Mission and the Bottom Line: Performance Incentives in a Multi-Goal Organization

Xavier Giné, Ghazala Mansuri, and Slesh A. Shrestha[*]

May 2018

Abstract

The impact of performance pay in institutions with multiple goals depends on complementarities in the cost of effort as well as in production. To assess their relative importance, workers of a mission-oriented nonprofit were randomly assigned to one of two bonus schemes, incentivizing either the performance of a microcredit program or the strengthening of community groups. We find that the credit bonus improved credit-related outcomes but it undermined the social outcome. In contrast, the social bonus advanced the social and credit outcomes, but only for employees working alone. These results suggest that production complementarities are important.

1 Introduction

Economic theory has long suggested that monetary incentives can motivate agents to fulfill the goals of their principals.[1] In a seminal article, Holmstrom and Milgrom (1991), however, argue that incentives can produce poor results in settings where workers perform multiple tasks. The challenge of using performance incentives in a multi-task setting is perhaps the reason why evaluations of teacher incentives find mixed results on student's performance in tests and critical thinking (Neal, 2011). Similarly, studies of health care providers find weak incentive effects on rewarded as well as unrewarded measures of health (Mullen et al., 2010).

Despite a substantial theoretical literature on worker incentives that emphasizes the role of task complementarities in a multi-task setting, there is very little empirical evidence on how such complementarities affect performance.

For-profit firms use profit-based incentives to overcome this multi-task problem (Murphy, 1999). But nonprofit organizations and public bureaucracies are driven by broader missions, often cast in diffuse and aspirational language (Dixit 2002). As Wilson (1989) has shown, the most successful bureaucracies are those that translate such aspirational missions into narrowly focused operational goals, which serve to increase accountability and make performance easier to evaluate and reward. However, missions often involve multiple goals, with associated tasks that are costly to split across workers (Dewatripont et al., 2000; Besley and Ghatak, 2017). Relatedly, some goals can be costlier to measure than others.

In addition, incentivizing staff on a subset of goals can have implications for their performance on the non-incentivized goals, and therefore, for the broader mission. The effect of such incentives will depend, on the one hand, on the degree of substitutability in the disutility cost of effort across various tasks.[2] Moreover, when workers are intrinsically motivated to achieve certain pro-social goals, financial incentives may directly affect their intrinsic motivation (Gneezy and Rustichini, 2000; Bénabou and Tirole, 2006).[3] On the other hand, the impact of financial incentives will depend on whether effort in tasks associated with one goal directly contributes to other goals. Such production complementarities are a common feature of multi-goal organizations including for-profit social enterprises, in which actions taken by companies to enhance their social mission can directly undermine their bottom-line (Besley and Ghatak, 2017).

Previous empirical studies of social service delivery have examined the multi-task problem using a single bonus scheme that rewards performance based on either one task (Duflo et al., 2012; Ashraf et

---

[1]See Gibbons (1998) and Prendergast (1999) for a general overview of worker incentives used in organizations.

[2]If substitutability is high, workers may devote more effort to those that are directly incentivized to the detriment of others as argued by Holmstrom and Milgrom (1991).

[3]See Frey and Jegen (2001) and Gneezy et al. (2011) for an overview of intrinsic motivation literature.

al., 2014), or a set of tasks (Olken et al., 2014; Berg et al., forthcoming). In this paper, we take a novel approach to testing the multi-task problem by using two different bonus schemes, each rewarding one of the two goals of the partner institution. This design allows us to examine directly the role of cost and production complementarities. In a multi-task context, the optimal incentive scheme would likely reward both goals simultaneously. Such a scheme, however, would not reveal the nature of the underlying cost and production complementarities even though the worker would take these into account when allocating effort optimally. Berg et al. (forthcoming) and Besley and Ghatak (forthcoming), for example, derive the optimal incentive scheme that rewards the different tasks undertaken by workers but assume that there are no production complementarities. In this sense, knowledge about the nature of cost and production complementarities can inform the institution about the need to pay for performance incentives and their potential impacts on its operational outcomes and mission.

In the paper, we first develop a stylized model of worker effort and then provide experimental evidence of the cost and production complementarities from a randomized trial implemented by a mission oriented non-profit institution. In the model, workers choose effort over two tasks, each related to an organizational goal, that are allowed to be complements, substitutes, or neither in disutility cost and production. We also discuss the role of intrinsic motivation and poor measurement of one of the tasks.

The partner non-profit is a prominent development organization in Pakistan called the National Rural Support Program (NRSP). NRSP has two operational goals: building and strengthening organizations of the poor and supporting poor households directly through small (micro) loans intended for investment in income generating activities. All NRSP field staff (Field Assistants or FAs) support both operational goals in their day to day interactions with poor communities.[4]

In our experiment, all active FAs were assigned to one of two bonus schemes or to a control group. The "social bonus" rewarded effort on tasks related to social empowerment, such as working with communities to create and strengthen organizations of the poor, while the "credit bonus" incentivized the health of the microcredit portfolio, which required bringing in new community members for micro loans and ensuring the timely repayment of loans.

Our field experiment, together with the predictions of the stylized model, allow us to answer three questions that are central to designing contracts for workers in multi-goal organizations: (1)

---

[4]Prior to the experiment, NRSP had been rapidly expanding the microcredit program, raising concerns about possible negative effects on the quality of the community level institutions. At the same time, most FAs were being moved from main branches to smaller satellite offices located in/near villages (labeled 'village branches') in an effort to improve their proximity to clients. While working directly from the main branches, FAs had been offered a fixed salary. NRSP was also concerned that the transfer of FAs to village branches, typically in teams of two FAs, could weaken the monitoring ability of supervisory staff and was therefore interested in testing the introduction of pay for performance incentives for FAs.

In a context where workers have multiple tasks and direct worker supervision is not possible, can monetary incentives be used to improve worker performance? (2) Is it important to understand the nature of production and cost complementarities between tasks? 3) Does working in teams affect the impact of monetary incentives for multi-task agents and, if so, how?

Our results show that staff effort on social-related tasks did not harm (and in some instances, improved) the performance of the institution's credit program but an incentivized focus on credit related tasks undermined the institution's empowerment mission. In particular, the credit bonus improved NRSP's microcredit program but only for outcomes directly incentivized by the bonus. At the same time, it worsened the quality of community organizations (COs). In contrast, the social bonus increased CO formation and improved client empowerment, and did so without worsening microcredit outcomes. In fact, among FAs working individually, the social bonus was as effective as the credit bonus at improving credit outcomes.

This asymmetric impact of the credit bonus on the social goal and of the social bonus on the credit goal can only be explained by production complementarities, where the social task helps in the production of the credit goal while the credit task harms the production of the social goal. Put differently, while complementarities in the disutility cost alone could explain why the credit bonus worsened social-related outcomes, they cannot explain why at the same time the bonus that incentivized social outcomes improved the health of the credit portfolio. Therefore, our findings indicate that production complementarities are empirically relevant.

In addition, we find a significant decline in intrinsic motivation among all FAs offered the social bonus. This decline in intrinsic motivation alone, which potentially raised the cost of social effort, also generates an asymmetric impact of the two bonus schemes, but it cannot explain either our findings on the non-incentivized goals.

For FAs working in teams, the social bonus had a negative impact on both credit and empowerment outcomes. This is accompanied by an overall decline in teamwork, and for those working in teams in the baseline, this also exacerbated the propensity to free-ride. In contrast, the credit bonus had no impact on intrinsic motivation or the odds of free-riding in teams.

These results contribute to several strands of the literature. Evaluations of microcredit programs have typically found small or negligible impacts on empowerment or other social-related outcomes (Banerjee et al. 2015, among others).[5] Our results offer a plausible explanation for this finding. We find that incentive structures that only reward the performance of the credit portfolio, similar to the incentives provided by many of the institutions reviewed in Banerjee et al. (2015), undermine

---

[5]Relatedly, several studies have found that incentives focused on credit-related tasks can change the composition of the borrower pool, favoring richer and more credit worthy individuals (McKim and Hughart, 2005; Aubert et al., 2009).

social-related goals. To be sure, the introduction of incentive structures that focus on repayment or that rely on CO membership fees may be a response to the pressure that microfinance institutions face to become financially self-sustainable (Greaney et al., 2016), but under these schemes social empowerment may languish.

More broadly, anti-poverty programs increasingly provide a holistic set of private and public services based on the idea that combinations of interventions are required to address the multidimensional problems of development (Mansuri and Rao, 2013; Banerjee et al., 2015). Our results suggest that a careful assessment of task complementarities in implementation design will be critical for understanding the success or failure of such programs.

Our results also relate to the broader literature on the role of performance pay in organizations (Lazear, 2000; Paarsch and Shearer, 2000; Shearer, 2004). Studies that contemporaneously vary worker incentive structure within a single firm are rare (Bandiera et al. 2007, 2013 and Friebel et al. 2017 are notable exceptions). We contribute to this literature by studying incentive design in mission-oriented organizations with staff that not only have multiple tasks, but may also be intrinsically motivated (Besley and Ghatak, 2005; Osterloh and Frey, 2000; Bowles and Polanina-Reyes, 2012) and sometimes work in teams (Bandiera et al., 2010, 2013).

In such settings of delivery of public goods and social services, incentives have been shown to affect worker performance by changing, in some instances, the number and the quality of job applicants (Bó et al., 2013; Ashraf et al., 2014; Deserranno, 2016) and by inducing greater effort among mission-motivated workers (Ashraf et al., 2014), albeit to a much smaller degree compared with their peers whose preferences are not aligned with the mission (Carpenter and Gong, 2016).[6] Ashraf et al. (2014) find that both financial and non-financial rewards given to boost performance in a social cause such as selling condoms to prevent HIV/AIDS were effective, especially among socially motivated agents. In Berg et al. (forthcoming), agents were hired to spread information about a public health insurance program. They find that in the absence of incentive pay, social distance prevents the flow of information while incentive pay is particularly effective in overcoming social distance. Bó et al. (2013) also finds that higher wages do not have adverse selection effects on motivation. In contrast to these papers, we find that financial incentives crowd-out intrinsic motivation and in addition, they affect performance by undermining the willingness of motivated employees to work in teams.

The rest of the paper proceeds as follows. Section 2 describes NRSP's organizational goals and

---

[6]Lavy (2002, 2009), Muralidharan and Sundararaman (2011), and Duflo et al. (2012), among others, have examined the effects of financial and non-financial incentives on public teachers; Bó et al. (2013) and Rasul and Rogger (2016) on government bureaucrats; Khan et al. (2015) on tax inspectors; Olken et al. (2014) on community groups; Ashraf et al. (2014) and Deserranno (2016) on development workers; Mullen et al. (2010) on health care workers; Baicker and Jacobson (2007) and Banerjee et al. (2014) on policing. For review of the literature, see Neal (2011) and Finan et al. (2017).

its overall mission, and outlines the experimental design. Section 3 presents the model of worker effort choice in an organization with multiple goals. Section 4 discusses the data, Section 5 describes the empirical strategy, and Section 6 reports the results of the experiment and discusses how the empirical findings match with the predictions of the model. Section 7 concludes.

2 Context and Experiment

NRSP's mission is to reduce poverty by empowering poor households and investing in their livelihoods.[7] Central to this mission is a process of social mobilization—that involves the formation and strengthening of COs of the poor at the village or community level. Each CO is typically comprised of 15 members, who live close to each other in the same village.[8] Once the CO is formed, its members meet regularly to save, attend skill-training programs, and work collectively on local infrastructure projects.

NRSP also enhances the livelihood of CO members by offering microfinance services. Two-thirds of CO members are active borrowers. Microfinance is provided in the form of individual loans, usually with a single or monthly installments and a maturity of six to 12 months.[9] CO membership is a prerequisite to access these loans.

NRSP views microcredit and social mobilization as the main instruments to improve their livelihoods and empower communities. At the same time, the health of its microcredit program is also critical to NRSP's financial sustainability.

NRSP's dual focus on social mobilization and microcredit is reflected in its branch management structure. In each branch or Field Unit (FU), a Social Organizer (SO) oversees the social mobilization aspects of the program while a Credit Officer (CrO) is in charge of the microcredit program. Field Assistants (FAs), who are at the bottom of this hierarchy, report to the SO for social mobilization and to the CrO for all microcredit related issues. Both SO and CrO in all FUs are paid a flat wage that does not depend on the performance of FAs.

FAs are the institution's front line staff that engage directly with local communities and CO members on a daily basis. Thus, FAs deliver both credit- and social-related services to CO members,

---

[7]NRSP is a development organization operating in Pakistan since 1991. Its activities have covered more than 2.5 million households, with 550,000 current clients in all four provinces, making it the largest rural support program in the country in terms of outreach, staff and development activities.

[8]Depending on the local norms, CO members may be of the same or mixed gender.

[9]All loans are individual loans with no joint liability at the CO level. CO members are eligible to receive new loans even if some members from the CO have overdue amounts. Each borrower is however required to find two guarantors, who can be members of the same CO. NRSP uses these guarantors and other CO members to exert pressure on the defaulting borrower to repay. The loans can be used for the purchase of agricultural inputs, livestock, and investments in household enterprises. A new borrower starts with a maximum loan size of PKR 10,000, which can increase in intervals of up to PKR 5,000 with each successful loan cycle.

and are responsible for all on-the-ground activities related to NRSP's two goals. Among the social-related activities, FAs facilitate the formation and management of COs, which includes attending CO meetings, ensuring that COs maintain adequate records of meetings, attendance and savings, and gathering requests by CO members for skill training. Among credit-related activities, FAs screen loan applications from CO members and assess their creditworthiness as potential borrowers, typically at the applicant's home. FAs are also charged with ensuring timely loan repayment and visits to the home of delinquent borrowers.

FAs regularly work overtime hours, and thus they likely face trade-offs between devoting their time towards credit- or social-related activities.[10] The exact nature of cost complementarity between FAs' effort on credit and social activities will depend on how increasing time and effort on one activity affects the disutility cost of exerting effort in the other activity.

In addition, both credit and social-related activities are likely to independently contribute to the "production" of both goals. In the baseline survey, for example, more than 90 percent of FAs say that social-related tasks such as regular and on-time CO meetings improve the creditworthiness of CO members (see Table 1). Similarly, credit activities such as enforcing strict repayment and following up with borrowers at their homes, decrease CO quality because they discourage borrowers, especially those in arrears, from attending and participating in CO meetings regularly. Hence, these production spillovers of credit activities on the social goal, and vice-versa, are not necessarily symmetric, and when they exist, they can be positive or negative.

Lastly, FAs work individually or in teams of two or three individuals. FAs working in teams co-manage a group of COs by dividing the monthly workload among them. Each team member is responsible for attending the meetings of the COs assigned to him or her that month and for collecting the repayments from CO members due that month. A given CO, therefore, will be managed by different FAs over time. Teamwork among FAs is encouraged by NRSP management to ensure continuity in case the FA falls sick, leaves NRSP, or is promoted. Teamwork also provides NRSP a useful way to train inexperienced FAs while they are on the job, by partnering them with relatively more experienced FAs. A detailed description of team formation is provided in Section 4 and in Appendix C.

Until recently, all FAs had been working directly from the branch (FU) with the direct supervision of both the CrO and SO, while earning a fixed salary. At the time of the study, NRSP had transferred 85 percent FAs from FUs to village branches in an effort to have FAs be closer to the field. FAs continued to work alone or in teams, but this decentralization meant that direct supervision by the supervisors was no longer possible. Since the management was concerned that a fixed salary might

---

[10]In the baseline survey, the self-reported average daily overtime among study-sample FAs is 2 hours (see Table 1).

no longer be optimal in absence of adequate monitoring, NRSP was willing to explore other ways of remunerating the staff. During this time, NRSP had also been scaling up its microcredit program thanks to its partnership with the Pakistan Poverty Alleviation Fund (PPAF), which provided financial support through both grants and loans. The health of the microcredit program was crucial for NRSP's growth and survival, as the program funds were loans from the PPAF that needed to be repaid. But this microcredit expansion raised concerns among NRSP management about its implications for the quality of COs that were being formed and managed by FAs.

2.1 Bonus intervention

We worked with NRSP to design and implement two pay-for-performance schemes for FAs to evaluate the cost and production complementarities on FA effort across credit and social activities. The study was conducted in all 35 FUs located in 15 districts across Sindh, Punjab, and Khyber Pakhtunkhwa provinces, where NRSP was active in March 2005. We thus use all of the active NRSP front line staff at the time, which provided us with a sample of 162 FAs. FAs were randomly divided into three groups (two treatment groups, and one control group).[11] To ensure that all FAs under a given CrO-SO management team were provided with the same bonus scheme, the randomization was done at the FU level.[12] Appendix Table A.2 reports the list of FUs in the study and their bonus assignments.

FAs in the treatment group received one of two bonus schemes. The credit bonus incentivized performance on disbursement and loan recovery. The social bonus incentivized performance on observable correlates of CO quality: new CO formation, regular CO meeting, and savings by CO members.

The bonus scheme was designed to be easily understood, fair, and transparent. Each bonus had two triggers. The first trigger determined whether an FA was eligible to receive a bonus while the second trigger determined the bonus amount once the first trigger was achieved. Appendix Table A.1 describes the triggers and provides more details about the bonus scheme.

NRSP management had been setting monthly targets on several credit and social empowerment outcomes even before the intervention, but prior to our intervention they were not linked to any performance incentive scheme. These targets were based on past performance and were meant to be achievable but were set at a higher level than current performance. Put differently, an FA

---

[11]Since social-related tasks rely more heavily on the discretionary actions of CO members, the social outcomes might be less reflective of FA effort and may be more difficult to achieve. According to the baseline survey, 56.8 percent of FAs find CO quality difficult to improve while only 18.9 percent of FAs report repayment and disbursement difficult to improve. In addition, social mobilization outcomes like savings and attendance are less costly for CO members to renege on compared to defaulting on their loans. For these reasons, we assigned more branches to the social bonus and control group compared to the number of FUs in the credit bonus.

[12]FAs that were already working from a village branch were also assigned to the treatment of the relevant FU.

working with the same intensity as before should not receive a bonus. The intervention only provided monetary incentives to FAs for achieving these targets and it did not affect their career progression or any other aspect of the program.[13]

Treatment FAs that had met their monthly target received the incentive as a bonus pay added to their base monthly salary.[14] For FAs working in teams, the bonus was paid based on whether the joint performance of the team exceeded the target. The monthly base salary of an FA was about PKR 3,000 (USD 50.54) at the time of the study.[15] The largest bonus an FA could earn in any month was PKR 600 (20 percent of the base salary). FAs in control FUs continued to earn the (flat) base salary.

The bonus scheme was announced in March 2005. Treatment FAs became eligible to receive the bonus starting on April 2005. The bonus intervention lasted for 15 months, and ended in June 2006. To discourage any intertemporal substitution of worker effort, FAs in treatment FUs were not informed in advance about whether and when the bonus would end. FAs in control FUs were never told about the intervention, and none of the control FAs interviewed in June 2006 reported having any knowledge of the bonus. Detailed timeline of the study is presented in Appendix Figure A.2.

3 Theory

Consider an employee of an organization, which has two main tasks that produce outcomes y_1 and y_2. The employee needs to decide how much effort (e_1, e_2) to allocate to each task.

Both tasks carry a disutility cost of effort. For simplicity, we assume that the employee is risk neutral. The employee's utility function is then given by

$$W - C(e_1, e_2)$$

where W is the employee's salary and $C(\cdot)$ is a convex function in both arguments denoting the disutility cost of effort.

Employee effort generates outcome y_i, associated with task $i = 1, 2$, according to the following production technology

$$y_1 = \theta_1 e_1 + \gamma_1 e_2 + \epsilon_1 \quad \text{and} \quad y_2 = \gamma_2 e_1 + \theta_2 e_2 + \epsilon_2,$$

---

[13]While FAs could be promoted to Senior FA and earn a slightly higher salary, only one of the 162 study FAs had a Master's degree, the required schooling level for a promotion to SO or CrO.

[14]During the intervention, slightly more than 25 percent of treatment FAs qualified for a bonus each month. In any given month, two-fifths of FAs offered the credit bonus and one-fifth of FAs offered the social bonus qualified for it. Appendix Figure A.1 presents the monthly frequency and the amount of bonus payments made during the study period.

[15]The exchange rate in March 2005 was USD 1 = PKR 59.36.

where (ϵ_1, ϵ_2) is a pair of observational noises. θ_1 and θ_2 are positive scalars, converting effort on task i into outcome $i = 1, 2$. γ_1 and γ_2 are scalars which capture the "production spillover" effect of effort on task j on outcome i. We assume that $\theta_i > |\gamma_i|, i = 1, 2$.

In general, scalars γ_1 and γ_2 can be positive, negative or zero. The sign of γ_1 (γ_2) determines whether effort on task 2 (1) increases, has no effect on, or decreases outcome y_1 (y_2). If $\gamma_1 > 0$, the two tasks are complements in producing y_1, in that effort on task 2 increases y_1. Conversely, if $\gamma_1 < 0$, then the two tasks are substitutes in producing y_1, in that effort on task 2 decreases y_1. Finally, if $\gamma_1 = 0$, then task 2 does not contribute to the production of y_1.[16]

We now introduce a task specific bonus scheme (b_1, b_2). An employee offered a bonus for task 1 (2) earns an amount $b_1 y_1$ ($b_2 y_2$) in addition to the base salary w.[17] An employee offered a bonus on task 1 chooses e_1 and e_2 to maximize

$$\max_{e_1, e_2} \quad b_1(\theta_1 e_1 + \gamma_1 e_2) + w - C(e_1, e_2)$$
$$\text{s.t.} \quad e_1 \geq 0, \quad e_2 \geq 0.$$

The first order conditions (incentive constraints) yield

$$b_1 \theta_1 = C'_1(e_1, e_2) \quad \text{and} \quad b_1 \gamma_1 \leq C'_2(e_1, e_2) \quad (= \text{if } e_2 > 0), \tag{1}$$

where $C'_i(e_1, e_2) = \frac{\partial C(e_1, e_2)}{\partial e_i} \geq 0$, $i = 1, 2$. When offered a bonus on task 2, the first order conditions are

$$b_2 \gamma_2 \leq C'_1(e_1, e_2) \quad (= \text{if } e_1 > 0) \quad \text{and} \quad b_2 \theta_2 = C'_2(e_1, e_2). \tag{2}$$

Assuming an interior solution ($e_i > 0$, $i = 1, 2$) and differentiating (1) and (2) above with respect to $b_i, i = 1, 2$ we obtain

$$\theta_1 = C''_{11} \frac{\partial e_1}{\partial b_1} + C''_{12} \frac{\partial e_2}{\partial b_1} \quad \text{and} \quad \gamma_1 = C''_{21} \frac{\partial e_1}{\partial b_1} + C''_{22} \frac{\partial e_2}{\partial b_1}$$
$$\gamma_2 = C''_{11} \frac{\partial e_1}{\partial b_2} + C''_{12} \frac{\partial e_2}{\partial b_2} \quad \text{and} \quad \theta_2 = C''_{21} \frac{\partial e_1}{\partial b_2} + C''_{22} \frac{\partial e_2}{\partial b_2}$$

where the term $C''_{ij} = \frac{\partial^2 C}{\partial c_i \partial c_j}, i, j = 1, 2$ is an element of the Hessian of the disutility cost function $C(e_1, e_2)$. The Hessian matrix is symmetric by definition, that is, $C''_{12} = C''_{21}$.[18] If an increase in e_1 makes e_2 costlier in disutility terms, then the reverse must also be true.

---

[16] Berg et al. (forthcoming) and Besley and Ghatak (forthcoming) assume no production complementarities and thus $\gamma_i = 0, i = 1, 2$.

[17] The assumption of risk neutrality guarantees that linear incentive schemes are optimal.

[18] Berg et al. (forthcoming) and Besley and Ghatak (forthcoming) parametrize the cost function as $C(e_1, e_2) = \frac{1}{2}c_1 e_1^2 + \frac{1}{2}c_2 e_2^2 + \delta e_1 e_2$. As a result, $C''_{12} = C''_{21} = \delta$.

From the expressions above and simplifying, we obtain

$$
\begin{aligned}
\frac{\partial e_1}{\partial b_1} &= \frac{C_{22}''}{D}\theta_1 - \frac{C_{12}''}{D}\gamma_1 \\
\frac{\partial e_2}{\partial b_1} &= -\frac{C_{12}''}{D}\theta_1 + \frac{C_{11}''}{D}\gamma_1 \\
\frac{\partial e_1}{\partial b_2} &= \frac{C_{22}''}{D}\gamma_2 - \frac{C_{12}''}{D}\theta_2 \\
\frac{\partial e_2}{\partial b_2} &= -\frac{C_{12}''}{D}\gamma_2 + \frac{C_{11}''}{D}\theta_2
\end{aligned}
\tag{3}
$$

where $D = C_{11}''C_{22}'' - C_{12}''^2 > 0$ is the determinant of the Hessian of the disutility cost function $C(e_1, e_2)$.

Effort in each task, thus responds to the bonus depending on the sign of the technology scalars $\gamma_i, i = 1, 2$, and on the cross-partial of the disutility cost function C_{12}''.

In addition, differentiating the production technologies with respect to $b_i, i = 1, 2$ we obtain

$$
\begin{aligned}
\frac{\partial y_1}{\partial b_i} &= \theta_1 \frac{\partial e_1}{\partial b_i} + \gamma_1 \frac{\partial e_2}{\partial b_i} \\
\frac{\partial y_2}{\partial b_i} &= \gamma_2 \frac{\partial e_1}{\partial b_i} + \theta_2 \frac{\partial e_2}{\partial b_i}
\end{aligned}
\tag{4}
$$

The expressions in (4) above allows us to examine how the bonus $b_i, i = 1, 2$ will impact outcomes y_1 and y_2. We first note that given the assumptions made, a bonus on task i will always improve outcome i. That is, $\frac{\partial y_i}{\partial b_i} > 0, i = 1, 2$. This can be verified by substituting in for $\frac{\partial e_i}{\partial b_i} > 0$ and $\frac{\partial e_i}{\partial b_j}$ ($i, j = 1, 2$), and simplifying terms. Second, the impact of a bonus on task i on outcome j, $i \neq j$, will depend on the nature of cost and production complementarities, that is, on the signs of C_{12}'' and the technology scalars γ_1 and γ_2. We now examine this impact for different values of technology and cost parameters.

Case 1: $\gamma_1 > 0$ **and** $\gamma_2 > 0$

The incentive constraints in (1) and (2) suggest that $e_1 > 0$ and $e_2 > 0$ irrespective of the bonus offered. The impact of either bonus on the other outcome is found by substituting the expressions for $\frac{\partial e_i}{\partial b_j}, i, j = 1, 2$ from (3) in (4) and simplifying. We obtain

$$
\frac{\partial y_2}{\partial b_1} = \frac{\partial y_1}{\partial b_2} = \theta_1\gamma_2 \frac{C_{22}''}{D} - (\theta_1\theta_2 + \gamma_1\gamma_2)\frac{C_{12}''}{D} + \theta_2\gamma_1 \frac{C_{11}''}{D}
\tag{5}
$$

The impact of a bonus on task 1 on outcome 2 is the same as the impact of a bonus on task 2 on outcome 1.

When tasks are substitutes in the disutility cost of effort, that is, $C_{12}'' > 0$, such that an increase in e_1 makes e_2 costlier in disutility terms (and vice versa), the impact cannot be signed. The first and last terms are positive while the second term is negative. Intuitively, there are two opposing

11

forces. On the one hand, effort in a particular task increases the disutility cost of effort in the other task because $C''_{12} > 0$. Hence, effort on the unrewarded task may decline as the individual increases effort on the rewarded task, thus reducing production of the unrewarded outcome. On the other hand, the production complementarities ($\gamma_i > 0$, $i = 1, 2$) suggest that effort in the rewarded task increases production of the unrewarded outcome. The net effect is therefore ambiguous.

Alternatively, when tasks are complements in the disutility cost of effort, that is, $C''_{12} \leq 0$, then the impact is positive as the second term of the expression in (5) is now non-negative. In this case, effort in a particular task decreases the disutility cost of effort on the other task and so effort in the unrewarded task will increase with an increase in effort in the rewarded task.

Case 2: $\gamma_1 > 0$ **and** $\gamma_2 \leq 0$

The incentive constraints in (1) suggest that $e_1 > 0$ and $e_2 > 0$ when a bonus on task 1 is offered. Therefore, the impact of the bonus on task 1 on outcome 2 is given by expression (5) above, and it is ambiguous.[19] In contrast, when a bonus on task 2 is offered, the incentive constraints in (2) suggest that $e_1 = 0$ and $e_2 > 0$. In this case, the impact of the bonus on task 2 on outcome 1 is given by

$$\frac{\partial y_1}{\partial b_2} = \gamma_1 \left(\theta_2 \frac{C''_{11}}{D} - \gamma_2 \frac{C''_{12}}{D} \right) > 0, \tag{6}$$

and it is positive because the expression in parenthesis is positive and $\gamma_1 > 0$. Intuitively, the bonus on task 2 has no direct impact on the effort on task 1 (that is, $e_1 = 0$), yet outcome 1 will increase because of the production complementarity (scalar $\gamma_1 > 0$).

Case 3: $\gamma_1 \leq 0$ **and** $\gamma_2 > 0$

This case is the opposite of Case 2. The incentive constraints in (1) suggest that $e_1 > 0$ and $e_2 = 0$ and so the impact of the bonus on task 1 on outcome 2 is then given by

$$\frac{\partial y_2}{\partial b_1} = \gamma_2 \left(\theta_1 \frac{C''_{11}}{D} - \gamma_1 \frac{C''_{12}}{D} \right) > 0, \tag{7}$$

which is positive because the expression in parenthesis is positive and $\gamma_2 > 0$. Intuitively, the bonus on task 1 has no direct impact on the effort on task 2 (that is, $e_2 = 0$), and as a result, outcome 2 will increase because tasks are strategic complements in the production of outcome 2 (scalar $\gamma_2 > 0$).

---

[19]Given the assumptions, it is always the case that $\theta_1\theta_2 + \gamma_1\gamma_2 > 0$, but the second term of the expression in (5) can be positive or negative depending on the sign of C''_{12}.

The incentive constraints in (2) suggest that $e_1 > 0$ and $e_2 > 0$ when a bonus on task 2 is offered. The impact of the bonus on task 2 on outcome 1 is therefore given by expression (5) above, and it is ambiguous because the last term is non-positive but the second term depends on the sign of C_{12}''.

Case 4: $\gamma_1 \leq 0$ and $\gamma_2 \leq 0$

When a bonus on task 1 is offered, the incentive constraints in (1) suggest that $e_1 > 0$ and $e_2 = 0$, while the constraints in (2) suggest that $e_1 = 0$ and $e_2 > 0$ when a bonus on task 2 is offered.

In this case, the impact of the bonus on tasks 1 and 2 is non-positive and given in expressions (7) and (6), respectively. If there are no production complementarities ($\gamma_1 = 0$, $\gamma_2 = 0$), then the bonus on a given task has no impact on the other outcome. If the two tasks are substitutes in the production of each outcome ($\gamma_1 < 0$, $\gamma_2 < 0$), then the bonus will increase effort on the rewarded task thus decreasing the unrewarded outcome.

3.1 Discussion

Table 2 provides the predictions for how the bonuses (b_1 and b_2) affect outcomes y_1 and y_2 in each of the above four cases, separately for $C_{12}'' \leq 0$ (Panel A) and $C_{12}'' > 0$ (Panel B). A positive (negative) sign indicates that the impact of the bonus on the outcome is positive (negative). A question mark indicates that the impact is ambiguous.

Several important patterns emerge in Table 2. First, the impact of a bonus on task i on outcome i is always positive. Second, production complementarities are needed to explain asymmetric impacts of the bonuses on each goal. In particular, only when the technology scalars γ_1 and γ_2 have different signs (Cases 2 and 3) can the impact of the bonus on task 1 on outcome 2 have the opposite sign from that of the bonus on task 2 on outcome 1. In contrast, when they have the same sign as in Cases 1 and 4, the impact of the bonus on task 1 on outcome 2 will have the same sign as the impact of the bonus on task 2 on outcome 1.

Case 4.2 is of particular importance because it assumes no production complementarities ($\gamma_1 = 0$, $\gamma_2 = 0$). In this case, effort in the incentivized task, say e_1 does not crowd-out effort in the non-incentivized task because it is already a corner solution ($e_2 = 0$). However, if workers were intrinsically motivated to perform task 2 but only when not directly incentivized ($b_2 = 0$), then crowd-out of effort could occur if tasks were substitutes in the cost of effort ($C_{12}'' > 0$).

We examine this case in more detail assuming as in Besley and Ghatak (forthcoming) that the employee derives utility m per unit of outcome 2 produced, and for simplicity, we further assume that the cost of disutility also takes the quadratic form.

An employee that is not offered any bonus solves the following problem

$$\max_{e_1,e_2} \quad m\theta_2 e_2 + w - \frac{1}{2}c_1 e_1^2 - \frac{1}{2}c_2 e_2^2 - \delta e_1 e_2.$$
$$\text{s.t.} \quad e_1 \geq 0, \quad e_2 \geq 0.$$

The first order conditions (incentive constraints) yield

$$e_1 = 0 \quad \text{and} \quad m\theta_2 = c_2 e_2. \tag{8}$$

The first order conditions for the problem of an employee offered a bonus on task 1 are

$$b_1\theta_1 = c_1 e_1 + \delta e_2. \quad \text{and} \quad m\theta_2 = c_2 e_2 + \delta e_1. \tag{9}$$

Comparing the first order conditions with respect to e_2 in (8) and (9), it is clear that the bonus on task 1 increases effort on task 1, and that it lowers effort on task 2 if $\delta > 0$, i.e. if tasks were substitutes in the cost of effort.

When offered a bonus on task 2, the first order conditions are

$$e_1 = 0 \quad \text{and} \quad b_2\theta_2 = c_2 e_2 + \delta e_1. \tag{10}$$

Comparing the first order conditions in (8) and (10) shows that the bonus on task 2 has no effect on effort on task 1, and it increases effort on task 2 if $b_2\theta_2 > m\theta_2$.

Table 2 reports the predictions on how bonuese affect outcomes under this situation in Case 5 of Panel B. The predictions show that intrinsic motivation can result in an asymmetric impact of the bonuses on the two outcomes. The nature of this asymmetry, however, is different from that in Cases 2 and 3. In particular, only production complementarities in Case 2 (Case 3) can result in a negative (positive) impact of the bonus on task 1 on outcome 2 and a positive (negative) impact of the bonus on task 2 on outcome 1.

In Section 6 we compare the actual impacts of the bonuses introduced in the field experiment with these predictions.

Consider now a bonus that rewards both tasks simultaneously. The employee would choose e_1 and e_2 to maximize

$$\max_{e_1,e_2} \quad b_1(\theta_1 e_1 + \gamma_1 e_2) + b_2(\theta_2 e_2 + \gamma_2 e_1) + w - C(e_1, e_2)$$
$$\text{s.t.} \quad e_1 \geq 0, \quad e_2 \geq 0.$$

The first order conditions (incentive constraints) yield

$$b_1\theta_1 + b_2\gamma_2 = C_1'(e_1, e_2) \quad \text{and} \quad b_2\theta_2 + b_1\gamma_1 = C_2'(e_1, e_2), \tag{11}$$

The organization seeks to maximize the total surplus given by the sum of the organization's objective function and the employee's welfare. Letting the scalars $\alpha_i, i = 1, 2$ be the weight that the organization puts on outcome i, the problem of the organization is

$$\max_{e_1, e_2} \quad \alpha_1(\theta_1 e_1 + \gamma_1 e_2) + \alpha_2(\theta_2 e_2 + \gamma_2 e_1) - C(e_1, e_2)$$

subject to the incentive constraints in (11)

This problem is similar to the one solved by the employee above, and it is clear that the optimal bonus satisfies $b_i = \alpha_i, i = 1, 2$, that is, the institution should reward a task inasmuch as it values the outcome. The optimal bonus therefore does not depend on the nature of production and cost complementarities since the employee will internalize them when choosing the optimal level of effort. As a result, the only way to assess whether complementarities in production and disutility cost exist, is by offering a bonus scheme that only rewards one task.

4   Data

Data used in the empirical analysis come from multiple sources. Survey data were collected between January and February 2005, prior to the announcement of the bonus, and in June 2006, the last month of the intervention. These surveys asked each FA about his or her demographic and household characteristics, current employment conditions and work history, along with his or her level of motivation for working with NRSP.

These two rounds of survey data are supplemented with administrative data from NRSP, including the monthly employee records with the employment status of each FA, salary and bonus information, and the name of FU or village branch where the FA worked. NRSP also provided us with a monthly record of COs managed (or co-managed) by each FA from June 2004 to June 2006. This FA-CO panel helps us construct the monthly portfolio of COs for each FA during the 10 months before and the 15 months of the bonus intervention.

FA's performance was tracked using two administrative datasets. Data on loan disbursements and recovery are obtained from NRSP's Management Information Systems (MIS) database. The MIS digitally records all loans taken and repaid by all borrowing CO members by installment. A total of 5,364 unique COs appear in the MIS database during the 25 months that overlap with the

FA-CO panel. Of them, 4,404 COs (82.1 percent) were managed by the 162 FAs who were working for NRSP at the time of the study.[20] Out of the 4,404 COs managed by the study-sample FAs, 4,008 COs show loan activity at least once during these 25 months, and have 5.81 active borrowers each month with repayment or disbursement in 14 out of the 25 months, on average.

Information on social mobilization efforts is obtained from the Monthly Progress Reports (MPRs) submitted each month by each FA for the COs managed or co-managed by him or her. This report includes information on meeting attendance, member savings, and loans approved and denied during the meeting. The MPRs data are available for the 15 months when the bonus was implemented. These data were verified by a supervisor through random visits to a subset of scheduled CO meetings.[21]

We aggregate the CO level credit and social outcomes at the FA-month level using information from the FA-CO panel. We calculate the performance of an FA before and after the bonus, by taking the average across the 9 months prior to the bonus announcement and the 15 months during the bonus period, respectively. Data from March 2005 (the month when the bonus was announced but not yet implemented) is dropped from the analysis.

In addition, CO members from a subset of COs managed by our study-sample FAs were interviewed in November 2006 (5 months after the end of our study) as part of a baseline survey for another study (see Giné and Mansuri (2017)). It covered 11 FUs, and interviewed 1691 CO members from 214 COs managed by 57 (out of 162) study-sample FAs. The survey asked CO members about any changes since around the time the bonuses were introduced in their COs' activities—such as discussions of non-credit related social issues during CO meetings, member's ability to speak freely and actively participate in CO decisions, willingness to seek advice from CO leaders outside of CO meetings, and collective action taken by CO members to jointly purchase agricultural inputs or sell the harvest. We use these data to construct subjective quality measures of a CO as reported by its members.

Lastly, we interviewed supervisors in June 2006 (last month of the bonus). The survey asked supervisors about the performance of all FAs working under them on various credit and social outcomes in the previous month. They also reported their subjective evaluation of each FA since the study began. We use the data from the supervisor survey to construct measures of supervisory

---

[20]The rest of the COs were managed and formed by FAs hired after the bonus intervention began in March 2004. In our analysis, we focus on the FAs who were already working with NRSP prior to the bonus intervention because any differential selection of new hires on their characteristics/quality across the different experimental arms could confound the results. While financial incentives have also been shown to affect performance through differential selection into working in an organization (Bó et al., 2013; Deserranno, 2016), the main focus of this paper is to understand the incentive effects on performance due to task complementarities.

[21]The random visits were carried out by the Credit Officer (CrO) to whom FAs report all issues related to micro-credit. All FAs working from the same FU report to the same CrO.

effort, and of their assessment of FA performance.

4.1 Baseline characteristics and balance tests

Columns 1, 2, and 3 of Table 1 report means of FA characteristics measured at baseline in the control, credit bonus, and social bonus groups, respectively. Columns 4, 5, and 6 report the p-value from the t-test of the difference in means between control FAs and credit bonus FAs (Cr-FAs); control FAs and social bonus FAs (Soc-FAs); and Cr-FAs and Soc-FAs, respectively. Across all the reported variables, we cannot reject that means are equal for any pairwise comparison at conventional levels of statistical significance. As indicated by the p-value of F-test at the bottom of Columns 4, 5, and 6, we again cannot reject that all covariates are not jointly different from zero in a regression where the dependent variable takes the value one if the FA is in the control group using the sample of FAs in the control and credit bonus groups in Column 4 and FAs in the control and social bonus groups in Column 5. In Column 6, the dependent variable takes value 1 if the FA is offered a credit bonus using the sample of FAs offered a bonus.

FAs in our study are on average 28 years old, roughly one-fourth are female, and slightly more than half of them have at least a high school degree (equivalent to 12 years of education). The average duration of employment with NRSP is 26 months, and NRSP was the first job for roughly two-fifths of FAs.

FAs manage on average 14 COs every month. Their average monthly portfolio consists of 91.4 active loans (new and ongoing), with roughly PKR 100,000 (USD 1,685) disbursed each month. The mean recovery rate on installments due at the end of each month is around 98 percent, while only 70 percent of such installments is recovered fully by the 20th of that month.

Slightly more than half of the FAs prefer a hypothetical bonus to be paid on credit outcomes as opposed to social outcomes. During the baseline interview, each FA was asked to rank what they liked most about working in NRSP. Roughly half of the FAs reported that the ability to help people is what they liked most. One-fifth of them had also done volunteer work before joining NRSP.

Out of 162 FAs in the study, 132 FAs were successfully interviewed in the follow up survey. This attrition rate is almost identical and not statistically different across the three groups (see bottom of Table 1), suggesting that attrition bias is not a concern when examining impacts of bonus on outcomes measured in the follow up survey. In addition, CO meetings held by 31 FAs were never visited by a supervisor. These 31 FAs do not appear in the verified MPRS data, restricting our sample to 131 FAs when examining social outcomes. The selection into this restricted sample is again not statistically different across control FAs, Cr-FAs, and Soc-FAs (see bottom of Table 1). Similarly, 73 FAs for whom we have subjective assessments from supervisors are not differentially

selected across the two bonus and control groups.

Appendix Tables D.1, D.2, and D.3 present means of baseline variables in the control and the two bonus groups, and their differences for the verified MPRS, follow up, and supervisor evaluation restricted samples, respectively. None of the differences in means (out of 63 differences) in Appendix Table D.1 are statistically significant at the 10 percent conventional level. In Appendix Tables D.2 and D.3, four and three differences are statistically significant at the 10 percent level respectively. In all samples, the F-tests at the bottom of Columns 4-6 cannot reject the hypothesis that all variables are jointly insignificant in explaining assignment to an experimental arm.

4.2 Partnership

Roughly two-fifths of FAs co-manage their entire CO portfolio with other FAs, while slightly less than one-fourth manage all their COs on their own. Appendix Figure C.1 plots the distribution of FAs based on the share of their CO portfolio that are co-managed with other FAs during the 9 months prior to the bonus announcement. The median level of co-management is 73 percent, and we classify FAs who co-manage more than this median value during the pre-bonus months as "partnered" FAs in the analysis.[22]

Columns 1 and 2 of Appendix Table C.1 report the means of FAs' baseline characteristics for non-partnered and partnered FAs respectively; Column 3 reports the p-values from the F-tests of the difference in means between the two groups. We find no statistically significant difference in any reported characteristics including education and work experience between partnered and non-partnered FAs. The p-value of the F-test (reported at the bottom of Column 3) cannot reject the equality of means across the two groups. Column 4 presents the correlation between the FA's and his/her partner's characteristics. NRSP management tend to form teams between FAs of the same gender and the same level of education (correlation coefficients are 0.834 and 0.309 respectively). In Table 1, we do not find statistically significant difference in the propensity to work in a team prior to bonus nor in the pre-bonus share of co-managed COs between FAs in the different experimental arms. Appendix C contains a more detailed discussion on partnership.

---

[22]In the baseline, almost 90 percent of partnered FAs (71 out of 81 partnered FAs) co-manage their COs with one other FA, while the rest co-manage with two other FAs. We also find that FA teams are stable throughout the study period, unless one of the team members quits NRSP.

5 Empirical Strategy

Because the bonus assignment is random, we can estimate the causal impact of introducing the bonus scheme by estimating OLS with the following specification:

$$Y_{i,1} \;=\; \eta_r \;+\; \psi\, Y_{i,0} \;+\; \beta_C\, TC_i \;+\; \beta_S\, TS_i \;+\; \epsilon \tag{12}$$

where $Y_{i,1}$ is the post-treatment outcome of interest for FA i, η_r is a region dummy (one for each of the four NRSP's administrative regions), and $Y_{i,0}$ is the pre-treatment outcome for FA i. TC_i (TS_i) is an indicator variable that takes the value of one if FA i was offered the credit (social) bonus, and zero otherwise, and ϵ is a mean-zero error term. Because the offer of bonuses was done at the FU level and there are 35 FUs in the study, we conduct all statistical inferences using the t-asymptotic wild cluster bootstrap at the FU level described in Cameron et al. (2008).[23] All tables discussed in Section 6 report the coefficients and the t-asymptotic wild cluster bootstrapped p-values.

The coefficients of interest in the regression are β_C and β_S, which estimate the average treatment effects of the credit and social bonus on FA outcomes $Y_{i,1}$, respectively.

We also examine the impact of bonus separately by partnership status of FAs at baseline using the following specification:

$$Y_{i,1} \;=\; \eta_r \;+\; \psi\, Y_{i,0} \;+\; \pi\, P_i \;+\; \beta_C\, TC_i \;+\; \beta_S\, TS_i \;+\; \delta_C\, P_i * TC_i \;+\; \delta_S\, P_i * TS_i \;+\; \epsilon, \tag{13}$$

where P_i is an indicator variable that takes the value of one if FA i was partnered with another FA prior to the bonus announcement. We use baseline partnership rather than actual partnership status during the study to avoid selection into partnership due to treatment, since the bonus could have led to the creation or destruction of FA teams.

The coefficients δ_C and δ_S on the interaction terms $P_i * TC_i$ and $P_i * TS_i$ respectively, capture the differential impact of the bonus on FAs that work in a team, relative to those that work alone. The coefficients β_C and β_S estimate the impact of credit and social bonus, respectively, on FAs that work alone, while the sum of the coefficients $\beta_C + \delta_C$ and $\beta_S + \delta_S$ estimate their impact on partnered FAs.

---

[23]This bootstrap procedure provides asymptotic refinement over standard methods of inference for OLS with clustered data, and it provides a more accurate cluster-robust inference even when there is a few number of clusters.

6 Results

6.1 Impact of bonus on NRSP's twin goals

6.1.1 Credit outcomes

Table 3 examines the effects of the credit and social bonus on FA performance related to microcredit outcomes. Columns 1 and 2 present the impact on the two outcomes that were directly incentivized: number of active loans and repayment by the 20th of the month. The number of active loans increased by 24.1, and the repayment improved by 8.4 percentage points for FAs offered the credit bonus (Cr-FAs) compared to control FAs. Both estimates are statistically significant at the 10 percent level (p-values are presented below each coefficient in Table 3). The size of these impacts is large, amounting to a 20 percent increase in active loans and a 12 percent improvement in repayment from the mean performance of control FAs. The impacts of the social bonus on the two trigger variables of the credit bonus are small (9.406 and -0.020), and not different from zero at conventional levels of statistical significance.

Columns 3-5 estimate the impacts of the bonuses on other credit outcomes not directly incentivized: number of new loans, disbursement amount, and repayment by end of the month. In contrast to the impacts on the two trigger variables, Cr-FAs showed no improvements on any of these non-incentivized credit outcomes. In fact, the improved repayment rate at the 20th of the month made little difference to the repayment rates by the end of the month, partly because the end of the month repayment rates were already above 96 percent among control FAs. The impacts on new loans and disbursement amount are also small in magnitude (6.1 and 0.21 percent respectively compared to the means in the control group), and are not statistically significantly different from zero. The difference in performance between Cr-FAs and Soc-FAs is small in size, and not statistically significant at conventional levels for any of the non-incentivized outcomes.

Since the outcomes in Columns 1-5 of Table 3 may be correlated, we follow Kling et al. (2007) to account for the problem of multiple hypothesis testing and construct a summary index that aggregates information over multiple outcomes. The credit index in Table 3, Column 6 is calculated by taking an equally weighted average across all five standardized microcredit outcomes. The impact of credit bonus on this index is positive and large, suggesting that Cr-FAs performed 0.238 standard deviations higher (on the credit index) than control FAs. However, it is not statistically significant at conventional levels. Moreover, this impact is largely due to improvements in the two specific outcomes that were directly incentivized by the credit bonus, rather than a general increase in performance in all credit-related tasks. The impact of the social bonus is virtually zero and thus not statistically significant.

6.1.2 Social outcomes

Table 4 estimates the impact of the bonuses on the objective measures used by NRSP to evaluate the quality of COs and social empowerment. Columns 1-3 report the impacts on the three measures directly incentivized and used as triggers for the social bonus, while Columns 4-6 report the impacts on other social measures not directly incentivized.

We find that Soc-FAs formed 0.225 more new COs per month than control FAs (Column 1). The estimate is statistically significant at the 1 percent level, and amounts to a 58.6 percent increase in CO formation compared to the mean of 0.384 in the control group. It is however almost identical to and also not significantly different from Cr-FAs, who also increased CO formation by 0.284 compared to control FAs. This is not entirely unexpected since CO membership is a prerequisite for applying for microcredit loans.

While Cr-FAs and Soc-FAs increased new CO formation relative to control FAs, the impact of the credit bonus on the rest of CO quality outcomes in Columns 2-6 is negative and large in magnitude among Cr-FAs. Cr-FAs decrease the share of savers in CO meetings by 12.7 percentage points, worsen attendance by 10.5 percentage points, and reduce the share of COs with multiple meetings in a month by 19.4 percentage points relative to control FAs. The estimates are statistically different from zero at the 10 percent level, and amount to 18.2, 13.5, and 46.0 percent decline in savings, attendance, and meetings relative to the mean of controls, respectively. This suggests a large negative effect of the credit bonus on social-related activities.

In contrast, relative to control FAs we find no change in these measures of CO quality among Soc-FAs. The impacts of social bonus on the share of savers among CO members and their attendance in CO meetings, which make up the remaining triggers for the social bonus, are small (-0.03 and -0.027 respectively) and not statistically different from zero at conventional levels. But they are statistically different from those of Cr-FAs (p-values are 0.110 and 0.024, respectively).[24] On savings and attendance outcomes, Soc-FAs outperformed Cr-FAs by 9.7 and 7.8 percentage points, respectively.

We construct a CO quality index similar to the credit index, by taking an equally weighted average of all six standardized measures of CO quality (with mean zero and standard deviation one).[25] The effect of social bonus on the CO quality index in Column 7 is slightly negative (-0.051 standard deviations) but not statistically different from zero. For Cr-FAs, however, this index is large and negative (-0.384 standard deviations), and statistically significantly different from zero at

---

[24]We note that attendance levels among control FAs are high at 78 percent and as a result, Soc-FAs would have qualified for a positive bonus amount conditional on meeting their first trigger targets without any change in attendance.

[25]While calculating the CO quality index, the sign of one of the outcomes, i.e. "Dead COs," is reversed so that for all the outcomes, positive values represent an increase in social empowerment.

the 1 percent level. Cr-FAs also performed worse on the CO quality index as compared to Soc-FAs by 0.333 standard deviations (p-value of this difference is 0.014).

Table 5 examines the effects of the bonuses on subjective measures of CO quality constructed from a survey of CO members. These client-level data provide us with complementary measures of CO quality and more detailed information on the CO and its members' activities that are directly related to community mobilization and social empowerment. Client data were only collected for a subset of COs in 10 of the 35 FUs as part of the baseline for another study. Clients in each of the two treatment and control groups have characteristics that are not significantly different across experimental arms (see Appendix Table D.4).

In Columns 3 and 4 of Table 5, we find that clients of Soc-FAs are more likely to engage in buying and selling agricultural inputs and outputs collectively with others in their village and that they are more likely to turn to their CO leaders for help or advice. The estimated impacts on these two outcomes are large (50.0 and 68.6 percent respectively compared to the control means), and they are statistically significant at the 1 percent level. Additionally, members of COs managed by Soc-FAs increased active participation in CO decisions and are also more likely to discuss non-credit related social issues during CO meetings. While these effects are not statistically significant at conventional levels, the point estimates however are large in magnitude (77.4 and 86.9 percent respectively compared to their means in the control group). In contrast, the estimates of the credit bonus in Columns 1-4 are close to zero and not statistically significant.

The effect of the social bonus on the empowerment index, constructed by taking an equally weighted mean of the four outcomes in Columns 1-4 of Table 5, is positive by 13.1 percentage points and suggests a 72.0 percent improvement compared to the control mean. It is also statistically significant at the 10 percent level. In comparison, the effect of credit bonus on this index is about half in magnitude (6.7 percentage points) and not statistically significantly different from zero. The difference in impact between the social and credit bonus (of 6.4 percentage points) is significant at conventional levels (p-value is 0.128).

Overall, these results suggest that while the credit bonus improved the NRSP's microcredit program, albeit only for outcomes directly incentivized, it also worsened the quality of COs thus undermining NRSP's goal of empowering communities through social mobilization. In comparison, the social bonus increased CO formation without worsening the objective measures of CO quality and without adversely affecting microcredit outcomes. It also improved subjective measures of CO quality and client empowerment: COs managed by Soc-FAs are more cohesive and more likely to work collectively on economic and social activities.

Appendix Figure E.1 plots the bonus effects on FA outcomes (credit and social indices) month-

by-month for the 15-month bonus period. In contrast to Jayaraman et al. (2016) that find a large productivity response immediately following a change in the incentive contract followed by a decline four months after the change, the plots in Appendix Figure E.1 suggest that monthly effects of the bonus were fairly consistent across the 15 months and similar in size.

6.2 Production and cost complementarities

We now compare the results from the randomized experiment with the theoretical predictions derived in Section 3. The model predictions presented in Table 2 show that the bonus impact on the incentivized goal is always positive for all 8 different cases of cost and production complementarities. Our empirical findings validate this: credit bonus improved the microcredit program, and social bonus improved the subjective measures of social empowerment.

On the other hand, the theoretical predictions on the effect of a bonus on the other goal (i.e. the effect of the credit bonus on social outcomes, and of the social bonus on credit outcomes) are sometimes different from zero and not always symmetric; and they vary by the model assumptions about the nature of cost and production complementarities.

In our experiment, we find a negative impact of the credit bonus on social outcomes and the non-negative impact of the social bonus on credit outcomes.[26] This is consistent with only two out of 10 cases (Case 2 in both panels), where task 1 refers to credit-related activities and task 2 refers to social-related activities.

The two cases that match our empirical results have one striking similarity. Case 2 in both panels are identical in their assumptions about the nature of production complementarities, i.e. $\gamma_1 > 0$ and $\gamma_2 \leq 0$. These values of γ_1 and γ_2 imply that a healthy credit portfolio is more easily achieved when FAs work hard on organizing new COs or ensuring that existing COs are cohesive; and that enforcing repayment discipline may discourage borrowers, perhaps those in arrears, from attending CO meetings thus undermining the social goal.[27] In the model, these production spillovers from efforts e_2 and e_1 on outcomes y_1 and y_2 respectively are independent of the complementarities in the disutility cost.

While our results do not help identify whether effort levels on credit and social tasks are compliments or substitutes in the disutility cost of effort, they suggest that production complementarities

---

[26]In Section 6.4 we find that among non-partnered FAs, the effect of social bonus on the credit index is positive and large, and it is statistically significant at the 10 percent level. Non-partnered Soc-FAs performed 0.297 standard deviations higher on the credit index compared to control FAs, and this improvement in performance is almost identical to that of non-partnered Cr-FAs, who also performed 0.277 standard deviations higher on the credit index than control FAs.

[27]In Case 2 of Panel B, in which the two tasks are assumed to be substitutes in FA's disutility cost of effort ($C_{12}'' > 0$), the credit bonus is predicted to affect social goal negatively i.e. $\frac{\partial y_2}{\partial b_1} < 0$ (and the social bonus positively impact credit goal) as long as the term $\gamma_1 > 0$ is not too large.

exist. In particular, the results are not consistent with Case 4.2 that assumes no production complementarities ($\gamma_1 = 0$, $\gamma_2 = 0$). The results are also not consistent with Case 1 of Panel B, which assumes that the production spillovers are positive while the two tasks are substitutes in the disutility cost ($C_{12}'' > 0$). In this case, the negative effect on non-incentivized outcomes can come about if the bonus triggers a large enough reallocation of agents' effort away from the unrewarded tasks to the rewarded tasks. Evaluations of teacher incentive schemes, for example, underscore this idea as performance bonuses can be harmful when they induce teachers to replace effective instruction with significant accounts of teaching to the test (Neal, 2011).

Our findings provide an alternate explanation for a negative impact of a bonus on the non-incentivized outcome. In the context of microfinance, incentivizing front-line staff on repayment may undermine the social empowerment of clients because effort on repayment activities may directly harm social-related outcomes, even if the staff does not shift effort away from social-related activities. This is consistent with the null effects of microfinance programs on empowerment indicators in Banerjee et al. (2015). More generally, our findings suggest that both cost as well as production complementarities are relevant in designing an effective incentive scheme, especially when only a subset of goals can be effectively measured, and thereby incentivized.

6.3 Alternative channels

Next, we explore whether our results can be explained through alternative mechanisms besides production and cost complementarities. For this purpose, we look at three additional explanations: (1) differences in intrinsic motivation between credit and social related tasks; (2) differences in the noisiness of measurement between credit and social outcomes; and (3) differential response by supervisors to credit and social bonus.

6.3.1 Intrinsic motivation

Intrinsic motivation associated with the social mission of an organization often plays an important role in determining the level effort by its workers (see for example Besley and Ghatak, 2005). In a multigoal organization, intrinsic motivation of workers can be associated with tasks related to only a subset of its goals that are perceived by workers as being *pro-social*. For example, Berg et al. (forthcoming) find that introducing a monetary bonus scheme leads agents to improve effort on the *non-social* tasks, while not affecting their intrinsic motivation and their effort related to the *social* tasks. In our case, the credit and social bonuses could differentially affect the intrinsic motivation of FAs, and this depends on whether FAs view credit and social tasks differently in terms of their pro-social value.

We test this by estimating the impact of the two bonus on the intrinsic motivation of FAs in Table 6. In the follow up survey, FAs were asked questions related to their intrinsic motivation. We use these self-reported measures to construct a motivation index, where the larger value on the index implies a higher intrinsic motivation.[28] Based on this index (Column 4), the social bonus decreased intrinsic motivation by 16.7 percentage points (p-value is 0.074). In contrast, the impact of the credit bonuses is close to zero at -0.060 and not statistically significant. More importantly, the impacts of the two bonuses on the motivation index are statistically different from each other (p-value is 0.084).

These results provide evidence that incentivizing effort on the social-related tasks undermined FAs' intrinsic motivation, suggesting that FAs' intrinsic motivation was likely associated with NRSP's social goal of community empowerment. Given this, Case 5 of Panel B in Table 2 indicates that our results cannot be explained by a decline in intrinsic motivation alone. If FAs were intrinsically motivated to perform social tasks (task 2), then a bonus on social tasks (b_2) would not change effort in the credit tasks (task 1) because it is already at a corner ($e_1 = 0$). This contradicts the finding of positive effects of the social bonus on credit outcomes among non-partnered Soc-FAs discussed later in Section 6.4. Intrinsic motivation for social tasks alone is however consistent with a bonus on credit tasks (task 1) worsening the performance on social outcomes as Cr-FAs devote less effort than control FAs to social activities.[29]

6.3.2 Poor measurement

Because workers typically perform several tasks, Holmstrom and Milgrom (1991) argue that if these tasks are measured with different degrees of accuracy, workers may devote more effort to those easily measured to the detriment of others harder to measure. Moreover,if incentivized tasks are hard to measure, the bonus may not be effective in eliciting effort (Baker, 1992; Besley and Ghatak, forthcoming). In our study, social outcomes like CO quality are likely to be measured less accurately or to be less reflective of FA effort, compared to credit outcomes. The relative noisiness of social outcomes imply that the effects of social bonus on both goals are likely to be muted, while the credit bonus will improve credit outcomes and worsen social outcomes if $C''_{12} > 0$. Under this assumption, the impact of the social bonus on the credit outcome cannot be positive, but in the subsample of FAs

---

[28]The surveys include three questions related to intrinsic motivation. First, FAs were asked to list the things that they liked most about working with NRSP. We construct a dummy variable that equals one if the FA chose the ability to help people as what they like most about NRSP. Second, FAs were asked whether they identified with NRSP's mission. Lastly, they were asked whether they found their work with NRSP satisfying and important. We construct a motivation index by taking an equally weighted mean of the three dummy variables. Table 6, Columns 1-3 present the estimated impacts of the bonus on these three measures separately.

[29]Because the two tasks are substitutes ($C''_{12} \geq 0$), higher effort in the credit tasks means lower effort in the social tasks.

who were working alone, we find that the effect of the social bonus on credit outcomes is positive and significant. Therefore, poor measurement (in combination with intrinsic motivation) alone cannot explain the results.

6.3.3 Management effort

Lastly, we examine whether the two incentive schemes had an impact on supervisory effort and management quality. Managers could, for example, increase supervision towards the non-incentivized task for fears that FAs would focus attention on the incentivized task. Our measure of supervisor effort is the absolute difference between the actual performance of FAs during the month of the survey and that reported by the supervisor on two credit outcomes (number of active loans and repayment) and one social outcome (savings) in the supervisor survey.[30] Appendix Table E.3 reports the results. On both credit and social outcomes, the estimated effects of credit and social bonuses are close to zero and not statistically significantly different from zero at conventional levels. Put differently, the introduction of either bonus does not influence the supervisors' ability to correctly report their FA's performance on both incentivized and non-incentivized outcomes.

6.4 Impact of bonus by partnership

Given that NRSP relies on teamwork among FAs and that the impacts of the bonuses may differ depending on whether FAs work alone or in teams, we now examine the differential effects of the bonuses by FA partnership status in the baseline. Table 7, Columns 1 and 2 present the differential impacts on the credit and CO quality indices, respectively. The differential effects on the full sets of credit and social outcomes are presented in Appendix Tables E.1 and E.2.

In Column 1 of Table 7, non-partnered Cr-FAs performed 0.277 standard deviations higher than non-partnered control FAs on the credit index (statistically significant at the 10 percent level). The improvement of credit-related outcomes when credit-related activities are incentivized is perhaps unsurprising and predicted by the model in Section 3. In Column 2, Cr-FAs performed 0.382 standard deviations worse on the CO quality index than control FAs, and this difference is statistically significant at the 1 percent level.

Non-partnered Soc-FAs also performed 0.297 standard deviations higher on the credit index compared to control FAs (Column 1 of Table 7). The estimate is large and statistically significant at the 10 percent level. In Column 2, non-partnered Soc-FAs perform 0.122 standard deviations higher than control FAs on the CO quality index. While this estimate is not statistically significant

---

[30]Out of 162 study-sample FAs, we have supervisor cross-reports for 98 FAs (and for 55 FAs out of 132 FAs who also show up in the verified MPRs sample). We do not find evidence for a differential selection of FAs into the two restricted samples by treatment assignment.

at conventional levels, the results are consistent with a positive impact of the social bonus on both the credit and social goals.

More importantly, while the difference in the credit index between non-partnered Soc-FAs and Cr-FAs is negligible (0.02 standard deviation) and not statistically significant at any conventional levels, non-partnered Soc-FAs outperformed Cr-FAs on the CO quality index, and this difference is statistically significant at the 1 percent level. These effects on non-partnered FAs provide clear evidence for the asymmetric effects of the credit and social bonus on the non-incentivized goal, i.e. the social bonus improves credit outcomes, while the credit bonus harms the social goal.

Partnership, however, has a large and negative effect on Soc-FA, while among Cr-FAs it is mostly benign. Partnered Soc-FAs performed 0.269 standard deviations lower in the credit index and 0.182 standard deviations lower in the CO quality index compared to partnered control FAs (the former is statistically significant at the 12 percent level). The coefficient on the interaction term PxTS on both indices is large and negative (-0.566 and -0.304), and statistically significant at 5 and 10 percent level, respectively. On other other hand, the coefficient on the interaction term PxTC for both the credit and CO quality indices is close to zero, and not statistically significant.

The negative effect of partnership on the performance of Soc-FAs is accompanied by a decline in their propensity to work in teams after the social bonus was introduced. Partnership status of FA can change during the intervention either because FA requests to co-manage a smaller share of COs, work alone or because the supervisors decides to break-up a team or not form new teams.[31] Column 5 of Table 6 reports a decline of 12.5 percentage points in the share of partnered Soc-FAs at the end of the study compared to control FAs. This negative impact of the social bonus on the likelihood of partnership is statistically significant at the 1 percent level, and implies roughly a 20 percent decline in the share of Soc-FAs working in teams relative to the mean in the control group. This effect is also statistically different from Cr-FAs at the 10 percent level. The credit bonus had no impact on the propensity of Cr-FAs to work in teams.

These heterogeneous treatment effects by partnership, and the effect of the bonus on the likelihood of partnership by endline could be explained by free riding among partnered FAs. Since the effort of each FA working in a team is likely unobservable to other team members and social outcomes are less reflective of FA effort, partnered FAs who were offered the social bonus could have experienced a higher degree of free riding relative to partnered Cr-FAs. In addition, this free riding among partnered Soc-FAs could be further exacerbated by the significant decline in intrinsic motivation among Soc-FAs (Table 6, Column 4) already mentioned. Column 3 of Table 7 shows

---

[31]We consider an FA as partnered at the end of the study if the share of COs that are co-managed with other FAs during the treatment months exceeds the pre-treatment median value of co-sharing (73 percent of COs).

that this decline does not vary by partnership (p-value $= 0.522$).[32]

To further explore the link between teamwork and free riding, we construct a measure of free riding in teams based on an incentivized trust game played by FAs in the follow up survey. Upon receiving an amount from another randomly chosen and unknown FA, each FA was asked to send back to the unkown FA some of the money. The average amount received was PKR 58.52. The dependent variable "Shares with a partner" is a dummy that takes value one if the FA sent some amount back to his or her randomly chosen partner, and zero otherwise. In Column 5 of Table 7, we estimate the impact of credit and social bonus on free riding separately for partnered and non-partnered FAs.[33] As expected, among partnered FAs, the social bonus more than doubled the share of FAs who did not send any money back to their partners, suggesting a considerable increase in free riding among partnered Soc-FAs (statistically significant at the 10 percent level). For non-partnered FAs however the social bonus did not have any impact on free riding behavior. The difference in free riding between partnered and non-partnered Soc-FAs is statistically significant at the 5 percent level. Additionally, we do not observe changes in free riding behavior among neither partnered nor non-partnered Cr-FAs.

These results provide evidence of heterogeneous treatment effects by partnership, a decline in teamwork, and an increased propensity to free ride, that accompany a decline in intrinsic motivation of workers who were offered the social bonus. Consistent with studies of motivated agents (Gneezy and Rustichini, 2000), our results also highlight the role of intrinsic motivation for workers in mission-oriented organizations that work in teams, and that such considerations are important when designing incentives.

6.5   Performance assessment by supervisors

Table 8 estimates the impacts of the credit and social bonus on the assessment of FA performance provided by their supervisors. At the end of the study, supervisors of all study FAs were asked to evaluate each FA currently working under them on three specific dimensions: (1) the likelihood of being promoted to Senior FA; (2) perceived improvements in loan disbursement rates since the introduction of the bonus scheme; and (3) perceived improvements in savings by CO members. We use these measures to construct a supervisor assessment score by taking an equally weighted average of the three outcomes. Odd-numbered columns in Table 8 present the average treatment effects of

---

[32]Partnered and non-partnered Soc-FAs alike experienced a statistically significant decline in the motivation index compared to their control counterparts (p-values are 0.094 and 0.134, respectively).

[33]In Column 6 of Table 6, the effects of credit and social bonus on free riding are small in magnitude, and the estimates are not statistically different from zero and from each other at conventional levels.

This is perhaps not surprising, given that the effects on free riding are likely to be concentrated among partnered FAs.

the bonus on the three outcomes and on the assessment score; even numbered columns present the results by partnership status.

In Column 7 supervisors of Soc-FAs increased their assessment by 13.7 percentage points compared to supervisors of control FAs. While the estimate is not statistically different from zero, the magnitude of the effect implies a 46.3 percent increase over the control mean. In comparison, supervisors of Cr-FAs increased their assessment score, on average, by only 5 percentage points compared to the assessment of control FAs, and this effect is also not statistically significant at conventional levels.

Column 8 reports the supervisor's assessment of Column 7 by partnership status. Supervisors increased their assessment of non-partnered Soc-FAs by 35.2 percentage points compared to the assessment of control non-partnered FAs. The estimate is statistically significant (p-value is 0.072). Supervisors also increased their assessment of non-partnered Soc-FAs by 45.2 percentage points relative to partnered Soc-FAs in the same FU. This difference is statistically significant (p-value is 0.072). Partnered and non-partnered Cr-FAs, on the other hand, scored 2.8 percentage points lower and 15.0 percentage points higher than their counterparts in control FUs, respectively. None of these estimates for Cr-FAs are statistically significantly different from zero, and from each other at conventional levels.

These results are consistent and strengthen our previous findings. Table 7 reported that the social bonus improved performance in both credit- and social-related activities of non-partnered FAs, while partnered Soc-FAs performed significantly worse. The assessment of Soc-FAs by their supervisors also reflects these results. On the other hand, the impacts of the credit bonus on the supervisor assessment of Cr-FAs, who improved their performance on microcredit but worsened their social outcomes, are mixed, and do not very different in magnitude nor statistical power from that of FAs in control FUs.

7 Conclusion

In this paper, we provide evidence of the role of cost and production complementarities in an organization with multiple goals.

From a methodological perspective, an assessment of whether cost and production complementarities exist requires researchers to isolate the impact of rewarding one task on the other outcome, that is, $\frac{\partial y_i}{\partial b_j}, i \neq j$ and this is only feasible with an experimental design that incentivizes one task at a time. Comparing the optimal contract that rewards both tasks simultaneously to a fixed wage contract would perhaps yield improvements in both outcomes but would tell us little about existing

complementarities.

Although cost complementarities may exist, e.g. effort on a particular task may increase the cost of exerting effort on another task, we uncover important production complementarities as well. The credit bonus unsurprisingly improves the performance of the microcredit program but worsens CO quality and thus social empowerment. In contrast, at least among staff working alone, the social bonus improves social outcomes and is as effective as the credit bonus at improving credit outcomes. This result cannot obtain with disutility cost complementarities alone.

Given that the social bonus undermined the intrinsic motivation of all employees regardless of whether they worked alone or in teams, and it increased the propensity to free ride among those working in teams, the results suggest that rather than incentivizing both tasks simultaneously, a fixed wage may be optimal. In fact, shortly after the study concluded NRSP stopped collecting the data needed to pay the social bonus.

In this regard, our results highlight the various challenges that organizations with multiple goals face. We take as an example a development organization where an emphasis on sustainability may undermine its overarching development mission. As anti-poverty programs become increasingly multi-faceted by including microcredit, asset transfers, skill training and other interventions and are delivered through a community participation driven approach, the results suggest that the effectiveness of such programs rely not only on how these interventions are designed but also on how the delivery of different services is incentivized.

References

Ashraf, Nava, Oriana Bandiera, and B. Kelsey Jack, "No Margin, No Mission? A Field Experiment on Incentives for Public Service Delivery," *Journal of Public Economics*, 2014, *120*, 1-17.

Aubert, Cécile, Alain de Janvry, and Elisabeth Sadoulet, "Designing Credit Agent Incentives to Prevent Mission Drift in Pro-poor Microfinance Institutions," *Journal of Development Economics*, 2009, *90*, 153-162.

Baker, George P., "Incentive Contracts and Performance Measurement," *Journal of Political Economy*, 1992, *100(3)*, 598-614.

Baicker, Katherine and Mireille Jacobson, "Finders Keepers: Forfeiture Laws, Policing Incentives, and Local Budgets," *Journal of Public Economics*, 2007, *91*, 2113-2136.

Bandiera, Oriana, Iwan Barankay, and Imran Rasul, "Incentives for Managers and Inequality Among Workers: Evidence From a Firm-Level Experiment," *Quarterly Journal of Economics*, 2007, *122(2)*, 729-773.

Bandiera, Oriana, Iwan Barankay, and Imran Rasul, "Social Incentives in the Workplace," *Review of Economic Studies*, 2010, *77(2)*, 417-458.

Bandiera, Oriana, Iwan Barankay, and Imran Rasul, "Team Incentives: Evidence From A Firm Level Experiment," *Journal of the European Economic Association*, 2013, *11(5)*, 1079-1114.

Banerjee, Abhijit, Dean Karlan, and Jonathan Zinman, "Six Randomized Evaluations of Microcredit: Introduction and Further Steps," *American Economic Journal: Applied Economics*, January 2015, *7(1)*, 1-21.

Banerjee, Abhijit, Esther Duflo, Nathanael Goldberg, Dean Karlan, Robert Osei, William Pariente, Jeremy Shapiro, Bram Thuysbaert, and Christopher Udry, "A Multifacted Program Causes Lasting Progress for the Poor: Evidence from Six Countries," *Science*, 2015, *348(6236)*.

Banerjee, Abhijit, Esther Duflo, Rachel Glennerster, and Cynthia Kinnan, "The Miracle of Microfinance? Evidence from a Randomized Evaluation," *American Economic Journal: Applied Economics*, 2015, *7(1)*, 22-53.

Banerjee, Abhijit V., Raghabendra Chattopadhyay, Esther Duflo, Daniel Keniston, and Nina Singh, "Can Institutions be Reformed from Within? Evidence from a Randomized Experiment with the Rajasthan Police," *NBER Working Paper 17912*, 2014.

Bénabou, Roland and Jean Tirole, 'Incentives and prosocial behavior," *American Economic Review*, 2006, *96(5)*, 1652-78.

Berg, Erlend, Maitreesh Ghatak, R Manjula, D Rajasekhar, and Sanchari Roy, 'Motivating Knowledge Agents: Can Incentive Pay Overcome Social Distance?" *Economic Journal*, forthcoming.

Besley, Timothy and Maitreesh Ghatak, "Competition and Incentives with Motivated Agents," *American Economic Review*, 2005, *95 (3)*, 616-636.

Besley, Timothy and Maitreesh Ghatak, 'Profit with Purpose? A Theory of Social Enterprise," *American Economic Journal: Economic Policy*, 2017, *9 (3)*, 19-58.

Besley, Timothy and Maitreesh Ghatak, 'Pro-Social Motivation and Incentives," *Annual Review of Economics*, forthcoming.

Bó, Ernesto Dal, Frederico Finan, and Martin A. Rossi, "Strengthening State Capabilities: The Role of Financial Incentives in the Call to Public Service," *Quarterly Journal of Economics*, 2013, *128 (3)*, 1169-1218.

Bowles, Samuel and Sandra Polanina-Reyes, "Economic Incentives and Social Preferences: Substitutes or Complements?," *Journal of Economic Literature*, 2012, *50(2)*, 368-425.

Cameron, A. Colin, Jonah B. Gelbach, and Douglas L. Miller, "Bootstrap-based Improvements for Inference with Clustered Errors," *Review of Economics and Statistics*, 2008, *90(3)*, 414-427.

Casey, Katherine, Rachel Glennerster, and Edward Miguel, "Reshaping Institutions: Evidence on Aid Impacts Using a Preanalysis Plan," *Quarterly Journal of Economics*, 2012, *127*, 1755-1812.

Carpenter, Jeffrey and Erick Gong, "Motivating Agents: How Much Does the Mission Matter?" *Journal of Labor Economics*, 2016, *34(1)*, 211-326.

Deserranno, Erika, "Financial Incentives as Signals: Experimental Evidence from the Recruitment of Village Promoters in Uganda," *Working Paper*, 2016.

Dewatripont, Mathias, Ian Jewitt, and Jean Tirole, "Multitask Agency Problems: Focus and Taskk Clustering," *European Economic Review*, 2000, *44(4-6)*, 869-877.

Dixit, Avinash, "Incentives and Organizations in the Public Sector: An Interpretative Review," *Journal of Human Resources*, 2002, *37(4)*, 696-727.

Duflo, Esther, Rema Hanna and Stephen P. Ryan, "Incentives Work: Getting Teachers to Come to School," *American Economic Review*, 2012, *102(4)*, 1241-1278.

Khan, Adnan Q., Asim I. Khwaja, Benjamin A. Olken, "Tax Farming Redux: Experimental Evidence on Performance Pay for Tax Collectors," *Quarterly Journal of Economics*, 2015, *131(1)*, 219-271.

Finan, Fred, Ben Olken and Rohini Pande, "The Personnel Economics of the State," in A. Banerjee and E. Duflo (eds.) *Handbook of Field Experiments* Volume II, North Holland, 2017, 467-514.

Frey, Bruno S. and Reto Jegen, "Motivation Crowding Theory," *Journal of Economic Surveys*, 2001, *15(5)*, 589-611.

Friebel, Guido, Matthias Heinz, Miriam Krueger, and Nikolay Zubanov, "Team Incentives and Performance: Evidence from a Retail Chain," *American Economic Review*, 2017, *107(8)*, 2168-2203.

Gibbons, Robert, "Incentives in Organizations," *Journal of Economic Perspectives*, 1998, *12(4)*, 115-132.

Giné, Xavier and Ghazala Mansuri, "Money or Management? A Field Experiment on Constraints to Entrepreneurship in Rural Pakistan," *Working Paper*, 2017.

Gneezy, Uri, Stephan Meier, and Pedro Rey-Biel, "When and Why Incentives (Don't) Work to Modify Behavior," *Journal of Economic Perspectives*, 2011, *25(4)*, 191-209.

Gneezy, Uri and Aldo Rustichini, "Pay enough or don't pay at all," *Quarterly Journal of Economics*, 2000 *115(3)*, 791-810.

Greaney, Brian P., Joseph P. Kaboski, and Eva Van Leemput, "Can Self-Help Groups Realyy Be Self-Help?" *Review of Economic Studies*, 2016, *83*, 1614-1644.

Holmstrom, Bengt and Paul Milgrom, "Multitask Principal-Agent Analyses: Incentive Contracts, Asset Ownership, and Job Design," *Journal of Law, Economics, & Organization*, 1991, *7*, 24-52.

Jayaraman, Rajshri, Debraj Ray, and Francis de Véricourt, "Anatomy of a Contract Change," *American Economic Review*, 2016, *106(2)*, 316-358.

Khanna, Madhulika, Nishtha Kochhar, and Nethra Palaniswamy, "A Retrospective Impact Evaluation of the Tamil Nadu Empowerment and Poverty Alleviation (Pudhu Vaazhvu) Project," *Journal of Development Studies*, 2015, *51 (9)*, 1210-1223.

Kling, Jeffrey, Jeffrey Liebman, and Lawrence Katz, "Experimental Analysis of Neighborhood Effects," *Econometrica*, 2007, *75 (1)*, 83-119.

Lavy, Victor, "Evaluating the Effect of Teachers' Group Performance Incentives on Pupil Achievement," *Journal of Political Economy*, 2002, *110*, 1286-1317.

Lavy, Victor, "Performance Pay and Teachers' Effort, Productivity, and Grading Ethics," *American Economic Review*, 2009, *99*, 1979-2011.

Lazear, Edward P., "Performance Pay and Productivity," *American Economic Review*, 2000, *90(5)*, 1346-1361.

Mansuri, Ghazala and Vijayendra Rao, *Localizing Development: Does Participation Work?*, Policy Research Report, The World Bank: Washington, D.C., 2013.

McKim, Andrew and Matthew Hughart, "Staff Incentive Schemes in Practice: Findings from a Global Survey of Microfinance Institutions," Microfinance Network and CGAP, 2005.

Mullen, Kathleen J., Richard G. Frank, and Meredith B. Rosenthal, "Can You Get What You Pay For? Pay-for-Performance and the Quality of Healthcare Providers," *RAND Journal of Economics*, 2010, *41(1)*, 64-91.

Muralidharan, Karthik and Venkatesh Sundararaman, "Teacher Performance Pay: Experimental Evidence from India," *Journal of Political Economy*, 2011, *119(1)*, 39-77.

Murphy, Kevin J., "Executive Compensation," *Handbook of Labor Economics*, 1999, *3*, 2485-2563.

Neal, Derek, "The Design of Performance Pay in Education," *in Handbook of Economics of Education*, 2011, ed. Eric Hanushek, Steve Machin, and Ludger Woessmann. Amsterdam: Elsevier.

Olken, Benjamin A., Junko Onishi, and Susan Wong, "Should Aid Reward Performance? Evidence from a Field Experiment on Health and Education in Indonesia," *American Economic Journal: Applied Economics*, 2014, *6(4)*, 1-34.

Osterloh, Margit and Bruno S. Frey, "Motivation, Knowledge Transfer, and Organizational Forms," *Organization Science*, 2000, *11 (5)*, 538-550.

Paarsch, Harry J. and Bruce Shearer, "Piece Rates, Fixed Wages, and Incentive Effects: Statistical Evidence from Payroll Records," *International Economic Review*, 2000, *41(1)*, 59-92.

Prendergast, Canice, "The Provision of Incentives in Firms," *Journal of Economic Literature*, 1999, *37(1)*, 7-63.

Rasul, Imran and Daniel Rogger, "Management of Bureaucrats and Public Service Delivery: Evidence from the Nigerian Civil Service," *Economic Journal*, 2016.

Shearer, Bruce, "Fixed Rates, Fixed Wages and Incentives: Evidence from a Field Experiment," *Review of Economic Studies*, 2004, *71*, 513-534.

Wilson, James, *Bureaucracy: What Government Agencies Do and Why They Do It*, 1989, Basic Books, New York, NY.

Table 1: Summary statistics and balance tests

	No bonus (C) (1)	Credit bonus (TC) (2)	Social bonus (TS) (3)	P-values C=TC (4)	C=TS (5)	TC=TS (6)
Demographic characteristics						
Age	27.39	27.53	28.03	0.932	0.628	0.734
Female	0.266	0.250	0.129	0.880	0.118	0.140
Married	0.375	0.361	0.435	0.890	0.572	0.532
Household head	0.125	0.167	0.177	0.588	0.572	0.932
Completed high school	0.562	0.500	0.565	0.566	0.928	0.556
Household consumption *(PKR)*	6531	5875	6874	0.426	0.572	0.192
Housing quality index	0.167	-0.094	0.265	0.162	0.618	0.140
Employment characteristics						
Employed with NRSP *(months)*	26.92	25.97	26.40	0.672	0.882	0.932
NRSP first job	0.547	0.667	0.597	0.138	0.450	0.478
Works from a village branch	0.781	0.889	0.903	0.428	0.362	0.870
Number of COs managed	12.29	16.59	14.62	0.362	0.292	0.686
Share of COs co-managed	0.565	0.494	0.597	0.596	0.846	0.496
Partnered FA[a]	0.500	0.389	0.565	0.488	0.742	0.266
Preferences and motivation						
Wants to work for next two years	0.906	0.889	0.903	0.792	0.982	0.790
Overtime work *(hrs/day)*	1.940	1.748	2.223	0.632	0.396	0.180
Prefers credit bonus	0.594	0.528	0.565	0.618	0.766	0.792
Thinks social-related tasks help credit goal	0.906	0.944	0.952	0.402	0.326	0.884
Did volunteer work before NRSP	0.250	0.194	0.290	0.672	0.690	0.480
Best about NRSP is ability to help others	0.484	0.528	0.565	0.618	0.386	0.766
Monthly performance						
Number of active loans	75.19	99.87	103.3	0.342	0.248	0.906
New disbursement *(PKR)*	61894	100675	92354	0.184	0.142	0.746
Repayment on dues at 20th of month	0.749	0.724	0.703	0.682	0.460	0.790
Repayment on dues at end of month	0.984	0.968	0.994	0.742	0.322	0.452
Number of field units (FUs)	11	9	15	-	-	-
Number of field assistants (FAs)	64	36	62	-	-	-
Number of credit organizations (COs)	1411	1217	1776	-	-	-
FA attrition in followup survey	0.156	0.194	0.210	0.704	0.600	0.934
FA selection into verified MPRs[b]	0.719	0.944	0.823	0.288	0.608	0.244
FA selection into client survey	0.484	0.389	0.194	0.840	0.490	0.414
FA selection into supervisor evaluation	0.422	0.583	0.403	0.520	0.898	0.316
P-value for joint test of significance	-	-	-	0.979	0.998	0.991

Notes: The p-values (in F-tests in Columns 4-6) are calculated using the t-asymptotic wild cluster bootstrap at the field unit level. [a] *Partnered FA* is defined as a dummy variable which equals one if an FA is co-managing more than 73 percent of her/his CO portfolio (median value of co-sharing) with other FAs during the 9 months prior to the bonus announcement. [b] *Verified MPRs* sample includes FAs whose CO meetings were visited by the CrO at least once during the bonus period.

Table 2: Impact of bonus on outcomes

			Bonus on task 1		Bonus on task 2	
			$\frac{\partial y_1}{\partial b_1}$	$\frac{\partial y_2}{\partial b_1}$	$\frac{\partial y_1}{\partial b_2}$	$\frac{\partial y_2}{\partial b_2}$
Panel A:	$C_{12}'' \leq 0$					
	Case 1:	$\gamma_1 > 0$ and $\gamma_2 > 0$	+	+	+	+
	Case 2:	$\gamma_1 > 0$ and $\gamma_2 \leq 0$	+	?	+	+
	Case 3:	$\gamma_1 \leq 0$ and $\gamma_2 > 0$	+	+	?	+
	Case 4.1:	$\gamma_1 < 0$ and $\gamma_2 < 0$	+	-	-	+
	Case 4.2:	$\gamma_1 = 0$ and $\gamma_2 = 0$	+	0	0	+
Panel B:	$C_{12}'' > 0$					
	Case 1:	$\gamma_1 > 0$ and $\gamma_2 > 0$	+	?[a]	?[a]	+
	Case 2:	$\gamma_1 > 0$ and $\gamma_2 \leq 0$	+	?	+	+
	Case 3:	$\gamma_1 \leq 0$ and $\gamma_2 > 0$	+	+	?	+
	Case 4.1:	$\gamma_1 < 0$ and $\gamma_2 < 0$	+	-	-	+
	Case 4.2:	$\gamma_1 = 0$ and $\gamma_2 = 0$	+	0	0	+
	Case 5:	$\gamma_1 = \gamma_2 = 0$ and $m > 0$	+	-	0	+

Notes: A positive (negative) sign indicates that the impact of the bonus on the outcome is positive (negative). A question mark (?) indicates that the impact cannot be signed. [a] indicates that while the impact of the bonus on the outcome cannot be signed, the expressions are the same and thus have the same sign ($\frac{\partial y_2}{\partial b_1} = \frac{\partial y_1}{\partial b_2}$).

Table 3: Impact of bonus on microcredit outcomes

	Bonus triggers					
	Number of active loans	Repayment on dues at 20th of month	New loans	New disburse-ment	Repayment on dues at end of month	Credit index
	(1)	(2)	(3)	(4)	(5)	(6)
Credit bonus (TC)	24.1*	0.084*	0.673	-284.0	0.008	0.238
	0.068	0.072	0.646	1.000	0.530	0.160
Social bonus (TS)	9.406	-0.020	0.616	-444.8	-0.003	0.002
	0.546	0.672	0.732	1.000	0.810	0.926
P-value of F-test:						
TC = TS	0.342	0.020	1.000	1.000	0.332	0.114
Observations	162	162	162	162	162	162
Mean dep. var., control	118.8	0.716	11.00	138347	0.964	-0.163

Notes: All specifications control for region dummies and the pre-treatment value of the dependent variable. **Number of active loans** is the monthly average number of active loans (new and on-going) managed by the FA. **Repayment on dues at 20th of the month** is the monthly average share of installment dues paid in full by the 20th. **New loans** is the monthly average number of new loans issued by the FA. **New disbursement** is the monthly average amount of new loans issued by the FA in Rupees. **Repayment on dues at end of month** is the monthly average share of installment dues that were paid in full by end of the month. **Credit index** is calculated by taking an equally weighted mean across the standard distributions of the five microcredit outcomes in Columns 1-5. Higher value on the credit index implies better performance on microcredit. P-values are reported below the coefficients and are calculated using the t-asymptotic wild cluster bootstrap at the field unit level; *p<0.1, **p<0.05, ***p<0.01.

Table 4: Impact of bonus on CO quality

| | Bonus triggers | | | | | | |
	New COs	Savers per member	Attend-ance	Dead COs	Multiple meetings	Loan rejection rate	CO quality index
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Credit bonus (TC)	0.284	-0.127*	-0.105*	1.020	-0.194*	-0.079	-0.384***
	0.118	0.054	0.062	0.150	0.074	0.212	0.008
Social bonus (TS)	0.225***	-0.030	-0.027	0.056	-0.040	-0.047	-0.051
	0.008	0.460	0.636	0.892	0.738	0.372	0.740
P-value of F-test:							
TC = TS	0.722	0.110	0.024	0.138	0 .158	0.420	0.014
Observations	131	131	131	131	131	131	131
Mean dep. var., control	0.384	0.699	0.777	-2.230	0.422	0.138	0.118

Notes: All specifications control for region dummies. **New COs** is the monthly average number of new COs formed by the FA. **Savers per meeting** is the monthly average share of CO members who saved during CO meetings conducted by the FA. **Attendance** is the monthly average share of CO members present at the CO meetings conducted by the FA. **Dead COs** is the monthly average number of COs managed by the FA without any active borrowers for the entire bonus period. **Multiple meetings** is the monthly average share of COs managed by the FA that had more than one monthly meetings. **Loan rejection rate** is the monthly average share of social appraisals rejected by the FA. **Co quality index** is calculated by taking an equally weighted mean across the standard distributions of the six CO-quality outcomes in Columns 1-6. Higher value on the social index implies better performance on social mobilization. P-values are reported below the coefficients and are calculated using the t-asymptotic wild cluster bootstrap at the field unit level; *p<0.1, **p<0.05, ***p<0.01.

Table 5: Impact of bonus on social empowerment (client-level)

	Active CO participation (1)	Discussions on social issues (2)	Collective action (3)	CO leader advice (4)	Empowerment index (5)
Credit bonus (TC)	0.082	0.086	0.011	0.088	0.067
	0.406	0.494	0.830	0.186	0.260
Social bonus (TS)	0.178	0.146	0.070***	0.131***	0.131*
	0.178	0.510	0.000	0.000	0.072
P-value of F-test:					
TC = TS	0.248	0.604	0.488	0.566	0.128
Observations	1691	1691	1691	1691	1691
Mean dep. var., control	0.230	0.168	0.140	0.191	0.182

Notes: The sample includes CO members from a subset of COs managed by the study-sample FAs, who were interviewed in November 2006 (5 months after the end of the study). All specifications control for region dummies. **Active CO participation** is a dummy variable which equals one if a CO member reported that members in his/her CO expressed their opinions in meetings and participated in CO decisions more since July 2005 (3 months into the bonus period). **Discussions on social issues** is a dummy variable which equals one if a CO member reported that his/her CO discussed noncredit-related social issues like public goods and service provisions more frequently since July 2005. **Collective action** is a dummy variable which equals one if a CO member reported that he/she collectively bought and sold agricultural input and output with others in the village more frequently since July 2005. **CO leader advice** is a dummy variable if a CO member reported that he/she sought advice from CO leaders more frequently since July 2005. **Empowerment index** is calculated by taking an equally weighted mean across the four subjective CO quality variables in Columns 1-4. Higher value on the empowerment index implies higher CO quality. P-values are reported below the coefficients and are calculated using the t-asymptotic wild cluster bootstrap at the field unit level; *p<0.1, **p<0.05, ***p<0.01.

Table 6: Impact of bonus on motivation and teamwork

	Best about NRSP: ability to help (1)	Identify with NRSP mission (2)	Finds work important (3)	Motivation index (4)	Works with a partner (5)	Shares with a partner (6)
Credit bonus (TC)	-0.141	-0.068	0.005	-0.060	0.012	-0.011
	0.222	0.498	0.978	0.354	0.852	0.880
Social bonus (TS)	-0.234**	-0.152	-0.136	-0.167*	-0.125***	-0.012
	0.022	0.226	0.156	0.074	0.004	0.724
P-value of F-test:						
TC = TS	0.390	0.238	0.198	0.084	0.092	0.978
Observations	132	132	132	132	162	132
Mean dep. var., control	0.500	0.426	0.370	0.426	0.716	0.944

Notes: All specifications control for region dummies and the pre-treatment value of the dependent variable (except Columns 4 and 7). **Partnered FA** is a dummy variable which equals one if an FA co-manages more than 73 percent of her/his pre-treatment CO portfolio (median value of co-sharing) with other FAs. **Best about NRSP: ability to help** is a dummy variable which equals one if an FA ranks the ability to help people as the best thing about working in NRSP in the followup survey. **Identify with NRSP mission** is a dummy variable which equals one if an FA reported that he/she identifies with the mission of NRSP. **Finds work important** is a dummy variable which equals one if an FA reported that he/she finds NRSP work to be important and satisfying. **Motivation index** is calculated by taking an equally weighted mean across the three intrinsic motivation variables in Columns 1-3. Higher value on the motivation index implies higher intrinsic motivation. **Works with a partner** is a dummy variable which equals one if an FA co-manages more than 73 percent of his/her post-treatment CO portfolio with other FAs. **Shares with a partner** is a dummy variable which equals one if an FA decides to split the money with another unknown FA, after receiving a fixed amount from the unknown FA in a trust game. P-values are reported below the coefficients and are calculated using the t-asymptotic wild cluster bootstrap at the field unit level; *p<0.1, **p<0.05, ***p<0.01.

Table 7: Differential impact of bonus by partnership

	Credit index	CO quality index	Motivation index	Works with a partner	Shares with a partner
	(1)	(2)	(3)	(4)	(5)
Credit bonus (TC)	0.277*	-0.382***	-0.096	-0.009	0.030
	0.084	0.002	0.360	1.000	0.724
Social bonus (TS)	0.297*	0.122	-0.214*	-0.164	0.078
	0.100	0.330	0.094	0.302	0.114
P x TC	-0.081	0.015	0.059	0.042	-0.071
	0.582	0.954	0.746	0.906	0.660
P x TS	-0.566**	-0.304*	0.075	0.074	-0.170**
	0.012	0.090	0.522	0.784	0.030
Partnered FA (P)	-0.049	-0.113	-0.029	0.514*	0.081
	0.684	0.494	0.812	0.076	0.156
P-value of F-test:					
TC + P x TC	0.306	0.168	0.772	0.798	0.556
TS + P x TS	0.116	0.186	0.134	0.356	0.106
TC = TS	0.928	0.002	0.324	0.246	0.504
TC+PxTC=TS+PxTS	0.034	0.424	0.398	0.292	0.570
Observations	162	131	132	162	132
Mean dep. var., control	-0.163	0.118	0.426	0.716	0.944

Notes: All specifications control for region dummies and the pre-treatment value of the dependent variable (except Column 5). **Partnered FA** is a dummy variable which equals one if an FA co-manages more than 73 percent of her/his pre-treatment CO portfolio (median value of co-sharing) with other FAs. **Credit index** is calculated by taking an equally weighted mean across the standard distributions of the five microcredit outcomes in Table 2, Columns 1-5. Higher value on the credit index implies better performance on microcredit. **CO quality index** is calculated by taking an equally weighted mean across the standard distributions of the six social outcomes in Table 3, Columns 1-6. Higher value on the social index implies better performance on social mobilization. **Motivation index** is calculated by taking an equally weighted mean across the three intrinsic motivation variables in Table 6, Columns 1-3. Higher value on the motivation index implies higher intrinsic motivation. **Works with a partner** is a dummy variable which equals one if an FA co-manages more than 73 percent of his/her post-treatment CO portfolio with other FAs. **Shares with a partner** is a dummy variable which equals one if an FA decides to split the money with another unknown FA, after receiving a fixed amount from the unknown FA in a trust game. P-values are reported below the coefficients and are calculated using the t-asymptotic wild cluster bootstrap at the field unit level; *p<0.1, **p<0.05, ***p<0.01.

Table 8: Impact of bonus on performance assessment

	Promotion		Loan disbursement		CO savings		Assessment score	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Credit bonus (TC)	-0.016	0.070	0.060	0.091	0.105	0.288	0.050	0.150
	0.958	0.706	0.752	0.646	0.670	0.208	0.692	0.392
Social bonus (TS)	0.127	0.373	-0.040	0.180	0.322	0.503**	0.137	0.352*
	0.286	0.124	0.900	0.332	0.124	0.016	0.314	0.072
P x TC	-	-0.134	-	-0.004	-	-0.397	-	-0.178
		0.658		0.934	-	0.316	-	0.538
P x TS	-	-0.522**	-	-0.476	-	-0.358	-	-0.452*
		0.044		0.166	-	0.238	-	0.072
Partnered FA (P)	-	0.070	-	-0.047	-	0.317	-	0.113
		0.660		0.836	-	0.330	-	0.582
P-value of F-test:								
TC + P x TC	-	0.804	-	0.806	–	0.724	-	0.890
TS + P x TS	-	0.394	-	0.400	–	0.628	-	0.638
TC = TS	0.236	0.166	0.642	0.712	0.220	0.296	0.378	0.248
TC+PxTC=TS+PxTS	-	0.540	-	0.234	-	0.418	-	0.628
Observations	73	73	73	73	73	73	73	73
Mean dep. var., control	0.222	0.222	0.444	0.444	0.222	0.222	0.296	0.296

Notes: All specifications control for region dummies. ***Partnered FA*** is a dummy variable which equals one if an FA co-manages more than 73 percent of his/her pre-treatment CO portfolio (median value of co-sharing) with other FAs. ***Promotion*** is a dummy variable which equals one if a supervisor thinks that an FA is likely to get a promotion in the next 2 years. ***Loan disbursement*** is a dummy variable which equals one if a supervisor reports that an FA has improved performance in credit disbursement rate, compared to a year ago. ***CO savings*** is a dummy variable which equals one if a supervisor reports that an FA has improved performance in ensuring COs save regularly, compared to a year ago. ***Assessment score*** is calculated by taking an equally weighted mean across the three assessment outcomes by supervisor in Columns 1-3. Higher value on the evaluation index implies higher score in the supervisor evaluation. P-values are reported below the coefficients and are calculated using the t-asymptotic wild cluster bootstrap at the field unit level; *p<0.1, **p<0.05, ***p<0.01.

A Appendix: Study Design and Bonus Incentive Scheme

Table A.1: Description of the credit and social bonus incentives

Panel A: *Credit bonus*

The first trigger is based on disbursement, measured by the number of active loans managed by the FA in any month. The second trigger is based on whether the repayment on the installment was made in full by the 20th of the month due. The disbursement trigger can be satisfied at two target levels: High (A) or Low (B). If the FA meets at least target B for disbursement, he qualifies for a bonus based on his recovery rate at the 20th in that month.

If FA qualifies on target A, the size of the bonus is:
    20% of base monthly salary if repayment is 100%
    16% of base monthly salary if repayment is 99%
    12% of base monthly salary if repayment is 98%
    8% of base monthly salary if repayment is 97%
    4% of base monthly salary if repayment is 96%
    0 bonus if repayment is 95% or below

If FA qualifies on target B, the size of the bonus is:
    15% of base monthly salary if repayment is 100%
    12% of base monthly salary if repayment is 99%
    9% of base monthly salary if repayment is 98%
    6% of base monthly salary if repayment is 97%
    3% of base monthly salary if repayment is 96%
    0 bonus if repayment is 95% or below

The bonus cannot ever be negative.

Panel B: *Social bonus*

The first trigger is based on two outcomes: the number of new COs formed and the number of savers at CO meetings. High (A) and Low (B) target levels are set for both outcomes, and an FA needs to reach at least target B for both outcomes to satisfy the first trigger. The second trigger is based on the attendance of CO members at CO meetings. If an FA meets at least target B, he qualifies for a bonus based on member attendance at CO meetings.

If the FA qualifies on target A, the size of the bonus is:
    20% of base salary if average attendance is 85% or more (more than 60% in harvest months)
    16% of base salary if average attendance is 80% to 84%(between 56% and 60% in harvest months)
    12% of base salary if average attendance is 75% to 79% (between 50% and 55% in harvest months)
    8% of base salary if average attendance is 70% to 74% (between 46% and 50% in harvest months)
    4% of base salary if average attendance is 65% to 69% (between 40% and 45% in harvest months)
    0 bonus if attendance is below 65% (0 bonus if attendance is below 40%)

If the FA qualifies on target B, the size of the bonus is determined as follows:
    15% of base salary if average attendance is 85% or more (more than 60% in harvest months)
    12% of base salary if average attendance is 80% to 84% (between 56% and 60% in harvest months)
    9% of base salary if average attendance is 75% to 79% (between 50% and 55% in harvest months)
    6% of base salary if average attendance is 70% to 74% (between 46% and 50% in harvest months)
    3% of base salary if average attendance is 65% to 69% (between 40% and 45% in harvest months)
    0 bonus if attendance is below 65% (0 bonus if attendance is below 40%)

The bonus cannot ever be negative.

Notes: The bonus incentives were announced to the FAs in the treatment FUs in Mach 2005. The monthly bonuses were paid for 15 months during the study period, and terminated in June 2006. The average base monthly salary for an FA was PKR 3,000 (USD 50.54).

Table A.2: List of FUs and bonus assignments

	Region	District	Field Unit
Panel A: *No bonus*			
(control group)	Hyderabad	Badin	Matli
	Hyderabad	Badin	Talhar
	Hyderabad	Hyderabad	Hala
	Hyderabad	Mir Pur Khas	Digri
	Hyderabad	Mir Pur Khas	Ghulam Muhammad
	Hyderabad	Thatta	Mirpur Sakro
	Malakand	Malakand	Dargai
	Mianwali	Bhakkar	Bhakkar
	Mianwali	Mianwali	Mianwali (Swans)
	Rawalpindi	Attock	Hasanabdal
	Rawalpindi	Gujar Khan	Gujar Khan
Panel B: *Credit bonus*			
	Hyderabad	Badin	Badin II (Golarchi)
	Hyderabad	Hyderabad	Matiari
	Hyderabad	Mir Pur Khas	Hyderabad
	Malakand	Malakand	Thana
	Malakand	Mardan	Katlang
	Mianwali	Khusab	Quaidabad
	Rawalpindi	Attock	Attock
	Rawalpindi	Jand	Jand
	Rawalpindi	Jand	Pindi Gheb
Panel C: *Social bonus*			
	Hyderabad	Badin	Tando Bago
	Hyderabad	Hyderabad	Tando Allah Yar
	Hyderabad	Hyderabad	Tando M. Khan
	Hyderabad	Thatta	Mirpur Bathoro
	Hyderabad	Thatta	Sajawal
	Malakand	Malakand	Hero Shah
	Malakand	Malakand	Kabal
	Malakand	Mardan	Hatian
	Malakand	Mardan	Takhat Bhai
	Mianwali	Bhakkar	Dulle Wala
	Mianwali	Bhakkar	Mankera
	Mianwali	Khusab	Jauharabad
	Rawalpindi	Attock	Fateh Jang
	Rawalpindi	Gujar Khan	Doltala
	Rawalpindi	Pind Dadan	Pind Dadan Khan

Notes: The study was conducted in 35 Field Units (FUs) of NRSP located in 15 districts and four regions of Pakistan, where NRSP was active in March 2005. The two treatment and control assignments were randomly allocated across these 35 FUs. All FAs working in an FU received the same type of bonus (or control group).

Figure A.1: Monthly payments of credit and social bonus

(a) Qualified for a bonus

(b) Target A

(c) Target B
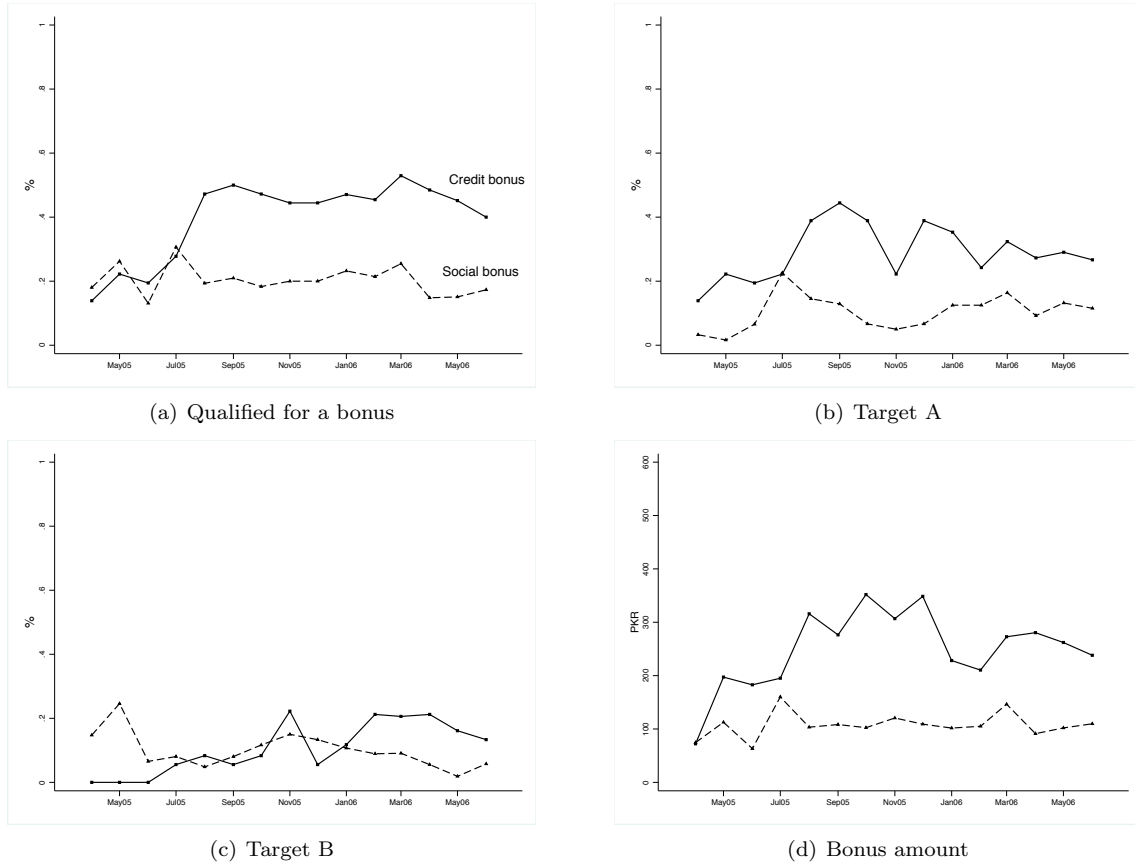
(d) Bonus amount

Notes: During the 15-months bonus period, 26.7 percent of treated FAs qualified for a bonus each month; and 62.9 percent of those qualified on target A. The average bonus amount was PRK 570.30 for target A and PKR 416.70 for target B. Comparing across the two types of bonus, two-fifths of Cr-FAs qualified for a bonus, while only one-fifth of Soc-FAs qualified for a bonus in any given month. Soc-FAs received PKR 124.30 less on monthly bonus payment compared to Cr-FAs, who on average earned PKR 249.30 in bonus each month. Soc-FAs therefore earned 50 percent less in bonus relative to Cr-FAs.

Figure A.2: Timeline of the study

June 04

Jan 05-Feb 05 **Mar 05** **April 05**

June 06

Nov 06

Monthly Bonus Payments

Bonus Announced

Client Survey

Baseline Survey

Followup & Supervisor Surveys

FA-CO Panel and MIS data (25 months)
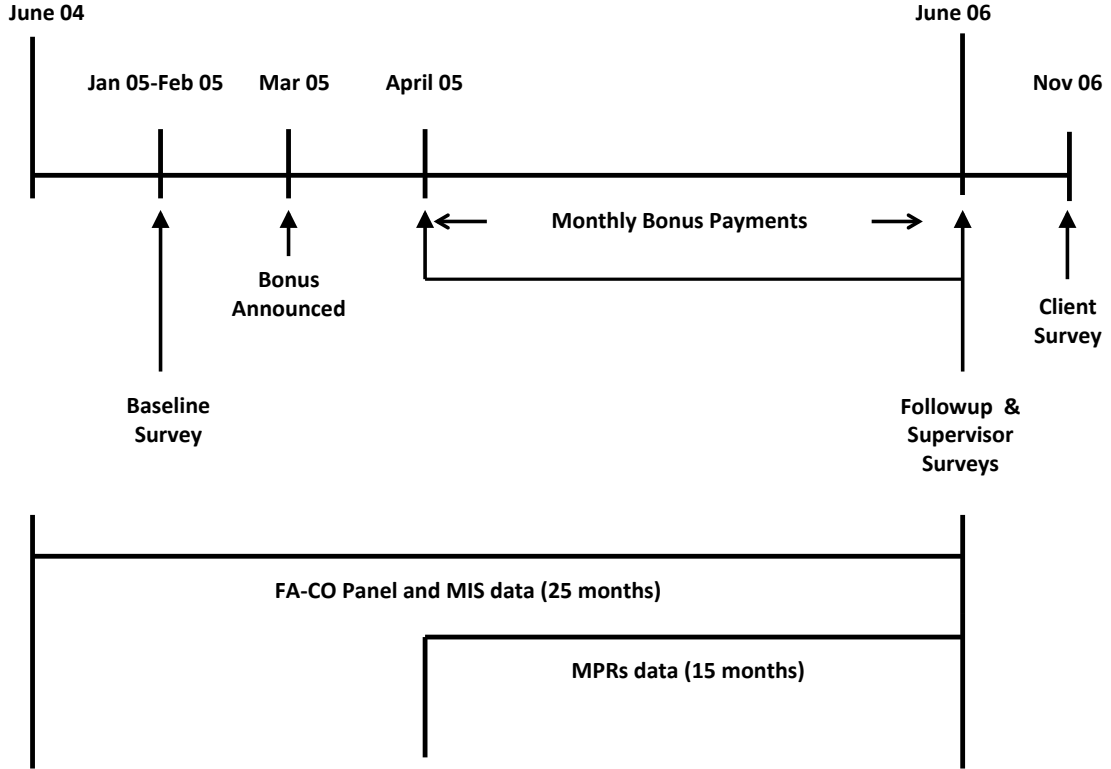
MPRs data (15 months)

B Appendix: Selection into Supervisor Visits

Data on CO-quality outcomes are based on the Monthly Progress Report (MPRs) filed by each FA for all COs visited that month. MPRs data are available for 15 months when the bonus was implemented. These data were verified by a supervisor i.e. a Credit Officer (CrO) through random visits to a subset of scheduled CO meetings. We restrict the analysis to MPRs data verified by supervisors.

According to the FA-CO panel, 4,380 unique COs were managed by FAs in our study sample during the bonus period. Out of them, 1,807 COs (41.26%) were visited by a CrO at least once in 15 months, and 6 months out of 15 on average. We take all the COs that show up in the FA-CO panel for each month (during the bonus period), and estimate the rate of CrO visits across the two treatment and the control groups using the following specification:

$$CrO_{c,t} \ = \ \alpha \ + \ \beta_r + \ \omega_t \ + \gamma \ TC_c \ + \ \lambda \ TS_c \ + \ \epsilon \tag{14}$$

where $CrO_{c,t}$ is an indicator variable that takes the value of one if a CO c was visited by a CrO in month t. β_r and ω_t are region and month dummies, respectively. The coefficients γ and λ estimate the propensity of CrO visits to CO meetings that are managed by credit and social bonus FAs, respectively (compared to CO meetings managed by control FAs).

Appendix Table B.1, Column 1 presents the estimated results, with p-values calculated using the wild cluster bootstrap at the FU level. Among control FAs, 10.5 percent of CO meetings was visited by a CrO. The estimated coefficients γ and λ are both close to zero, 0.039 and -0.000 respectively, and not statistically different from zero and from each other at conventional levels.

While we do not find evidence of a differential rate of CrO visits, we also test for any potential selection of COs visited by the supervisor on CO characteristics. For this purpose, we calculate CO's disbursement and repayment outcomes for each month (during the bonus period) using information from the MIS data, and then estimate the following specification:

$$Y_{c,t} \ = \alpha \ + \ \beta_r + \ \omega_t \ + \ \zeta \ CrO_{c,t} \ + \gamma \ TC_c \ + \ \lambda \ TS_c \ + \ \phi \ CrO_{c,t} * TC_c + \ \psi \ CrO_{c,t} * TS_c + \epsilon \tag{15}$$

where $Y_{c,t}$ is the characteristics of a CO c in month t. The coefficients ϕ and ψ on the interaction terms $CrO_{c,t} * TC_c$ and $CrO_{c,t} * TS_c$ represent the difference in CO characteristics for those that were visited by a CrO compared with those that were not, among COs managed by credit and social bonus FAs, respectively (relative to the same difference among COs managed by control FAs).

Appendix Table B.1, Columns 2-6 report the results on five different CO characteristics: the

Table B.1: Selection on frequency and the quality of CO meetings visited by a CrO

	CrO visit	Number of active loans	New loans	New disburs- ement	Repayment on dues at 20th of mth	Repayment on dues at end of mth	CO charac- teristics index
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Credit bonus (TC)	0.039	0.335	0.005	-400.5	0.041	0.013	0.098
	0.420	0.746	0.976	0.784	0.210	0.276	0.472
Social bonus (TS)	-0.000	0.087	0.013	-448.5	-0.002	0.008	0.022
	1.000	0.900	0.974	0.764	0.950	0.604	(0.914)
CrO visit (CrO)	-	3.625***	0.417***	4997***	0.006	0.015	0.426***
		0.000	0.000	0.000	0.892	0.350	(0.002)
CrO * TC	-	-0.288	-0.018	-448.3	-0.011	-0.015	-0.084
		0.778	0.932	0.848	0.770	0.346	0.528
CrO * TS	-	-1.158*	-0.179	-1656	-0.015	-0.014	-0.190
		0.092	0.194	0.378	0.742	0.400	0.182
p-value of F-test:							
TC = TS	0.388	-	-	-	-	-	-
CrO*TC = CrO*TS	-	0.260	0.138	0.404	0.814	0.952	0.288
Observations	53,127	53,127	53,127	53,127	53,127	53,127	53,127
No. of COs	4,380	4,380	4,380	4,380	4,380	4,380	4,380
R-squared	0.089	0.069	0.013	0.014	0.041	0.048	0.039
Mean dep. var., control	0.105	5.998	0.558	7022	0.832	0.966	-0.0723

Notes: The above regressions control for region and month dummies. P-values are reported below the coefficients and are calculated using the t-asymptotic wild cluster bootstrap at the FU level; *p<0.1, **p<0.05, ***p<0.01.

number of active loans, number of new loans, disbursement, and recovery rates at the 20th and at the end of the month. The estimated coefficient ϕ is close to zero (if anything, negative) and not statistically significantly different from zero at conventional levels for all five outcomes. The estimated coefficient ψ is also negative in sign for these five outcomes, although not statistically significantly different from zero at conventional levels (except for number of active loans, which is statistically significant at the 10 percent level). The two coefficients are also not statistically significantly different from each other at the conventional levels for all five outcomes.

Column 7 presents the results on the CO characteristics index, which is calculated by taking an equally weighted average across the standard distributions of the five measures. The results in Column 7 also suggest no differential selection of CrO visits to CO meetings that are managed by credit and social bonus FAs (compared to control FAs). Both coefficients are not statistically significantly different from zero and from each other at the conventional levels. The negative signs on both coefficients ϕ and ψ suggest a plausibly negative selection (if anything), which would underestimate our main results on social outcomes in Table 4.

C Appendix: Partnership

FAs may co-manage part of their CO portfolio jointly with other FAs. Partnership among FAs is encouraged by NRSP to ensure that services are delivered without interruption when an FA falls sick, leaves NRSP, or gets promoted. Partnership also provides NRSP a useful way to train inexperienced FAs while they are on the job, by partnering them with relatively more experienced FAs. In addition, it allows NRSP to keep check on corruption and fraudulent activities by FAs through peer monitoring.

Appendix Figure C.1 depicts the distribution of FAs based on the percentage of their CO-portfolio that was co-managed with other FAs during the nine months before the bonus was announced. The median pre-treatment level of co-management is 73 percent. We use the median to identify FAs as either partnered or non-partnered in the main analysis. Our results are however robust to using alternate cut-offs for defining partnership. Almost two-fifths of FAs co-manage their entire CO-portfolio with other FAs, while slightly less than one-fourth manage all their COs independently.

Columns 1 and 2 of Appendix Table C.1 present the mean of FA characteristics, preferences, and motivation separately for partnered and non-partnered FAs respectively; column 3 reports the p-values from the F-test of the difference in means between partnered and non-partnered FAs. For all variables including age, gender, and education, partnered FAs do not look any different from non-partnered FAs. Partnered FAs are slightly more experienced than non-partnered FAs (based on number of months of working at NRSP), though the difference is not statistically significant at the conventional level. As indicated by the F-test statistics at the bottom of Column 3, we can not reject equality of means across the full set of variables between partnered and non-partnered FAs.

Non-partnered FAs on average co-manage 17 percent of their CO-portfolio with other FAs, while the average co-management rate is 96 percent among partnered FAs. The average number FAs in a partnership team (excluding the FA) is 1.243.

Appendix Table C.1, Column 4 reports the correlation between FA's and the partner's characteristics (mean characteristics in case of two partners or more) among 81 partnered FAs. FA's gender is highly correlated with his partner's gender (correlation of 0.834), suggesting that most partnership-teams are formed between FAs of the same gender. More interestingly, partners are also positively sorted on their education. The correlation between FA's and his partner's education is 0.309. It is statistically significant at the 10 percent level. Partnered FAs are also positively sorted on experience (based on number of months working at NRSP) and preference for a type of bonus. The correlations are 0.162 and 0.209, but they are not statistically significant at the conventional level. The correlation between FA's and the partner's motivation is close to zero (corr=0.097), and it is also not statistically significantly different from zero.

Overall, we find no difference on FA characteristics between partnered and non-partnered FAs. In the paper, we take the pre-treatment selection into partnership and partnership formation as given.

Table C.1: Characteristics of partnered and non-partnered FAs

	Non-Partnered (NP)	Partnered (P)	p-value NP = P	Corr w/ partner's characteristics[a]
	(1)	(2)	(3)	(4)
Age	28.47	26.86	0.244	-0.122
Female	0.173	0.247	0.240	0.834***
Married	0.407	0.383	0.770	0.224
Household head	0.173	0.136	0.584	0.010
Completed high school	0.531	0.568	0.650	0.309*
Household consumption *(Rs.)*	6431	6602	0.730	0.147
Housing quality index	0.083	0.211	0.462	-0.244
Employed with NRSP *(months)*	27.17	25.85	0.556	0.162
NRSP first job	0.605	0.580	0.756	-0.022
Wants to work for next two years	0.889	0.914	0.724	-0.028
Prefers credit bonus	0.630	0.506	0.084	0.209
Thinks social helps credit	0.938	0.926	0.790	0.253
Did volunteer work before NRSP	0.296	0.210	0.380	0.028
Best about NRSP: ability to help	0.580	0.469	0.226	0.097
Number of field units (FUs)	32	23	-	-
Number of field assistants (FAs)	81	81	-	-
Share of COs co-managed	0.166	0.957	0.000	-
Number of partners	-	1.123	-	-
F-test statistics	-	-	0.696	-
p-value	-	-	0.776	-

Notes: The p-values (in F-tests in Column 3) are calculated using the t-asymptotic wild cluster bootstrap at the field unit level. FAs are categorized as partnered or non-partnered based on whether an FA is co-managing more than 73 percent of his/her CO portfolio (median value of co-sharing) with other FAs during the 9 months prior to the bonus announcement.
[a] For partnered FAs with more than one partners, we take the mean value of characteristics across multiple partners. Starred value indicates a statistically significant correlation between FA's and his partner's characteristics.

D   Appendix: Balance Tests on Restricted Samples

Table D.1: Summary statistics and balance tests (restricted sample, verified MPRs)

	No bonus (C) (1)	Credit bonus (TC) (2)	Social bonus (TS) (3)	C=TC (4)	C=TS (5)	TC=TS (6)
					p-values	
Demographic characteristics						
Age	28.04	27.85	27.82	0.888	0.942	0.982
Female	0.239	0.206	0.098	0.668	0.052	0.152
Married	0.370	0.382	0.431	0.940	0.652	0.746
Household head	0.174	0.176	0.176	0.964	0.930	1.000
Completed high school	0.587	0.500	0.569	0.494	0.812	0.558
Household consumption *(Rs.)*	7038	5927	6651	0.280	0.654	0.402
Housing quality index	0.095	-0.077	0.349	0.402	0.260	0.100
Employment characteristics						
Employed with NRSP *(months)*	26.17	26.15	25.51	0.980	0.704	0.826
NRSP first job	0.521	0.676	0.569	0.096	0.496	0.282
Work from a village branch	0.848	0.882	0.961	0.820	0.394	0.384
Number of COs managed	12.98	17.47	17.08	0.372	0.182	0.892
Share of COs co-managed	0.564	0.510	0.632	0.704	0.670	0.506
Partnered FA[a]	0.522	0.412	0.608	0.560	0.622	0.226
Preferences and motivation						
Wants to work for next two years	0.891	0.882	0.902	0.906	0.900	0.810
Prefers credit bonus	0.565	0.500	0.549	0.600	0.882	0.702
Thinks social-related task helps credit goal	0.957	0.941	0.941	0.738	0.802	0.948
Did volunteer work before NRSP	0.326	0.206	0.333	0.308	0.946	0.346
Best about NRSP is ability to help others	0.413	0.529	0.608	0.432	0.180	0.480
Monthly performance						
Number of active loans	86.51	105.6	122.9	0.528	0.196	0.502
New disbursement *(Rs.)*	65767	105845	107785	0.142	0.026	0.964
Repayment on dues at 20th of month	0.746	0.718	0.668	0.678	0.316	0.576
Repayment on dues at end of month	0.986	0.966	0.993	0.606	0.512	0.518
Number of field units (FUs)	10	9	14	-	-	-
Number of field assistants (FAs)	46	34	51	-	-	-
Number of credit organizations (COs)	764	792	1150	-	-	-
p-value for joint test of significance	-	-	-	0.971	0.983	0.992

Notes: The sample includes 131 out of 162 FAs whose CO meetings were visited by the supervisor at least once during the 15-month bonus period. The p-values (in F-tests in Columns 4-6) are calculated using the wild cluster bootstrap at the field unit level. [a] *Partnered FA* is defined as a dummy variable which equals one if an FA is co-managing more than 73 percent of his/her CO portfolio (median value of co-sharing) with other FAs during the 9 months prior to the bonus announcement.

Table D.2: Summary statistics and balance tests (restricted sample, follow up)

	No bonus (C) (1)	Credit bonus (TC) (2)	Social bonus (TS) (3)	p-values C=TC (4)	C=TS (5)	TC=TS (6)
Demographic characteristics						
Age	27.09	27.24	28.63	0.922	0.310	0.494
Female	0.315	0.310	0.143	1.000	0.116	0.180
Married	0.352	0.345	0.449	0.992	0.352	0.440
Household head	0.130	0.138	0.224	0.896	0.358	0.380
Completed high school	0.593	0.517	0.531	0.550	0.556	0.888
Household consumption *(Rs.)*	6486	6250	6769	0.836	0.602	0.544
Housing quality index	0.121	-0.047	0.300	0.430	0.352	0.144
Employment characteristics						
Employed with NRSP *(months)*	27.33	25.83	28.12	0.586	0.862	0.618
NRSP first job	0.574	0.655	0.592	0.344	0.826	0.426
Works from a village branch	0.796	0.862	0.898	0.654	0.472	0.708
Number of COs managed	12.70	17.66	15.35	0.330	0.344	0.650
Share of COs co-managed	0.587	0.522	0.572	0.616	0.944	0.756
Partnered FA[a]	0.519	0.414	0.531	0.548	1.000	0.500
Preferences and motivation						
Wants to work for next two years	0.889	0.862	0.918	0.678	0.662	0.318
Prefers credit bonus	0.630	0.483	0.551	0.326	0.554	0.680
Thinks social-related task helps credit goal	0.926	0.931	0.959	0.918	0.448	0.588
Did volunteer work before NRSP	0.241	0.207	0.327	0.826	0.446	0.466
Best about NRSP is ability to help others	0.519	0.448	0.531	0.474	0.968	0.536
Monthly performance						
Number of active loans	75.19	99.87	103.3	0.400	0.310	0.926
New disbursement *(Rs.)*	61894	100675	92354	0.132	0.190	0.672
Repayment on dues at 20th of month	0.749	0.724	0.703	0.698	0.718	0.580
Repayment on dues at end of month	0.984	0.968	0.994	0.266	0.324	0.468
Number of field units (FUs)	11	7	15	-	-	-
Number of field assistants (FAs)	54	29	49	-	-	-
p-value for joint test of significance	-	-	-	0.977	0.997	0.992

Notes: The sample includes 132 out of 162 FAs who were interviewed in the followup survey in June 2006. The p-values (in F-tests in Columns 4-6) are calculated using the wild cluster bootstrap at the field unit level. [a]*Partnered FA* is defined as a dummy variable which equals one if an FA is co-managing more than 73 percent of his/her CO portfolio (median value of co-sharing) with other FAs during the 9 months prior to the bonus announcement.

Table D.3: Summary statistics and balance tests (restricted sample, supervisor eval.)

	No bonus (C) (1)	Credit bonus (TC) (2)	Social bonus (TS) (3)	p-values C=TC (4)	p-values C=TS (5)	p-values TC=TS (6)
Demographic characteristics						
Age	27.11	28.43	28.12	0.716	0.636	0.938
Female	0.185	0.238	0.0800	0.632	0.364	0.252
Married	0.333	0.381	0.440	0.836	0.626	0.826
Household head	0.111	0.190	0.280	0.524	0.084	0.502
Completed high school	0.741	0.476	0.440	0.198	0.078	0.818
Household consumption *(Rs.)*	6157	6238	5888	0.894	0.768	0.680
Housing quality index	0.091	0.011	0.546	0.630	0.162	0.104
Employment characteristics						
Employed with NRSP *(months)*	27.07	25.81	25.80	0.744	0.744	0.996
NRSP first job	0.519	0.667	0.600	0.236	0.388	0.514
Works from a village branch	0.926	0.810	0.960	0.366	0.732	0.180
Number of COs managed	11.29	20.24	15.75	0.132	0.316	0.370
Share of COs co-managed	0.589	0.552	0.526	0.878	0.714	0.794
Partnered FA[a]	0.519	0.429	0.480	0.712	0.800	0.776
Preferences and motivation						
Wants to work for next two years	0.852	0.857	0.920	1.000	0.592	0.544
Prefers credit bonus	0.556	0.524	0.480	0.846	0.592	0.764
Thinks social-related task helps credit goal	0.963	0.952	0.920	0.848	0.466	0.616
Did volunteer work before NRSP	0.333	0.286	0.200	0.720	0.264	0.572
Best about NRSP is ability to help others	0.444	0.476	0.520	0.838	0.654	0.722
Monthly performance						
Number of active loans	83.74	118.7	113.7	0.290	0.432	0.722
New disbursement *(Rs.)*	61202	117086	90765	0.022	0.232	0.334
Repayment on dues at 20th of month	0.709	0.705	0.716	0.708	0.758	0.922
Repayment on dues at end of month	0.993	0.948	0.993	0.782	0.982	0.644
Number of field units (FUs)	6	6	13	-	-	-
Number of field assistants (FAs)	27	21	25	-	-	-
p-value for joint test of significance	-	-	-	0.958	0.946	1.000

Notes: The sample includes 73 out of 162 FAs for whom we have their supervisors' evaluation of their performance from the supervisor survey conducted in June 2006. The p-values (in F-tests in Columns 4-6) are calculated using the wild cluster bootstrap at the field unit level. [a]*Partnered FA* is defined as a dummy variable which equals one if an FA is co-managing more than 73 percent of his/her CO portfolio (median value of co-sharing) with other FAs during the 9 months prior to the bonus announcement.

Table D.4: Summary statistics and balance tests (client sample)

	No bonus (C) (1)	Credit bonus (TC) (2)	Social bonus (TS) (3)	p-values C=TC (4)	C=TS (5)	TC=TS (6)
Age	34.33	41.14	36.56	0.268	0.108	0.324
Female	0.120	0.184	0.226	0.140	0.398	0.744
Household head	0.474	0.575	0.506	0.208	0.304	0.276
Years of education	6.150	5.544	6.483	0.516	0.518	0.572
Household size	9.294	7.774	8.309	0.168	0.180	0.548
Number of children	3.084	2.405	2.758	0.456	0.526	0.614
Number of CO members (clients)	758	548	385	-	-	-
Number of field units (FUs)	3	4	4	-	-	-
Number of field assistants (FAs)	31	14	12	-	-	-
Number of credit organizations (COs)	83	71	59	-	-	-
p-value for joint test of significance	-	-	-	0.369	0.553	0.796

Notes: The sample includes 1691 clients of FAs (i.e. CO members) who were interviewed in Nov 2006 (5 months after the end of the study). The p-values (in F-tests in Columns 4-6) are calculated using the wild cluster bootstrap at the field unit level.

E Appendix: Additional Tables and Figures

Table E.1: Differential impact of bonus on microcredit outcomes, by partnership

| | Bonus triggers | | | | | |
| | Number of active loans | Repayment on dues at 20th of month | New loans | New disburse-ment | Repayment on dues at end of month | Credit index |
	(1)	(2)	(3)	(4)	(5)	(6)
Credit bonus (TC)	14.88	0.117**	-0.429	-9801	0.023	0.277*
	0.456	0.014	0.812	0.776	0.194	0.084
Social bonus (TS)	27.26	0.037	3.389	29389	0.020	0.297*
	0.212	0.276	0.154	0.390	0.310	0.100
P x TC	22.76	-0.069	2.729	22211	-0.027	-0.081
	0.392	0.154	0.196	0.384	0.320	0.582
P x TS	-33.18	-0.110***	-5.150*	-55657	-0.045*	-0.566**
	0.252	0.010	0.096	0.178	0.104	0.012
Partnered FA (P)	-18.92	0.031*	-3.214	-40066	0.034	-0.049
	0 .234	0.048	0.124	0.158	0.156	0.684
p-value of F-test:						
TC + P x TC	0.028	0.400	0.294	0.656	0.862	0.306
TS + P x TS	0.882	0.192	0.598	0.570	0.150	0.116
TC = TS	0.660	0.052	0.114	0.168	0.806	0.928
TC+PxTC=TS+PxTS	0.000	0.104	0.020	0.058	0.378	0.034
Observations	162	162	162	162	162	162
Mean dep. var., control	118.8	0.716	11.00	138347	0.964	-0.163

Notes: All specifications control for region dummies and the pre-treatment value of the dependent variable. ***Partnered FA*** is a dummy variable which equals one if an FA co-manages more than 73 percent of his/her pre-treatment CO portfolio (median value of co-sharing) with other FAs. ***New COs*** is the monthly average number of active loans (new and on-going) managed by the FA. ***Repayment on dues at 20th of the month*** is the monthly average share of installment dues paid in full by the 20th. ***New loans*** is the monthly average number of new loans issued by the FA. ***New disbursement*** is the monthly average amount of new loans issued by the FA in Rupees. ***Repayment on dues at end of month*** is the monthly average share of installment dues that were paid in full by end of the month. ***Credit index*** is calculated by taking an equally weighted mean across the standard distributions of the five microcredit outcomes in Columns 1-5. Higher value on the microcredit index implies better performance on microcredit. P-values are reported below the coefficients and are calculated using the t-asymptotic wild cluster bootstrap at the field unit level; *p<0.1, **p<0.05, ***p<0.01.

Table E.2: Differential impact of bonus on social mobilization outcomes, by partnership

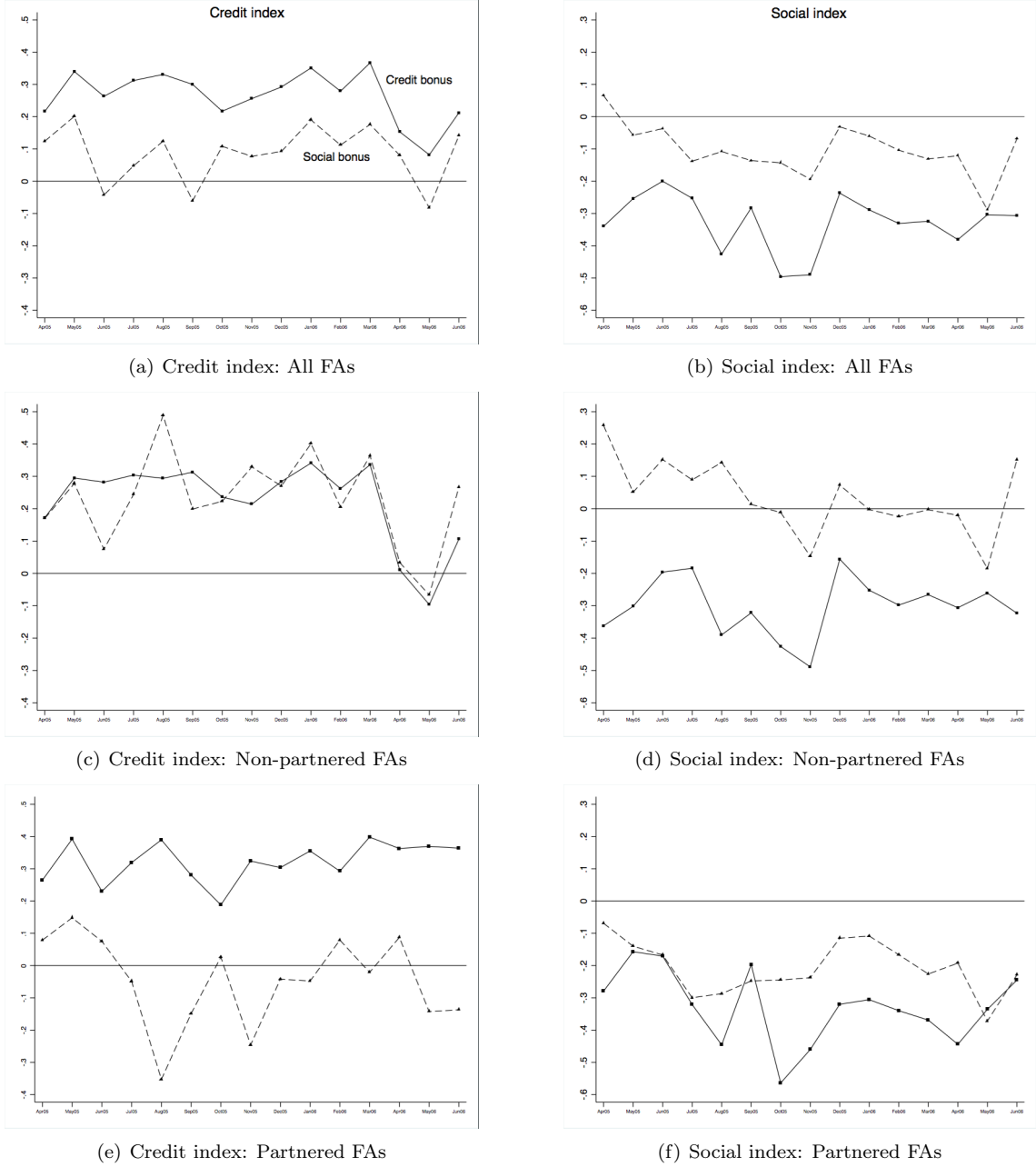|	Bonus triggers			Dead COs	Multiple meetings	Loan rejection rate	Social index
	New COs	Savers per member	Attend-ance				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Credit bonus (TC)	0.181	-0.121**	-0.084**	1.494	-0.168	-0.054	-0.382***
	0.336	0.030	0.020	0.186	0.272	0.424	0.002
Social bonus (TS)	0.430***	-0.059	0.012	-0.326	0.013	-0.024	0.122
	0.010	0.314	0.732	0.588	0.878	0.794	0.330
P x TC	0.264	-0.028	-0.047	-1.30	-0.050	-0.057	0.015
	0.210	0.796	0.552	0.238	0.770	0.384	0.954
P x TS	-0.356**	0.051	-0.068	0.662	-0.096	-0.041	-0.304*
	0.048	0.648	0.388	0.356	0.492	0.498	0.090
Partnered FA (P)	-0.173	-0.080	-0.039	-0.824	0.023	0.004	-0.113
	0.206	0.392	0.578	0.246	0.724	0.964	0.494
p-value of F-test:							
TC + P x TC	0.080	0.180	0.116	0.626	0.082	0.126	0.168
TS + P x TS	0.296	0.900	0.480	0.204	0.478	0.208	0.186
TC = TS	0.184	0.316	0.004	0.040	0.280	0.612	0.002
TC+PxTC=TS+PxTS	0.220	0.182	0.108	0.558	0.308	0.162	0.424
Observations	131	131	131	131	131	131	131
Mean dep. var., control	0.384	0.699	0.777	-2.230	0.422	0.138	0.118

Notes: All specifications control for region dummies. ***Partnered FA*** is a dummy variable which equals one if an FA co-manages more than 73 percent of his/her pre-treatment CO portfolio (median value of co-sharing) with other FAs. ***New COs*** is the monthly average number of new COs formed by the FA. ***Savers per meeting*** is the monthly average share of CO members who saved during CO meetings conducted by the FA. ***Attendance*** is the monthly average share of CO members present at the CO meetings conducted by the FA. ***Dead COs*** is the monthly average number of COs managed by the FA without any active borrowers for the entire bonus period. ***Multiple meetings*** is the monthly average share of COs managed by the FA that had more than one monthly meetings. ***Loan rejection rate*** is the monthly average share of social appraisals rejected by the FA. ***Social index*** is calculated by taking an equally weighted mean across the standard distributions of the six social mobilization outcomes in Columns 1-6. Higher value on the CO-quality index implies better performance on social mobilization. P-values are reported below the coefficients and are calculated using the t-asymptotic wild cluster bootstrap at the field unit level; *p<0.1, **p<0.05, ***p<0.01.

Table E.3: Impact of bonus on supervisory effort

	|Difference| between actual and supervisor-reported FA performance on:		
	Recovery rate	Number of active loans	Attendance
	(1)	(2)	(3)
Credit bonus (TC)	-0.029	12.15	0.021
	0.396	0.588	0.556
Social bonus (TS)	-0.018	10.82	0.037
	0.646	0.788	0.630
p-value of F-test:			
TC = TS	0.658	0.928	0.892
Observations	96	96	55
Mean dep. var., control	0.050	92.64	0.200

Notes: The sample includes 96 FAs and (55 FAs from verified MPRs sample) whose supervisors were interviewed in June 2006. During the interview, the supervisors were asked about each of their FA's performance in the previous month (i.e. May 2006) on two credit outcomes (number of active loans and repayment rates) and one social outcome (attendance of CO members in CO meetings). The dependent variables are constructed by taking the absolute difference between the supervisor's reported performance and the actual performance on an FA in May 2006. All specifications control for region dummies. P-values are reported below the coefficients and are calculated using the t-asymptotic wild cluster bootstrap at the field unit level; *$p<0.1$, **$p<0.05$, ***$p<0.01$.

Figure E.1: Impact of credit and social bonus by month

(a) Credit index: All FAs

(b) Social index: All FAs

(c) Credit index: Non-partnered FAs

(d) Social index: Non-partnered FAs

(e) Credit index: Partnered FAs

(f) Social index: Partnered FAs

Notes: The graphs above plot the estimated impact of credit bonus (solid line) and social bonus (dash line) on credit and social indices by month, for the 15-months bonus period. ATEs of credit and social bonus are estimated by using FA-month level data and by running an OLS regression with the following specification: $Y_{it} = \alpha + \beta_r + \theta_t + \Sigma_{j=11}^{25} \gamma_j TC_{ij} + \Sigma_{j=11}^{25} \sigma_j TS_{ij} + \epsilon$. γ_ts and $\sigma_t s$ for $11 \leq t \leq 25$ are plotted in (a) and (b) for the credit index and social indices (dependent variables) respectively. The effects on the subgroups by partnership are estimated by running an OLS regression with the following specification: $Y_{it} = \alpha + \beta_r + \theta_t + P_i + \Sigma_{j=11}^{25} \gamma_j TC_{ij} + \Sigma_{j=11}^{25} \sigma_j TS_{ij} + \Sigma_{j=11}^{25} \delta_j P_i TC_{ij} + \Sigma_{j=11}^{25} \omega_j P_i TS_{ij} + \epsilon$. γ_ts and σ_ts, which represent the effects on the non-partnered FAs, are presented in (c) and (d); the effects on the partnered FAs given by $\gamma_t + \delta_t$ and $\sigma_t + \omega_t$ are plotted in (e) and (f), for the dependent variables credit and social indices respectively.