard including multiple measures of performance, including the three metrics that were chosen as the focus of the incentive program (Figure 1, Panel A). To enhance the awareness about the incentive program and to sustain improvements

[8] Management clearly communicated that the incentive program would be of temporary nature, so not to set the expectations of future payments of monetary rewards with respect to the three metrics included in the program.

toward the stated goals, during the incentive period additional communication about the measures included in the incentive plan was provided to all healthcare workers via by-weekly emails reporting updates on the organizational performance levels and distances to the goals (Figure 1, Panel B). After the end of the incentive period, communication returned to the original practice of reporting performance via quarterly scorecard. At all times feedback was provided in the same manner and with the same content to all members of the organization, including both employees and physicians. Individual level performance was not communicated to the individual healthcare workers.

Physicians, while non eligible to receive monetary rewards, were subject to other forms of indirect incentives. Reinforcement practices varied across departments. Examples included writing the name of a physician that exhibited good hand hygiene compliance on hand-shaped paper cards, which would be affixed to a wall in recognition to the good behavior, or direct communication from the Chief Nursing Officer either praising the physician's for good behavior (Figure 2, panel A), or reminding the physician of the importance of good hand hygiene performance (Figure 2, panel B). These practices ended with the end of the incentive period.

During our interviews, members of the management team recalled some important concerns related to the structure of the incentive program. First, because of the asymmetry between accountability and reward eligibility across the members of the organization there was a concern with respect of the efficacy of the incentive program. Second, setting the goal at the organization level while paying the incentive at the individual level would generate opportunities of free riding. Third, the team was unsure as to whether the boost in performance would persist after the end of the incentive period.

3.2 - Research design

JRH provided individual level data of hand hygiene over 4 quarters. Observations reported in Q1 relate to the period preceding the introduction of the incentive program (*pre*-period), Q2 data relate to the quarter during which the incentive initiative took place (*incentive* period), performance data reported in Q3 and Q4 related to the two quarters subsequent to the removal of the incentive (*post*-period and *post-post* period). Individuals' identities were disguised and replaced with alphanumerical ID's. Data included the quarterly number of assessments of *gel-in* and *gel-out* for each employee, the number of successful *gel-in*'s and *gel-out*'s, the department, and organizational role. Following the methodology employed by JRH, in line with the recommendations of the Joint Commission and CMS, hand hygiene performance (*HH*) was calculated as:

$$HH_{it} = \frac{gel\_in_{it} + gel\_out_{it}}{gel\_in\_assess_{it} + gel\_out\_assess_{it}} \quad (1)$$

where *i* represents the individual member of the organization, and *t* represents the quarter of assessment, *gel_in* (*gel_out*) is the number of observations of individuals sanitizing their hands upon entry (exit) of the patient care area, and *gel_in_assess* (*gel_out_assess*) is the number of observations of hand hygiene behavior upon entry (exit) of the patient care area[9].

Table 1 reports the characteristics of the sample[10].

--- Insert Table 1 here ---

[9] Because of the presence of multiple secret shoppers and the performance of daily randomized audits, members of the organization can be subject to multiple assessments in each period. The data shared by JRH did not include the identity of the auditor or the exact data of the assessment (see table 1 – panel B)

[10] Of 464 total members of the organization only 351 were subject to the assessment of hand hygiene at least once during the four quarters. The remaining 113 were excluded from the sample as there would be no information about their hand hygiene performance. Based on conversations with JRH's representatives, these individuals serve roles that do not involve entering patient care areas as part of their regular duties.

In order to assess whether the incentivized behavior persists after the removal of the incentive, I compare values of HH reported after the end of the incentive period to those reported in Q1 (baseline, or pre- period). I assess the persistence of the behavior modification both in the short term, by comparing performance in the quarter after the removal of the incentive (Q3) with the baseline period (Q1), and in the long term, by comparing the performance reported in the second quarter after the removal of the incentive (Q4) with the baseline measures (Q1). The corresponding measures of organizational behavior modification persistence are formulated as follows:

$$HH\_Persist\_Short_i = HH_{i3} - HH_{i1} \quad (2)$$

where HH_{i3} is the hand hygiene performance of individual *i* reported at the end of Q3 and HH_{i1} is the individual's performance prior to the incentive program, and

$$HH\_Persist\_Long_i = HH_{i4} - HH_{i1} \quad (3)$$

where HH_{i4} is the hand hygiene performance of individual *i* reported at the end of Q3. A positive value of *HH_Persist_Short* (*HH_Persist_Long*) indicates that individual hand hygiene performance immediately after (a quarter removed from) the removal of the incentive is higher than the performance measured before the incentive program. That is, individuals continue to perform the required behavior with a higher degree of compliance even after the removal of the promise of a monetary reward. A negative value for *HH_Persist_Short* (*HH_Persist_Long*) would be consistent with crowding-out theories, whereby the removal of the incentive reduces the motivation to perform the behavior to a lower level than when the contract between organization and employees did not include any explicit reward.

Whether the performance improvement is a result of the incentive program and not just an unrelated trend in hand hygiene performance can be assessed by relating the likelihood of

forming a habit with the likelihood of responding positively to the incentive, as represented by the following logit model:

$$prob(HH\_Effect_i > 0) = \alpha + \beta_1 HH\_Pos\_Inc_1 + \beta_2 HH_{i1} + \beta_3 Bonus\_Eligible_i + \beta_4 Female_i + \beta_5 Tenure_i + \varepsilon_i \quad (4)$$

where *HH_Effect* represents each of the persistence measures (*HH_Persist_Short* and *HH_Persist_Long*). *HH_Pos_Inc* is an indicator variable that assumes the value of one if individuals respond positively to the incentive program. *Bonus_Eligible* indicates whether the healthcare worker is an employee at JRH, thus eligible to receive the award, or not. *Female* is an indicator variable assuming the value of 1 if the individual is female and zero otherwise. *Tenure* measures the number of years the healthcare worker has been part of the organization, measured at the end of the observation period (Q4). The individual incentive response is measured by:

$$HH\_Incentive_i = HH_{i2} - HH_{i1} \quad (5)$$

where HH_{i2} is the hand hygiene performance reported for individual *i* at the end of the incentive period (Q2) and HH_{i1} is the hand hygiene performance during the pre- period (Q1). In other words, *HH_Pos_Inc* will assume the value of one if *HH_Incentive* assumes a non-negative value. Additionally, I test whether the individual response to the incentive is likely to drive the magnitude of the habit effect. That is, I examine the persistence of individual price effects or crowding-out effects exhibited with respect to the incentive initiative. I specify the following model:

$$HH\_Effect_i = \alpha + \beta_1 HH\_Incentive_1 + \beta_2 HH_{i1} + \beta_3 Bonus\_Eligible_i + \beta_4 Female_i + \beta_5 Tenure_i + \varepsilon_i \quad (6)$$

where *HH_Effect* represents each of the persistence measures (*HH_Persist_Short* and *HH_Persist_Long*). In both models (4) and (6) I include the initial hand hygiene performance as

a control variable, as it is likely that the level of initial performance might drive the direction and response to the incentive program.

Descriptive statistics for the main variables of interest are reported in Table 2.

--- Insert Table 2 here ---

The following section describes the results of the estimation of the above models and proposes inferential conclusions based on statistical tests.

4 – Results of Statistical Tests of Hypotheses

The first hypothesis (H1) predicts that the incentive program generates a modification of hand hygiene performance that persists beyond the duration of the incentive period. Table 3 reports the results of univariate tests.[11] Results for the pooled sample (Panel A) show a significantly incentive effect (average performance in Q2 is significantly higher than average performance in Q1). Panel B shows that the behavior modification persists in the short term (performance in Q3 is, on average, significantly higher than performance in Q1). However, the prediction about behavior modification persistence in the long term is not supported by univariate tests of average performance (Panel C). As it is evident from the descriptive statistics in Table 2, more than 50% of the individuals included in the sample exhibited perfect performance in each of the quarters. Since this study evaluates the effect of temporary incentive program on performance improvements, I repeat the analyses excluding those healthcare workers that perform at 100% compliance in *every* quarter (herein: "perfect" workers). Because of the boundedness of the measure (compliance can only be at most 100%), we are unable to determine

[11] Note that, because the paired t-test compares means from a within-subjects test group, this test considers only subjects for whom hand hygiene performance was observed in both quarters included in the comparison. This is the reason why the number of observations and performance score means reported in each of these panel differ from those reported in the descriptive statistics.

whether their performance would increase. All we know about these individuals is that they do not decrease their performance over the observation period. With respect to the univariate tests comparing mean performance across quarters, the results are consistent with the pooled sample and offer partial support to H1. That is, in line with Stajkovic and Luthans (2001) I find that, on average temporary monetary incentives are effective, and generate behavior modifications that persists beyond the removal of the incentive. However, the persistence is, on average, short lived, and individuals regress to lower levels of performance after the first quarter subsequent to the removal of the incentive. In particular, the employee group (workers eligible to receive the monetary award) appears to behave in line with the expectations of crowding-out theory, as the performance in Q4 results to be lower than the performance level measured before the introduction of the incentive (see Table 2).

--- Insert Table 3 here ---

The second hypothesis (H2) addresses the differential effects of monetary incentives and peer pressure. My settings allow me to isolate a group of healthcare workers (i.e. the physicians) that are subject uniquely to peer pressure, while the rest of the members of the team members are subject to monetary incentives. Physicians are aware of the performance improvement initiative and are accountable, together with JRH's employees, for the achievement of the team goal. Although they are not eligible to receive any monetary incentive, they are aware of the monetary value that the organization has attached to hand hygiene compliance. Because of the information content conveyed with the monetary amount described by Gneezy et al. (2011), it is plausible to expect physicians to exhibit behaviors consistent with crowding-out. On the other hand, the lack of bonus eligibility is less likely to prevent the nature of the contractual agreement from converting to a transactional exchange. That is, physicians' hand hygiene behavior might

continue to be driven by the intent to "do good", because monetary outcomes are, in fact, impossible.

Results of logit estimations of equation (4) are summarized in Table 4, Panel A. The dependent variable is the probability of observing a positive behavior modification effect. When I include in the regression the entire sample, bonus-eligible employees are indistinguishable from the physicians with respect to the incentive effect (i.e. a positive change in performance during Q2, the incentive period) and to the short-term behavior modification persistence (i.e. a positive difference in performance between Q3 and Q1). However, bonus-eligible individuals exhibit a significantly lower probability to display long-term behavior modification persistence (β_3 = -4.519, $p < 0.05$) compared to the physicians. Additionally, when I eliminate the "perfect" workers from the sample, bonus-eligible employees exhibit performance improvements during the incentive period with significantly higher probability than the physicians (β_3 = 3.150, $p<0.05$). However, bonus-eligible employees are significantly less likely to *maintain* a positive improvement after the removal of the incentive (β_3 = -4.539, $p<0.05$ for the short term persistence effect, and β_3 = -4.995, $p<0.05$ for the long term persistence effect). Table 4, Panel B reports the estimation of equation (5) using robust OLS, where the dependent variable is the magnitude of the effects of interest. The coefficients estimated with respect to the influence of monetary rewards versus peer pressure alone confirm the conclusions inferred from the results of the logit model. Taken together, these results support H2, in that they show how monetary incentives, although they might result in higher short term performance improvements, are less likely to stimulate organizational behavior modifications that persist long after the removal of the incentive.

An interesting result worth noting is the relation between the incentive effect and the persistence of the behavior modification. The coefficients estimated with respect to *HH_Incentive* are significant and positively correlated with both the short term and the long term persistence of the performance improvement (both probability and magnitude) in hand hygiene compliance (Table 4, Panel A and B). My results show that individual responsiveness to monetary incentive programs exhibit variation across individuals, and that a positive response to the incentive program is more likely to engage an organizational behavior modification persisting in the long run. That is, individuals that do not exhibit behaviors corresponding to the crowding-out prediction are more likely to convert the incentivized behavior into a sustainable habit. These results have important practical implications. Managers can observe the employee's reaction to the incentive and interpret it as an early indicator of the long term success of the initiative. Early discovery of material crowding out behaviors can then be addressed with appropriate alternative corrective or supplemental measures.

6 – Conclusions

This study explores the effect of temporary incentive programs on the persistence of organizational behavior modifications. When organizations implement initiatives aiming at the establishment of new practices or at improving performance of existing ones, explicit links between successful implementations and monetary rewards are common practice. In many cases management teams use these temporary initiatives to boost performance, with the expectations that the new behaviors and performance levels will persist beyond the incentive period.

An extensive body of academic literature provides arguments against the usefulness of extrinsic incentives for performance improvement purposes, a phenomenon known as the crowding-out effect of extrinsic rewards on intrinsic motivation. The contract modification

introduced by the extrinsic incentive changes the interpretation of the relationship between the employee and the organization, transforming behaviors that might have been driven by voluntary cooperation into a transactional exchange. If the relative price established by the new contractual agreement is not in line with the employee's expectations, or if the employee perceives the contractual change as a transfer of the locus of control for the behavior to the manager, the motivation for performing the behavior might reduce to a point where the contract without the incentive would be more efficient than the one with the monetary reward. The removal of the incentive, once the change in the contract has been internalized by the employee, generates further detrimental effects on intrinsic motivation and performance. Implicit incentives, such as horizontal monitoring and peer pressure typical of team settings, are also effective motivators for performance improvement. The literature has not reached a definitive consensus with respect to the superiority between explicit and implicit incentives. My study contributes to this debate comparing the effect of implicit and explicit incentive within a team setting in which the stated goal is shared, but not all team members are eligible to receive a monetary award.

Using panel data on hand hygiene performance from a California for-profit orthopedic hospital, I show that a temporary performance improvement program succeeds in establishing favorable behaviors that persist for a while after the end of the incentive period. However, implicit incentives are more likely to deliver organizational behavior modifications that persist longer and are more substantial in magnitude. Additionally, my results indicate that the persistence of the behavior modification depends on the individual responsiveness to the incentive program itself. In other words, for individuals whose intrinsic motivation is less subject to the detrimental effects of extrinsic rewards, performance improvement is more likely and more sustainable over time.

This study is subject to several limitations. First, the particular nature of the incentivized behavior might lend itself to a higher likelihood of habit formation. The action targeted by the particular incentive program in these settings exhibits low complexity and requires little cognitive processing. Nonetheless, hand hygiene is a very critical factor influencing the incidence of infections, which, in turn drive the frequency of complications and readmissions, and, ultimately, malpractice litigation Additionally, many other performance improvement initiatives might similarly depend on the performance of repetitive actions (e.g. compliance with safety procedures, utilization of standard protocols for data recording, implementation of quality assurance procedures, etc.), therefore the generalization of these results should not be considered to be excessively limited. Second, the design of the particular incentive program at JRH exhibits several important limitations, due primarily to the relatively small size of the organization, and to timing issues. JRH is a small hospital specialized in joint replacement procedures. Applying the canonical rules of experiment design would have likely generated dangerous side effects. Consequently, it was not possible to define proper treatment and control groups and to randomly assign subjects to different conditions. Additionally, this particular design of incentive initiative allows for the occurrence of free riding, which was not measurable in a scientific way given the randomization of the number and occurrence of hand hygiene performance assessments. Further examination of the influence of such dysfunctional behaviors might shed more light on the potential consequences of such design choices. Finally, further investigation would be warranted for the interesting feature of these settings, where peer pressure (the implicit incentive mechanism) is activated by the introduction of a monetary (explicit) incentive.

Despite its limitations, this study contributes to the debate about the usefulness of monetary incentives versus implicit motivators for long term performance improvement

purposes. Additionally, this study contributes to the research on incentive design and performance measurement by analyzing the effects of a temporary incentive program applied to rank-and-file members of the organization with a clear and objectively measurable objective for an activity that is completely under the control of the agent. Finally, this study presents evidence of sustained improvement in hand hygiene compliance and offers some practical suggestions for implementation.

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Figure 1:

Panel A: Quarterly Performance Scorecard

Infection Prevention Dashboard						
Metric	TARGET	STRETCH	Q1	Q2	Q3	Q4
CLABSI SIR	< 1	0.0	0.00	0.00	0.00	0.00
CAUTI SIR	< 1	0.0	0.00	0.00	0.00	0.00
HA C. Diff SIR	< 1	0.0	0.66	0.00	0.00	0.00
HA MRSA BSI SIR	< 1	0.0	0.00	0.00	0.00	0.00
All HA VRE	0.1	0.0	0.00	0.00	0.00	0.00
HAND HYGIENE COMPL.	90%	100%	89% ^	94% ^	93%	94%

Panel B: Bi-weekly Performance Feedback Form

Metrics	Stretch	Goal	Baseline Data (September-October)		
5 Star Rating/MSPB Incentive			Periop Scores	Med/Surg Scores	HOI Overall
Quietness of Environment	72%	70%	64%	64%	64%
Communication about Medication	80%	76%	67%	67%	67%
Hand Hygiene	95%	92%	86%	96%	91%
			Pay Day Update 11/12/2015		
Quietness of Environment	72%	70%	68.2%	68.2%	68.2%
Communication of Medication	80%	76%	83.3%	83.3%	83.3%
Hand Hygiene	95%	92%	86.0%	97.0%	93.0%

Figure 2:

Panel A: Example of "Love note" sent by the CNO to a physician performing well during the incentive period.

You have been observed to be a phenomenal role model for keeping our infection rates LOW.

You have been observed to be 100% compliant this past month with hand hygiene.

Your patients appreciate your strong work as do I.

Keep up the great work.

Panel B: Example of "Love note" sent by the CNO to a physician performing poorly during the incentive period

Subject: Hand Hygiene Superstars, or not

Hi,

You have been identified as an opportunity waiting to improve your hand hygiene. Compliance with hand hygiene keeps our infection rates VERY LOW, shows as a great role model for all staff, and our patients are watching you!

The rules of engagement are:

1. *Observed gelling before going in a room*
2. *Observed gelling as you leave the room*
3. *If you are gelling out and going directly into the room in the same pod, keep moving. Do not touch anything and you are free to enter the next room.*
4. *The only exception is patients with c. diff. You must wash with soap and water. Don't be a vector for c. diff.*

Keep up the strong work and we will keep an eye on you!

Table 1: Sample selection and number of hand hygiene assessments

Panel A: Sample selection

Total members of the organization	464
less: members that were not assessed during any of the 4 quarters	114
Total members assessed during the 4 quarters	350
Of which:	
Hospital employees (eligible to receive the bonus)	264
Physicians (non-employees - not eligible to receive the bonus)	86

Panel B: Number of hand hygiene assessments per healthcare worker

	Mean	Std. Dev.	Median	Min	Max
Q1 = pre period	6.513	5.398	4	1	31
Q2 = incentive period	9.192	9.542	6	1	60
Q3 = post period	7.303	6.610	5	1	33
Q4 = post-post period	8.162	6.877	6	1	34

Panel C: Healthcare workers demographics

	Mean	Std. Dev.	Median	Min	Max
$Gender_i$	0.520	0.500	1	0	1
$Tenure_i$	6.812	5.619	6	0	42

Notes: *Panel A* reports the criteria used in selecting the sample for this study. Employees that, due to their organizational role not requiring direct contact with patients, were not subject to any assessment in any of the four quarters were excluded. Healthcare workers were distinguished by their eligibility to receive bonus payments. That is, physicians were not eligible to receive monetary incentives because they are note employees of the hospital. However, their hand hygiene observations were counted as part of the organizational performance. *Panel B*: due to the random audits performed by multiple secret shoppers, the number of assessment varied significantly across individual members. *Panel C* reports descriptive statistics for the characteristics of the employees. *Gender* is an indicator variable assuming the value of 1 if the employee is a female, and zero otherwise. *Tenure* is a variable indicating the number of years the employee has been part of the organization, calculated at the end of the observation period (end of Q4).

Table 2: Descriptive Statistics

Panel A	Hand hygiene performance by quarter						
		N	Mean	Std. Dev.	Median	Min	Max
Pooled Sample							
HH_{it}	Q1	195	0.879	0.228	1.000	0.000	1.000
	Q2	261	0.926	0.186	1.000	0.000	1.000
	Q3	251	0.923	0.196	1.000	0.000	1.000
	Q4	216	0.916	0.205	1.000	0.000	1.000
Employees							
HH_{it}	Q1	151	0.928	0.156	1.000	0.000	1.000
	Q2	204	0.943	0.163	1.000	0.000	1.000
	Q3	201	0.943	0.168	1.000	0.000	1.000
	Q4	179	0.914	0.202	1.000	0.000	1.000
Physicians							
HH_{it}	Q1	44	0.714	0.336	0.764	0.000	1.000
	Q2	57	0.867	0.245	1.000	0.000	1.000
	Q3	50	0.842	0.270	1.000	0.000	1.000
	Q4	37	0.923	0.221	1.000	0.000	1.000

Panel B	Hand hygiene incentive effect, and short term and long term persistence					
	N	Mean	Std. Dev.	Median	Min	Max
Pooled Sample						
$HH\_Incentive_i$	151	0.029	0.175	0.000	-0.500	1.000
$HH\_Persist\_Short_i$	144	0.041	0.188	0.000	-0.500	1.000
$HH\_Persist\_Long_i$	135	0.005	0.169	0.000	-0.500	0.500
Employees						
$HH\_Incentive_i$	124	0.013	0.118	0.000	-0.500	0.385
$HH\_Persist\_Short_i$	118	0.033	0.154	0.000	-0.400	1.000
$HH\_Persist\_Long_i$	117	-0.005	0.162	0.000	-1.000	0.500
Physicians						
$HH\_Incentive_i$	27	0.101	0.322	0.000	-0.500	1.000
HH_Habit_i	26	0.079	0.298	0.000	-0.500	0.800
$HH\_Persist_i$	18	0.073	0.202	0.000	-0.500	0.364

Notes: *Panel A* reports descriptive statistics for the measure of hand hygiene performance for each of the four quarters. HH_{it} is defined as $HH_{it} = \frac{gel\_in_{it} + gel\_out_{it}}{gel\_in\_assess_{it} + gel\_out\_assess_{it}}$. *Panel B* reports descriptive statistics for three measures of effectiveness of the incentive program, respectively defined as $HH\_Incentive_i = HH_{i2} - HH_{i1}$, $HH\_Persist\_Short_i = HH_{i3} - HH_{i1}$, and $HH\_Persist\_Long_i = HH_{i3} - HH_{i1}$.

Table 3: Univariate Analyses

Panel A: Estimation of the average incentive effect

	Paired t-test analysis							
	Pooled Sample				Removing "perfect" healthcare workers			
Variable	**N**	**Mean**	**Std err**	**Std dev**	**N**	**Mean**	**Std err**	**Std dev**
HH_{i1}	151	0.906	0.015	0.877	90	0.847	0.022	0.205
HH_{i2}	151	0.935	0.012	0.911	90	0.896	0.018	0.171
HH_Incentive	151	0.029	0.014	0.175	90	0.048	0.024	0.226
df	150				89			
t	2.024 **				2.039 **			

Panel B: Estimation of the average short term persistence effect

	Paired t-test analysis							
	Pooled Sample				Removing "perfect" healthcare workers			
Variable	**N**	**Mean**	**Std err**	**Std dev**	**N**	**Mean**	**Std err**	**Std dev**
HH_{i1}	144	0.9	0.016	0.189	83	0.832	0.024	0.22
HH_{i3}	144	0.941	0.013	0.156	83	0.897	0.021	0.185
HH_Persist_Short	144	0.041	0.016	0.188	83	0.065	0.026	0.239
df	143				82			
t	2.614 ***				2.475 ***			

Panel C: Estimation of the average long term persistence effect

	Paired t-test analysis							
	Pooled Sample				Removing "perfect" healthcare workers			
Variable	**N**	**Mean**	**Std err**	**Std dev**	**N**	**Mean**	**Std err**	**Std dev**
HH_{i1}	135	0.938	0.009	0.111	74	0.864	0.014	0.122
HH_{i4}	135	0.944	0.012	0.143	74	0.897	0.021	0.181
HH_Persist_Long	135	0.005	0.015	0.169	74	0.003	0.026	0.222
df	134				73			
t	0.373 n.s.				0.122 n.s.			

Notes: This table reports three univariate analyses of persistence of organizational behavior modifications. All univariate tests are performed via paired t-test, which compares means from a within-subjects test group; that is, this test considers only subjects for whom hand hygiene performance was observed in both quarters relevant for the effect of interest. *Panel A* reports univariate results about the average incentive effect $HH\_Incentive_i = HH_{i2} - HH_{i1}$; *Panel B* refers to the short term persistence effect $HH\_Persist\_Short_i = HH_{i3} - HH_{i1}$; *Panel C* reports the results relevant for the long term persistence effect $HH\_Persist\_Long_i = HH_{i3} - HH_{i1}$.
Each panel reports the results of the univariate tests performed on the entire sample, as well as on a restricted sample obtained by eliminating "perfect" workers (i.e. team members that perform at 100% compliance at all times). In all cases: * = p<0.10; ** = p<0.05; *** = p<0.01, two tails.

Table 4: Predictors of Behavior Modification Effects

Panel A: Probability of observing a positive behavior modification effect

	Complete Sample			Without "perfect" workers		
	P(HH_Incentive$_i$>0)	***P(HH_Persist_Short$_i$>0)***	***P(HH_Persist_Long$_i$>0)***	***P(HH_Incentive$_i$>0)***	***P(HH_Persist_Short$_i$>0)***	***P(HH_Persist_Long$_i$>0)***
HH_Pos_Inc		5.000*** [1.204]	5.051*** [1.423]		6.737*** [1.255]	5.347*** [1.440]
HH_{i1}	-17.406*** [5.571]	-2.827 [8.195]	-19.798*** [3.569]	-18.551*** [6.210]	5.644 [5.015]	-15.143*** [3.898]
Bonus_eligible	1.925 [1.747]	-1.594 [1.985]	-4.519** [2.076]	3.150** [1.434]	-4.539** [1.829]	-4.995** [2.160]
Female	0.412 [0.906]	-0.007 [1.546]	1.202 [1.653]	0.005 [0.637]	1.502 [1.272]	1.224 [1.643]
Tenure	-0.049 [0.051]	0.015 [0.035]	0.118*** [0.034]	-0.082 [0.069]	0.084 [0.058]	0.218** [0.092]
Intercept	12.719*** [4.370]	1.007 [7.492]	16.274*** [3.271]	13.741*** [4.927]	-5.631 [4.207]	11.963*** [3.587]
N	137	112	113	79	54	55
R2	0.569	0.739	0.809	0.583	0.635	0.730

Panel B: Magnitude of behavior modification effects

	Complete Sample			Without "perfect" workers		
	HH_Incentive$_i$	***HH_Persist_Short$_i$***	***HH_Persist_Long$_i$***	***HH_Incentive$_i$***	***HH_Persist_Short$_i$***	***HH_Persist_Long$_i$***
HH_Incentive$_i$		0.611*** [0.217]	0.546** [0.214]		0.777*** [0.206]	0.598*** [0.191]
HH$_{i1}$	-0.725*** [0.120]	-0.116 [0.251]	-0.589*** [0.214]	-0.854*** [0.130]	0.171 [0.288]	-0.764*** [0.242]
Bonus_Eligible$_i$	0.033 [0.048]	-0.055 [0.066]	-0.166** [0.076]	0.067 [0.059]	-0.177* [0.090]	-0.340*** [0.106]
Female$_i$	0.032 [0.025]	-0.009 [0.039]	0.111 [0.070]	0.025 [0.036]	0.023 [0.074]	0.243** [0.111]
Tenure$_i$	-0.001 [0.002]	0.002 [0.001]	0.001 [0.001]	-0.003 [0.005]	0.008** [0.004]	0 [0.004]
Intercept$_i$	0.643*** [0.112]	0.161 [0.238]	0.602*** [0.199]	0.735*** [0.119]	-0.062 [0.252]	0.764*** [0.220]
N	137	112	113	79	54	55
R2	0.488	0.508	0.418	0.537	0.577	0.582

Notes: Table 4 reports the results of statistical tests of hypothesis H2, which states that implicit incentives are more likely to generate more persistent organizational behavior modifications than monetary incentives. *Panel A* includes the logit estimation results for equation (4): $prob(HH\_Effect_i > 0) = \alpha + \beta_1 HH\_Pos\_Inc_1 + \beta_2 HH_{i1} + \beta_3 Bonus\_Eligible_i + \beta_4 Female_i + \beta_5 Tenure_i + \varepsilon_i$, where the dependent variable is, respectively, the probability of observing a positive incentive effect, the probability that the incentive effect persists in the short term (i.e. the quarter immediately after the removal of the incentive), and the probability of long term persistence. The estimation is performed both on the entire sample, as well as the sample restricted by the removal of the "perfect" workers. *Panel B* reports the results of the estimation of equation (6) $HH\_Effect_i = \alpha + \beta_1 HH\_Incentive_1 + \beta_2 HH_{i1} + \beta_3 Bonus\_Eligible_i + \beta_4 Female_i + \beta_5 Tenure_i + \varepsilon_i$, where the dependent variable is, respectively, the magnitude of the incentive effect, the magnitude of the short term persistence (i.e. how much better performance is observed in Q3 compared to Q1), and the magnitude of long term persistence (i.e. how much better performance is observed in Q4 compared to Q1). The model is estimated via OLS with heteroskedasticity robust standard errors. In all cases: * = p<0.10; ** = p<0.05; *** = p<0.01, two tails.