# Profits and Mission: Performance Incentives in a Multi-goal Development Organization

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**Abstract**

The impact of performance pay in institutions with multiple goals depends on the degree of complementarity between tasks achieving each goal. Workers of a microcredit-centered development institution were randomly assigned to one of two bonus schemes, incentivizing either the performance of a microcredit program that contributed to its sustainability (credit bonus), or social mobilization, the institution's mission (social bonus). We find that the credit bonus improved credit-related outcomes but it undermined the mission. In contrast, the social bonus advanced the mission without compromising the microcredit program but only for employees working alone, as it impacted negatively the performance of employees working in teams. We conclude that a fixed wage is the optimal contract if the institution cares both about sustainability and its mission.

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# 1 Introduction

While economic theory has long suggested that monetary incentives can motivate agents to fulfill the goals of their principals, in their seminal work, Holmstrom and Milgrom (1991) note that in practice fixed wages are ubiquitous.[1] Because workers typically perform several tasks, Holmstrom and Milgrom (1991) and others 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.

For-profit firms can overcome this multi-task problem through profit-based incentives (Murphy, 1999), but because nonprofit organizations and public bureaucracies typically have missions with multiple objectives (Besley and Ghatak, 2005), these may face additional challenges when trying to incentivize workers. In particular, employees of such institutions often face trade-offs when deciding how to allocate effort because focusing on a task related to advancing a particular goal could affect other institutional goals, even when tasks are measured with a similar degree of accuracy.[2] Despite a growing theoretical literature on worker incentives emphasizing the role of complementarities among tasks (for example, Dixit 2002), there is little empirical evidence suggesting that task complementarities are relevant when designing optimal contracts. In addition, many mission-oriented organizations rely on teamwork among workers, who are motivated by the organization's mission and, therefore, exhibit greater cooperation when working in teams (Osterloh and Frey, 2000). If monetary incentives crowd out this intrinsic motivation, incentives may not only be ineffective, but they may also undermine the willingness of employees to work in teams.[3]

In this paper, we develop a stylized model of worker effort that takes task complementarity and teamwork seriously and derive separate predictions on the impacts of monetary incentives depending on whether employees work alone or in teams. We then provide experimental evidence from a randomized evaluation to learn about the degree of complementarity across tasks in a multi-goal organization and about the optimal contract.

In our model, workers choose effort over two tasks, each related to one of the two goals of a microcredit-centered development institution: the performance of the microcredit portfolio (sustainability) and the social empowerment of its clients (mission). The credit- and social-related tasks are allowed to be either strategic complements, substitutes, or neither in achieving both goals. The model predicts that the impacts of monetary incentives will depend crucially on the assumptions

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

[2] For example, Siwale and Ritchie (2012) provide a case study of two microfinance institutions in Zambia where credit officers had difficulty combining their roles as "loan repayment" agents and "facilitators" of social empowerment. They observe that the majority of them eventually prioritized their tasks related to the microcredit program to the detriment of the social goal.

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

made about task complementarity and teamwork.

The field experiment randomly assigned 162 facilitators (also known as Field Assistants or FAs) working for a prominent development institution in Pakistan called the National Rural Support Program (NRSP), into one of two bonus schemes or to a control group. The social bonus rewarded effort in tasks related to social empowerment, such as working with community leaders to create and strengthen community organizations (COs). The credit bonus, on the other hand, incentivized the health of the microcredit portfolio, which requires bringing new clients and ensuring on time repayment. Prior to the experiment, NRSP had been expanding the microcredit program and transferring most FAs from its main branches to village branches. While working directly from the main branches, FAs had been offered a fixed salary. NRSP was concerned that the transfer of FAs to village branches would weaken the ability to monitor the staff and was interested in testing the introduction of a pay for performance incentive for FAs. In order to minimize disruptions due to FA turnover, after the transfer NRSP relied more on teams of typically two FAs per village branch.

In this context, the field experiment and the predictions of the model, taken together, allow us to answer three questions that are central to designing optimal contracts for workers in multi-goal organizations: (1) In a context where direct worker supervision is not possible, can monetary incentives be used to improve worker performance? (2) Can incentives create trade-offs across the organization's goals? What is the role of strategic complementarities or substitution between tasks in determining the optimal contract? (3) Does working in teams affect the impact of monetary incentives and if so, under what conditions?

We find that the impact of the two bonuses matches the predictions of the model when the two tasks are complements in achieving the credit goal, and substitutes in achieving the social empowerment goal. Put differently, effort in the social-related task does not harm the performance of the microcredit program but focusing only on credit-related tasks makes it harder to achieve the mission.

In particular, the credit bonus improved NRSP's microcredit program but only for outcomes directly incentivized by the bonus. Moreover, by encouraging effort on the credit-related tasks, the credit bonus worsened the quality of COs thus undermining NRSP's mission of empowering communities through CO mobilization. In contrast, the social bonus significantly increased new CO formation, and did so without worsening microcredit outcomes or CO quality. In fact, among FAs working individually, the social bonus was as effective as the credit bonus at improving credit outcomes.

The social bonus, however, had a negative impact on FAs working in teams. The model provides some insights on why the performance of FAs working in teams may suffer under the social bonus.

Following Osterloh and Frey (2000) among others, the model assumes that rewarding effort in the social-related task undermines the intrinsic motivation of FAs and may exacerbate free-riding, regardless of task complementarity or teamwork. Our results suggest that FAs who were offered the social bonus experienced a significant decline in intrinsic motivation. Among FAs working in teams, this decline 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.

Our results contribute to several strands of the literature. Evaluations of microcredit programs have typically found little by way of transformative impacts on empowerment or other social-related outcomes (Banerjee et al. (2015), among others). Several studies have also 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). Our results offers a possible explanation for both findings. We show that incentive structures that reward staff only on the performance of the credit portfolio tend to undermine social-related goals. They also increase focus on the tasks that are tracked for the payment of incentives to the detriment of other tasks, such as building new self-help or community groups or outreach to the poor. These incentive structures that focus only on the loan portfolio may be in place as a response to the pressure that microfinance institutions face to become financially self-sustainable.

Our results also contribute to the literature on the use of performance-based incentives to improve the delivery of public goods and services in both developing and developed countries (Lavy, 2002, 2009; Muralidharan and Sundararaman, 2011; Duflo et al., 2012; Bó et al., 2013; Olken et al., 2014; Imberman and Lovenheim, 2015). 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 (Banerjee et al., 2015). These programs often use a community participation approach, which relies on active and empowered communities.[4] Our results suggest that a careful assessment of task complementarities will be critical for understanding the success or failure of such programs.

Finally, our results relate to the broader literature on the role of performance pay in organizations in general (Lazear, 2000; Paarsch and Shearer, 2000; Shearer, 2004). Studies that contemporaneously vary worker's incentive structure within a single firm are rare (with the exception of Bandiera et al. (2007, 2013)). We extend this literature by studying optimal employment contracts in mission-oriented organizations that not only face multi-task problems (Besley and Ghatak, 2005), but may also employ intrinsically motivated workers (Osterloh and Frey, 2000; Bowles and Polanina-Reyes,

[4]In the last 10 years, the World Bank alone has invested USD 85 billion in such participatory community driven development projects, with mixed results in improving a range of socio-economic outcomes and strengthening political institutions (Casey et al., 2012; Mansuri and Rao, 2013; Khanna et al., 2015).

2012) and require teamwork (Bandiera et al., 2010, 2013).

The rest of the paper proceeds as follows. Section 2 describes NRSP's organizational goals and its overall mission, and outlines the experiment design. Section 3 presents the model of worker effort choice in an organization with multiple objectives. 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 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.

NRSP's mission is to reduce poverty by empowering communities and investing in their livelihoods through microcredit. The social mobilization efforts revolve around creating and managing local groups known as Community Organizations (COs). Each CO typically comprises of 15 individuals, who live close to each other in the same village. Depending on the local norms, CO members may be of the same or mixed gender. CO members meet regularly to save, to attend skill training programs and to identify and work on local development issues through the co-financing and co-management of infrastructure projects.

NRSP also provides microfinance services to two-thirds of CO members, usually with single or monthly installment loans with a maturity of six to 12 months for the purchase of agricultural inputs, livestock, and investments in household enterprises.[5] CO meetings serve as the main conduit for the disbursement and repayment of loans. NRSP views microcredit and its social mobilization efforts as the main instruments to improve the livelihoods of communities where it operates.

NRSP's activities are carried out by Field Assistants (FAs), the institution's front line staff that engage directly with local communities and CO members on a daily basis. FAs have a wide range of responsibilities across NRSP's twin goals. Among social-related activities, FAs facilitate the formation and strengthening of COs, which includes attending CO meetings, ensuring that COs maintain adequate records of meetings, attendance and savings, and the gathering of requests for skill training by CO members. Among credit-related activities, they screen loan applications and assess the creditworthiness of potential borrowers typically at the applicant's home, and are charged

[5]While on paper all loans are backed by joint liability at the CO level, in practice new loans are routinely issued even if some CO members have overdue amounts. Each borrower is in addition required to find two guarantors, who can be members of the same CO. FAs use guarantors to exert pressure on the defaulting borrower rather than to enforce repayment from them. 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.

with ensuring timely loan repayment during CO meetings and visits to the home of delinquent borrowers.

NRSP's dual focus on social mobilization and microcredit is reflected in its branch management structure. In each branch or Field Unit (FU), a Credit Officer (CrO) is in charge of the microcredit program, while a Social Organizer (SO) oversees the social mobilization activities. FAs report to the CrO for all issues related to microcredit and to the SO for issues related to social mobilization.

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 amongst 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 due that month. Teamwork among FAs is encouraged by NRSP management to ensure continuity in case the FA falls sick, leaves NRSP, or gets promoted. Teamwork also allows NRSP to pair newly hired FAs with relatively more experienced ones. A detailed description on team formation is provided in Section 4 and in Appendix D.

Until recently, all FAs had been working directly from the FU with the direct supervision of both the CrO and SO earning a fixed salary. At the time of the study, NRSP had transfered most FAs from their FUs to village branches in an effort to move FAs be closer to the field. FAs continued to work alone or, increasingly, in teams, but this decentralization meant that direct supervision by the CrO and SO was no longer possible. Since the management was concerned that a fixed salary might no longer be optimal, NRSP was willing to explore other ways of remunerating the staff.

## 2.1 Bonus intervention

The effectiveness of monetary incentives on NRSP's twin goals depends on whether the credit- and social-related tasks are strategic complements, substitutes or neither. For example, if enforcing strict repayment discourages borrowers, especially those in arrears, from attending and participating in CO meetings, then FA effort in credit-related task might improve credit outcomes while undermining the social mobilization goal. On the other hand, focusing on tasks related to social mobilization could benefit or harm credit outcomes depending on whether social-related activities improve or worsen credit outcomes.

In this context, we worked with NRSP to design and implement two types of pay-for-performance incentives for FAs to test the potential trade-offs (or complementarities) between its more immediate goal of financial sustainability through a sound microcredit program and its mission of social and economic empowerment of its clients.

The study was conducted in all 35 Field Units (FUs) located in 15 districts across Sindh, Punjab and Khyber Pakhtunkhwa provinces, where NRSP was active in March 2005. This provided us

with a sample of 162 FAs (in 35 FUs), who were working with NRSP at the time. These FAs were randomly divided into three groups (two treatment groups, and one control group). To ensure that all FAs under a given CrO-SO management team are provided with the same bonus scheme, the randomization was done at the FU-level. FAs that were already working from a village branch were also assigned to the treatment of the relevant FU. At the time of the study, 85 percent of FAs were working from a village branch. FAs in the treatment group received one of two bonus schemes. The credit bonus incentivized performance on credit-related targets: disbursement and loan recovery. The social bonus incentivized performance on observable correlates of CO quality: new CO formation, regular CO meeting, and saving 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 if the first trigger was achieved. 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 in credit treatment FUs qualified for a bonus, while one-fifth of FAs in social treatment FUs qualified for a bonus. Appendix Table B.1 describes the triggers and provides more details about the bonuses. Appendix Figure B.1 presents the monthly frequency and the amount of bonus payments made during the study period.

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.[6] For these reasons, we assigned more branches to the social bonus and control group compared to the number of FUs in the credit bonus. Appendix Table B.2 reports the list of FUs in the study and their bonus assignments, and the timeline of the study is presented in Appendix Figure B.2.

While NRSP management had been setting monthly targets on several credit and social empowerment outcomes before the 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. The intervention rewarded these targets and did not change career concerns or anything else about the program. Treatment FAs that had met their monthly target received the incentive as a bonus pay added to their base monthly salary. 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.[7]

[6] In addition, social mobilization outcomes like savings and attendance are less costly for CO members to renege on compared to defaulting on loans.

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

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. 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.

# 3 A Model of Staff Incentives

In this section we outline a simple model of worker effort with two key features of multi-goal development organizations like NRSP: the potential complementarities across tasks in achieving each organizational goal and worker motivation.

Consider an employee of a microcredit-centered development organization, who decides whether to expend effort $e_c$ in a credit-related task, such as nudging borrowers to repay on time; and effort $e_s$ in a social-related task, such as organizing new COs or fostering cohesion among CO members during meetings. For simplicity, we assume that effort in the credit-related task takes on two values, $e_c = \{0, 1\}$, so that effort is either exerted or not. Effort in the social-related task takes on three values $e_s = \{0, \underline{e}, \overline{e}\}$, where $0 < \underline{e} < \overline{e}$.

The employee can work alone or in a team of two where the other team member's level of effort is unobserved. In both cases, the employee earns a salary

$W$ and suffers a disutility of effort.

The organization has two goals: sustainability through the performance of the credit portfolio $y_c$ and the empowerment of its clients $y_s$. Each goal can take on two values:

$$y_i = \begin{cases} \overline{y}_i & \text{with probability } \pi_i(e_c, e_s), \\ \underline{y}_i & \text{otherwise} \end{cases}$$

for $i = c, s$. The high value $\overline{y}_i$ denotes that goal $i$ has been achieved. The probability of achieving the target for each goal $\pi_i(e_c, e_s), i = c, s$ and the different ways in which effort levels $e_c$ and $e_s$ affect this probability is central to the way we introduce task complementarity and will be discussed in the next subsection.

We introduce a bonus scheme similar to that of the field experiment described in Section 2. An employee offered a credit (social) bonus earns an amount $b$ in addition to the base salary $w$ if the credit (social) goal is achieved, that is, if $y_c = \overline{y}_c$ (or $y_s = \overline{y}_s$). If the employee works in a team, each

team member earns the bonus if the joint output achieves the goal. More formally, the institution offers a wage contract to an FA working alone such that $W = w + b\mathbb{1}(y_i = \overline{y}_i)$, $i = c, s$ where $b$ is the bonus pay and $\mathbb{1}(\cdot)$ is an indicator function.

### 3.1 Task complementarity

The impact of incentives on employee effort and thus on achieving the twin goals depends on how each effort level $e_c$ and $e_s$ affects the probability of achieving each goal. Effort in the credit-related task $e_c$ (social-related task $e_s$) might not only increase the probability of success of the credit-related goal $y_c$ (social-related goal $y_s$) but it could also affect, positively or negatively, the probability of achieving the social-related goal $y_s$ (credit-related goal $y_c$). Put differently, credit and social-related tasks may be strategic complements $C$, substitutes $S$ or neither $N$.

Table 1 reports the assumed probability of success $\pi_i(e_c, e_s), i = c, s$ under each of these cases. In Panel A, we assign values $\{0, \underline{\pi}_c, \overline{\pi}_c, 1\}$ to the probability $\pi_c$ of achieving the credit goal as follows. When both tasks are neither complements nor substitutes in achieving credit goal ($N$), $\pi_c$ does not vary with $e_s$ for any given $e_c$. In contrast, when both tasks are substitutes in achieving the credit goal ($S$), $\pi_c$ decreases with $e_s$ holding $e_c$ constant, while $\pi_c$ increases with $e_s$ when both tasks are complements ($C$). For example, when the social-related task does not affect the credit goal ($N$), if no credit-related effort is exerted ($e_c = 0$), the probability of achieving the credit goal is $\pi_c = \underline{\pi}_c$, regardless of the social-related effort $e_s$. When credit-related effort is exerted, then $\pi_c(1, \cdot) = \overline{\pi}_c$ for every level of $e_s$, where $\overline{\pi}_c > \underline{\pi}_c$.

In Panel B, we assign values to the probability of achieving the social goal $\pi_s = \{0, \underline{\pi}_s, \overline{\pi}_s\}$ that reflect the relationship between $e_c$ and $\pi_s$, while holding $e_s$ constant, under the three cases of task complementarity described above. For example, when the credit-related task does not affect the social goal (that is, when both tasks are neither complements or substitutes in achieving social goal ($N$), we assume that $\pi_s(\cdot, 0) = 0$, $\pi_s(\cdot, \underline{e}) = \underline{\pi}_s$ and $\pi_s(\cdot, \overline{e}) = \overline{\pi}_s$, where $\overline{\pi}_s > \underline{\pi}_s > 0$, for any values of $e_c$.

Also implicit in Table 1 is the assumption that effort levels are nosier in the probability of success of the social goal $\pi_s(e_c, e_s)$ than in the credit goal $\pi_c(e_c, e_s)$. The credit goal is achieved with certainty when effort in the social-related task is either lowest ($e_s = 0$) in scenario $S$ or highest ($e_s = \overline{e}$) in scenario $C$. In contrast, the social goal can only be at best achieved probabilistically even when the highest level of effort is expended.

### 3.2 Worker motivation

Workers' intrinsic motivation, particularly related to expending effort on social task, is captured by their disutility function $\psi(e_c, e_s)$, which is defined as:

$$0 = \psi(0,0) = \psi(0,\underline{e}) < \psi(1,0) = \psi(1,\underline{e}) < \psi(0,\overline{e}) < \psi(1,\overline{e}).$$

We assume that the employee is sufficiently motivated so that the medium level of effort in the social-related task ($e_s = \underline{e}$) can be expended at no cost $\psi(0,\underline{e}) = 0$. In addition, expending effort in the credit-related task is easier than exerting the highest level of effort in the social-related task as $\psi(1,0) < \psi(0,\overline{e})$.

Following Frey and Oberholzer-Gee (1997) among others, we assume that monetary incentives used to elicit effort in the *social-related* task undermine the employee's intrinsic motivation.[8] Therefore, the employee faces a larger cost of effort $\Psi(e_c, e_s)$ when offered the social bonus. This new disutility of effort satisfies

$$0 = \Psi(0,0) < \psi(1,0) = \Psi(1,0) < \Psi(0,\underline{e}) < \Psi(1,\underline{e}) < \Psi(0,\overline{e}) < \Psi(1,\overline{e}).$$

In particular, the cost of expending effort $e_s = \underline{e}$ is no longer zero. In fact, it is costlier to expend effort $e_s = \underline{e}$ than to expend effort on credit-related task $e_c = 1$.

### 3.3 Worker optimization problem

The utility function of an employee is given by $U = E(W) - \psi$. When no bonus is offered, the employee (either working alone or in teams) earns a fixed salary $W = w$ that does not depend on the level of effort. The employee therefore solves

$$\max_{e_c, e_s} w - \psi(e_c, e_s),$$

or equivalently, he or she seeks to minimize the cost of effort.

An employee working alone that is offered a credit bonus faces an expected wage of $E(W) = w + bE\left(\mathbb{1}(y_c = \overline{y}_c)\right) = w + b\pi_s(e_c, e_s)$ and so he or she solves

$$\max_{e_c, e_s} w + \pi_c(e_c, e_s)b - \psi(e_c, e_s).$$

[8] This assumption is justified by the analysis reported in Table 7, columns 1-4 which provide evidence of a significant decline in intrinsic motivation among FAs assigned to the social bonus. See section 5.3 for more details.

When the employee works in a team, and because each team member's effort level is unobservable, the optimal choice of effort is made simultaneously and non-cooperatively. The optimal choice of effort is found by solving the Nash equilibrium of a 6x6 game as each player chooses the credit and social-related effort levels $e_c$ and $e_s$, respectively, among all possible combinations. Equivalently, since the equilibrium is always symmetric, we can solve for each of the three 2x2 subgames involving credit-related effort $e_c$ holding social-related effort $e_s$ constant, to then find the level of social-related effort $e_s$ that yields the largest payoff amongst the equilibria in each of the three 2x2 subgames.

Similarly, an employee offered a social bonus working alone solves

$$\max_{e_c,e_s} w + \pi_s(e_c, e_s)b - \Psi(e_c, e_s).$$

where $\Psi(e_c, e_s)$ is the new disutility of effort. Employees working in teams solve a similar 6x6 game to the one described above.

We now solve for the optimal effort levels under each bonus scheme and task complementarity case. Given that there are 3 cases of task complementarity for each of the two goals, there are a total of 9 cases to consider. For the generic Case $ij$, $i, j = N, S, C$, index $i$ indicates how the social-related task affects the credit goal while index $j$ indicates how the credit-related task affects the social goal.

In order to make progress in solving for the optimal effort levels, we make the following assumptions that describe the relationship between the disutility of effort and the expected benefit from achieving the goals:

A1. $b(\overline{\pi}_c - \underline{\pi}_c) > \psi(1, \underline{e}) > b\overline{\pi}_c(\overline{\pi}_c - \underline{\pi}_c)$.

A2. $\psi(0, \overline{e}) - \psi(1, \underline{e}) > b(1 - \overline{\pi}_c)$

A3. $\psi(0, \overline{e}) > b(1 - \underline{\pi}_c^2)$

A4. $\Psi(1, \overline{e}) - \psi(1, 0) > b(\overline{\pi}_s - \underline{\pi}_s) > \Psi(0, \overline{e}) > b\overline{\pi}_s(\overline{\pi}_s - \underline{\pi}_s)$.

A5. $b\underline{\pi}_s^2 > \psi(1, 0)$

We describe in detail the optimal effort choices under each bonus scheme (and the benchmark of no bonus) for Case $NN$, which we consider the benchmark case as tasks are neither strategic complements nor substitutes in achieving both goals, and Case $CS$ where both tasks are strategic complements in achieving the credit goal $y_c$ but strategic substitutes in achieving the social goal $y_s$.

***Case NN:*** In this case, effort in the credit-related task $e_c$ does not affect the social goal $y_s$ and effort in the social-related task $e_s$ does not affect the credit goal $y_c$. Tasks are therefore neither strategic complements nor substitutes.

As described earlier, with no bonus the employee seeks to minimize the cost of effort, irrespective of whether he or she works alone or in a team. Since the employee is intrinsically motivated, he will only expend effort in the social-related task. The optimal effort choices are $e_c = 0$ and $e_s = \underline{e}$.

An employee working alone who is offered a credit bonus assesses the different payoffs under all effort level combinations $(e_c, e_s)$ to solve:

$$w \ + \max\{ \ \underline{\pi}_c b, \ \underline{\pi}_c b - \psi(0, \overline{e}), \ \overline{\pi}_c b - \psi(1, \underline{e}), \ \overline{\pi}_c b - \psi(1, \overline{e})\}.$$

The optimal effort choices are $e_c = 1$ and $e_s = \underline{e}$ by Assumption A1. In words, the credit bonus is sufficient to induce greater effort in the credit-related task.

When the employee works in a team, the optimal choice of credit-related effort $e_c$ is found by solving the three 2x2 subgames as described earlier. Panel A of Table 2 presents the 2x2 subgame for the social-related effort at its optimal level $e_s = \underline{e}$, ignoring the base wage $w$.[9] Since Assumption A1 holds, the dominant strategy in the subgame of Table 2 is to expend no effort in the credit-related task ($e_c = 0$) because free-riding in the team undermines the expected benefit from the bonus. Each team member will therefore exert $e_c = 0$ and $e_s = \underline{e}$.

An employee working alone who is offered a social bonus solves:

$$w \ + \max \ \{0, \ \underline{\pi}_s b - \Psi(0, \underline{e}), \ \underline{\pi}_s b - \Psi(1, \underline{e}), \ \overline{\pi}_s b - \Psi(0, \overline{e}), \ \overline{\pi}_s b - \Psi(1, \overline{e})\}.$$

The optimal effort choices are $e_c = 0$ and $e_s = \overline{e}$ by Assumption A4. In words, the expected monetary incentive from the social bonus is large enough to induce increased effort in the social-related task. When the employee works in a team, the optimal effort choices are $e_c = 0$ and $e_s = 0$. This is because exerting credit-related effort $e_c = 1$ is costly and it does not increase the probability of achieving the social goal, hence $e_c = 0$. Given this, $e_s = 0$ is the dominant strategy in the 3x3 subgame where $e_c = 0$ because Assumption A4 holds. When the social bonus is offered, expending social-related effort $e_s = \underline{e}$ is no longer zero, and consequently, the optimal effort choice $e_s$ for an employee working in a team falls due to free riding. In sum, the social bonus increases the employee's propensity to free-ride due to the decline in intrinsic motivation.

***Case CS:*** In this case, effort in the social-related task $e_s$ has a positive effect on the credit goal $y_c$ but effort in the credit-related task $e_c$ has a deleterious effect on the social goal $y_s$. Thus, both tasks are strategic complements in achieving the credit-related goal but strategic substitutes in

[9]The social-related effort $e_s = \underline{e}$ is optimal because the probability of achieving the credit-related goal does not depend on the social-related effort and exerting $e_s = \overline{e}$ is costlier than exerting $e_s = \underline{e}$. In addition, the employee is indifferent between exerting $e_s = 0$ and $e_s = \underline{e}$ since both are costless but the probability of achieving the social-related goal is higher under effort $e_s = \underline{e}$.

achieving the social-related goal. For example, a healthy credit portfolio will be more easily achieved if the employee works hard organizing new COs or ensuring that existing COs are cohesive ($e_s = \overline{e}$). In contrast, enforcing repayment discipline ($e_c = 1$) might discourage borrowers, especially those in arrears, from attending CO meetings, thereby making the social goal harder to achieve.

Similar to the Case $NN$, the employee's optimal effort choices are $e_c = 0$ and $e_s = \underline{e}$ when no bonus is offered. An employee working alone who is offered a credit bonus solves:

$$w \ + \max \{0, \ -\psi(1,0), \underline{\pi}_c b, \ \overline{\pi}_c b - \psi(1,\underline{e}), \ b - \psi(0,\overline{e}), \ b - \psi(1,\overline{e})\}.$$

The optimal effort choices are $e_c = 1$ and $e_s = \underline{e}$ (by assumptions A1 and A2). When the employee works in a team, the optimal choice of credit-related effort $e_c$ is found by solving the 2x2 subgames for effort levels $e_s = \underline{e}$ and $e_s = \overline{e}$.[10] The subgame for $e_s = \underline{e}$ was presented in Panel A of Table 2, while that for $e_s = \overline{e}$ is in Panel B, ignoring again the base wage $w$ as part of the payoff.

It is clear that if the social-related effort is $e_s = \overline{e}$, the dominant strategy is $e_c = 0$ to minimize the disutility of effort. Employee earnings in the equilibrium when $e_s = \underline{e}$ are $W = w + \underline{\pi}_c^2 b$ in Panel A of Table 2 and $W = b - \psi(0,\overline{e})$ when $e_s = \overline{e}$ in Panel B. Since $\psi(0,\overline{e}) > b(1 - \underline{\pi}_c^2)$ by Assumption A3, effort level $e_s = \underline{e}$ yields higher earnings. Therefore, the optimal effort choices when a credit bonus is offered to an employee working in a team are $e_c = 0$ and $e_s = \underline{e}$.

An employee working alone who is offered a social bonus solves

$$w \ + \max \{\underline{\pi}_s b, \ -\psi(1,0), \ \underline{\pi}_s b - \Psi(0,\underline{e}), \ \underline{\pi}_s b - \Psi(1,\underline{e}), \ \overline{\pi}_s b - \Psi(0,\overline{e}), \ \overline{\pi}_s b - \Psi(1,\overline{e})\}.$$

Similar to the Case $NN$, the optimal effort choices are $e_c = 0$ and $e_s = \overline{e}$ by Assumption A4. When the employee works in a team, the optimal effort choices are again $e_c = 0$ and $e_s = 0$. Exerting credit-related effort $e_c = 1$ is costly, and because both tasks are strategic substitutes, it reduces the probability of achieving the social goal, hence $e_c = 0$. The 3x3 subgame when $e_c = 0$ has the same payoffs as in Case $NN$ and so by Assumption A4, $e_s = 0$.

### 3.4 Predictions

While the optimal effort choices are the same for cases $NN$ and $CS$, the expected value of the credit $y_c$ and social $y_s$ goals are different because the probabilities of achieving each goal are different. Table 3 provides the predictions for how the credit and social bonuses affect the credit and social

[10] Social-related effort level $e_s = 0$ cannot be optimal because $e_s = \underline{e}$ yields a higher probability of achieving the credit goal because both tasks are strategic complements, and $e_s = \underline{e}$ can be exerted without incurring a cost ($\psi(0,0) = \psi(0,\underline{e}) = 0$).

goals under all nine cases, separately for workers working alone (Panel A) and in teams (Panel B).[11] The row labeled "Credit (Social) - No Bonus" refers to the impacts of offering a credit (social) bonus, relative to offering the base compensation only, while the row labeled "Credit - Social" refers to the impacts of offering a credit bonus, relative to offering a social bonus. A positive (negative) sign indicates that the difference in the expected value of a given goal between the experimental arms is positive (negative). A zero indicates that the expected value of the goal is the same in both experimental arms.

Two important patterns emerge in Table 3. First, each bonus affects the two goals differently depending on the assumptions about tasks complementarity. For example, the model often predicts that the introduction of a bonus leads to improvements in, say, goal 1 but to declines in goal 2 when both tasks are assumed to be substitutes in goal 2. Second, the impact of the bonus varies by whether the employee is working alone or in a team.

For cases $NN$ and $CS$, the model predicts that those assigned to the credit bonus will outperform control FAs in achieving the credit goal among employees working alone under both cases, but they will underperform in achieving the social goal in Case $CS$ and they will not do any better than control FAs in Case $NN$. Workers assigned to the social bonus will also outperform control FAs in achieving the credit goal in Case $CS$ and they will not undermine the credit goal in Case $NN$; whereas, they will outperform control FAs in achieving the social goal in both cases. When employees work in teams, however, assignment to the social bonus may lead to worse credit outcomes in Case $CS$ as they no longer put effort in the social-related task, while in Case $NN$ it leads to no improvements in either goal.

In Section 5 we compare the actual impacts of the bonuses introduced in the field experiment with these predictions to identify whether the tasks are strategic complements or substitutes in achieving NRSP goals and ultimately determine the optimal contract for FAs.

# 4 Data

Data used in the 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

[11] Panel A of Appendix Table A.1 reports the expected values of each goal for cases $NN$ and $CS$ under the status quo of no bonus (control) and the two bonuses introduced in the field experiment. Panel B reports the difference in expected values between the pairwise comparisons of Table 3. For example, the difference in expected value of the credit goal $y_c$ achieved by employees working alone offered the credit bonus compared to those in the control group ("Credit- No Bonus") is $(\overline{\pi}_c - \underline{\pi}_c)(\overline{y}_c - \underline{y}_c) > 0$, hence positive. For this reason, in Table 3 there is a positive sign.

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 identify the monthly portfolio of COs for each FA during the bonus intervention period (15 months), and for 10 months before the bonus began.

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%) were managed by the 162 FAs who were working for NRSP at the time of the study.[12] 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 on average, with a repayment or disbursement in 14 out of the 25 months that the study lasted.

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.[13] Such visits were conducted in 15.4 percent of CO meetings held during the bonus period. To allay concerns about data manipulation, we rely only on the verified MPRs data rather than the self-reported data.[14]

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.[15]

[12]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 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.

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

[14]We do not find any evidence of differential monitoring by CrOs across experimental arms. Similarly, COs of comparable quality were visited by CrOs across experimental arms, where CO quality was based on CO-level disbursements and repayments. A detailed discussion and analysis of CO selection is presented in Appendix C and Appendix Table C.1.

[15]FAs were informed in March 2005 that bonus would start in April. FA's performance in March is likely to be affected by this announcement. Results are however robust to including the month of March in the analysis.

Columns 1, 2 and 3 of Table 4 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 F-test statistic and associated P-value at the bottom of columns 4-6, we again cannot reject that all covariates are not jointly different from zero in a regression where the dependent variable is "being a control FA" in columns 4 and 5 and "being a Cr-FA" in Column 6.

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. Ninety percent of FAs report that social mobilization helps achieve good repayment. During the baseline interview, each FA was asked to rank what they liked most about working with NRSP. Roughly half of the FAs reported that the ability to help people is what they liked most. One-fifth of them had done also 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 4), 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 the restricted sample is again not statistically different across control FAs, Cr-FAs, and Soc-FAs (see bottom of Table 4).

Appendix tables E.1 and E.2 present means of baseline variables in the control and the two bonus groups, and their differences for the follow up and verified MPRS restricted samples, respectively. Four out of 63 differences in means in Appendix Table E.1 are statistically significant at the 10 percent level, which would be expected if occurring by chance. In Appendix Table E.2, none of the differences are statistically significant at the 10 percent conventional level. In both 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 each experimental arm.

### 4.1 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 D.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 as "partnered" FAs in the analysis.[16]

Columns 1 and 2 of Appendix Table D.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 F-test (reported at the bottom of Column 3) also reject the joint equality of means across the two groups.

Column 4 presents the correlation between the FA's and his partner's characteristics. Partnerships are mainly formed between FAs of the same gender and the same level of education (correlation coefficients are 0.834 and 0.309 respectively). In the main analysis, we take partnerships that were formed prior to the bonus as given. In Table 4, we do not find statistically significant differences in the propensity to work in teams (prior to the bonus) between control FAs, Cr-FAs, and Soc-FAs. A more detailed discussion on partnership is provided in Appendix D.

## 5 Empirical Strategy

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

$$Y_{i,1} \;=\; \alpha \;+\; \beta_r \;+\; \theta\, Y_{i,0} \;+\; \gamma_C\, TC_i \;+\; \gamma_S\, TS_i \;+\; \epsilon \tag{1}$$

where $Y_{i,1}$ is the post-treatment outcome of interest for FA $i$, $\beta_r$ 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,

[16] 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.

and zero otherwise, and $\epsilon$ 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 statistical inference using the t-asymptotic wild cluster bootstrap at the FU level as described in Cameron et al. (2008).

The coefficients of interest in the regression are $\gamma_C$ and $\gamma_S$, 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 for partnered and non-partnered FAs. The differential effect of bonus by FA's baseline partnership is estimated using the following specification:

$$Y_{i,1} = \alpha + \beta_r + \theta\, Y_{i,0} + \eta\, P_i + \gamma_C\, TC_i + \gamma_S\, TS_i + \delta_C\, P_i * TC_i + \delta_S\, P_i * TS_i + \epsilon, \quad (2)$$

where $P_i$ is an indicator variable that takes the value of one if FA $i$ was partnered with another FA at the time the bonuses were announced.

The coefficients $\delta_C$ and $\delta_S$ on the interaction terms $P_i * TC_i$ and $P_i * TS_i$ respectively reveal the extent to which the impact of credit bonus and social bonus varies according to whether an FA works alone or in a team. The coefficients $\gamma_C$ and $\gamma_S$ estimate the impact of credit and social bonus, respectively, on non-partnered FAs. The sums of the coefficients $\gamma_C+\delta_C$ and $\gamma_S+\delta_S$ estimate their impacts on partnered FAs.

# 6 Results

We examine the effects of the credit and social bonus on NRSP's two goals in Tables 5 and 6. Panel A reports the average treatment effects of the bonus; and in Panel B, we estimate the impacts separately for partnered and non-partnered FAs. We first discuss the ATE results. Then, we use the differential results from Panel B to compare how the estimated impacts on partnered and non-partnered FAs match the predictions of the model under different assumptions of tasks complementarity in Table 3. In doing so, we identify whether the credit and social-related tasks are strategic complements or substitutes (or neither) in achieving NRSP's two goals.

## 6.1 Average treatment effects

Table 5 examines the effects of the credit and social bonus on microcredit outcomes. Columns 1 and 2 present the impact on the two outcomes that triggered a payment of the credit bonus: number of active loans and repayment by the 20th of the month. The number of active loans increased by 24.1, and repayment improved by 8.4 percentage points for Cr-FAs (FAs offered the credit bonus) compared to control FAs. Both estimates are statistically significant at the 10 percent level. 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. Cr-FAs also performed statistically significantly better than Soc-FAs (FAs offered the social bonus) on repayment. 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 repayment rates at 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 performance of Cr-FAs is also not statistically significantly different from that of Soc-FAs on these non-incentivized outcomes.

Since the outcomes in columns 1-5 of Table 5 may be correlated, we follow Kling et al. (2007) to account for the problem of multiple inference and construct a summary index that aggregates information over multiple outcomes. The credit index in Table 5, Column 6 is calculated by taking an equally weighted average across the standard distributions of all five microcredit outcomes. The impact of the 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. But 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 social bonus is close to zero (0.002 standard deviations) and not statistically significant.

Table 6 estimates the impact of the two bonuses on various outcomes of CO quality, our measure of client empowerment. Columns 1-3 report the impacts on the three measures used as triggers for the social bonus, while columns 4-6 report the impacts on other CO quality measures not directly incentivized.

We find that Soc-FAs formed 0.225 more new COs each month than control FAs (Column 1). The estimate is statistically significant at the 5 percent level, and amounts to a 58.6 percent increase in CO formation compared to the mean in the control group (0.384). 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. The effect of the credit bonus on CO formation is statistically significant only at the 15 percent level.

While both Cr-FAs and Soc-FAs increase new CO formation relative to control FAs, the impact of the credit bonus on the rest of CO quality outcomes considered in columns 2-6 is negative and large in magnitude. 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 a 18.2, 13.5, and 46.0 percent decline in savings, attendance, and meetings, respectively. This suggests a large negative effect of the credit bonus on the Cr-FAs' performance in social-related tasks.

In contrast, we find no change in these measures of CO quality among Soc-FAs. The impact of the 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, is small (-0.03 and -0.027, respectively) and not statistically different from zero at conventional levels. But it is statistically different from those of Cr-FAs (at the 15 and 5 percent levels). It is worth noting that attendance levels among control FAs was quite high (close to 80 percent). In fact, Soc-FAs would have qualified for a positive bonus amount conditional on meeting their first trigger targets without any change in attendance. For non-incentivized social outcomes in columns 4-6, the performance of Soc-FAs is not significantly different from those of control FAs.

We construct a CO quality index similar to the credit index, by taking an equally weighted average of all six measures of CO quality standardized with mean zero and standard deviation one.[17] 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. On the other hand, the impact of credit bonus on this index is large and negative, and statistically significantly different from zero at the 1 percent level. The difference between Cr-FAs and Soc-FAs on the CO quality index is also significant at the 5 percent level.

Overall, these results suggest that while the credit bonus improved the NRSP's microcredit program, only directly incentivized outcomes improved. At the same time, the quality of COs worsened thus undermining the organization's mission. In comparison, the social bonus had relatively more muted impacts on CO quality as well as on microcredit outcomes. It increased new CO formation without worsening CO quality and more importantly, without adversely affecting microcredit outcomes.

[17] 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.

## 6.2 Complementarity between tasks

We now compare the results to the predictions of the model in Table 3. The predictions make clear that the impacts of the bonuses differ depending on whether FAs work alone or in teams. For this reason, we focus on the differential impacts of the bonuses by FA partnership. The results are reported in Panel B of Tables 5 and 6.

### 6.2.1 Bonus impacts on non-partnered FAs

For non-partnered Cr-FAs, the effects on the two credit trigger outcomes in Table 5 are large and positive, and the effect on the repayment at 20th of the month is also statistically significant at the 5 percent level. Non-partnered Cr-FAs perform 0.277 standard deviations higher than non-partnered control FAs on the credit index of Column 6 (statistically significant at the 10 percent level).

In Table 6, the impacts of the credit bonus on savings and attendance are negative and large in magnitudes. These estimates are statistically significant at the 10 percent level. Moreover, Cr-FAs performed 0.382 standard deviation worse on the CO quality index than control FAs. This difference is statistically significant at the 1 percent level. Based on Table 3, the positive and significant impact of the credit bonus on credit outcomes but its negative and significant impact on social outcomes is consistent with cases $NS$ and $CS$, and inconsistent with the rest of the cases that predict either a positive or zero impact on the credit goal and a positive or zero impact on the social goal.

According to Table 5, non-partnered Soc-FAs also perform 0.297 standard deviations higher on the credit index compared to control FAs. The estimate is large but not statistically significant at the 10 percent level. It is however statistically significant at the 15 percent level. In Table 6, non-partnered Soc-FAs perform 0.122 standard deviations higher than control FAs on the CO quality index. While the estimate is not statistically significant at conventional levels, the results are consistent with cases $NC$ and $CS$, which predict a positive impact of the social bonus on both the credit and social goals. More importantly, the difference in the credit index between the non-partnered Soc-FAs and Cr-FAs is negligible (0.02 standard deviation), and not statistically significant at any conventional levels, but non-partnered Soc-FAs outperformed Cr-FAs on the CO quality index, and this difference is statistically significant at the 1 percent level. These results on both the credit and social goals are only consistent with cases $CS$ and $SC$.

In sum, all of the estimates but one are consistent with the predictions of the model for Case $CS$ for non-partnered FAs. In contrast, the results strongly contradict the rest of cases for which at least 3 out of 6 predictions are wrong.

### 6.2.2 Bonus impacts on partnered FAs

According to Table 5, partnered Soc-FAs performed extremely poorly on all microcredit outcomes. On the credit index, they performed 0.269 standard deviations lower compared to partnered control FAs. The effect is statistically significant at the 10 percent level. They also performed statistically significantly worse than partnered Cr-FAs in the credit index at the 10 percent level. These results on credit goals are consistent with three cases: $CS$, $CC$ and $CN$.

On both the credit and CO quality indexes, the differences between partnered Cr-FAs and control FAs are not statistically significant at conventional levels. The zero impact of the credit bonus among partnered FAs on both the credit and social goals is consistent with all nine cases.

On the CO quality index in Table 6, partnered Soc-FAs underperformed compared to control FAs by 0.182 standard deviations. The estimate is however not statistically different from zero at conventional levels. Partnered Soc-FAs outperform Cr-FAs on the CO quality index but this difference is also not statistically significant. These null results on social goals are consistent with five cases $NN, NS, CS, SN$ and $SS$. The results are inconsistent with the remaining cases $CC$ and $SC$ that predict a positive impact on social goals among Soc-FAs (relative to control), and case $CN$, which predicts a larger negative impact for Soc-FAs relative to Cr-FAs. Therefore, among partnered FAs, the estimated impacts of the credit and social bonuses on NRSP's two goals match with all the predictions of the model for only one case: $CS$.

Overall, the results from both the partnered and non-partnered FAs are consistent with only one of the nine cases, i.e. the Case $CS$. This suggests that credit- and social-related tasks are strategic complements in improving NRSP's microcredit program, but both tasks are strategic substitutes in advancing its community empowerment goals. In other words, effort on improving CO quality through social mobilization has a positive impact on microcredit performance, while effort on credit-related tasks undermines the mission of social mobilization. As a result, the optimal contract may be one that does not involve a pay for performance incentive ($b = 0$ in the model).

## 6.3 Intrinsic motivation and teamwork

With these results in hand, we turn to the final question of the impact of the bonuses on intrinsic motivation and teamwork. The model in Section 3 provides some insight as the social bonus undermines the intrinsic motivation of FAs, regardless of tasks complementarity.

We construct three measures of intrinsic motivation from the baseline and follow up surveys. These are presented in columns 1-3 of Table 7. In Column 1, FAs were asked to list the things that they liked most about working with NRSP. The measure is an indicator variable that takes the value

1 if the FA chose the ability to help people.

We find that in the follow up survey, Soc-FAs are 23.4 percentage points less likely than control FAs to choose this option, and the difference is statistically significant at the 5 percent level. In comparison, the decline in intrinsic motivation for Cr-FAs is small (almost half that for Soc-FAs in magnitude), and is not statistically significant at conventional levels.

In the follow-up survey, FAs were also asked whether they identified with NRSP's mission and whether they found their work with NRSP satisfying and important. The impact of the bonuses on these two alternate measures is presented in columns 2 and 3. Soc-FAs are 15.2 and 13.6 percentage points less likely to report being intrinsically motivated compared to control FAs on these two measures, respectively. The estimates are not statistically significant at conventional levels, however, though they are large in magnitude and indicate a 35-percent decline in intrinsic motivation, compared to the control means. In contrast, the impact on Cr-FAs is negligible.

In Column 4, we construct a motivation index by taking an equally weighted mean of the three measures in columns 1-3. Based on this index, the social bonus decreased intrinsic motivation by 16.7 percentage points (statistically significant at the 10 percent level). In contrast, the impact of the credit bonus was close to zero (-0.060) and significantly different from the social bonus at the 10 percent significance level.

These results provide suggestive evidence that incentivizing effort related to the social task undermined intrinsic motivation. This finding is consistent with the model, as all Soc-FAs appear to have a decline in motivation, regardless of whether they work alone or in a team. In Panel B, Column 4, both partnered and non-partnered Soc-FAs experienced a statistically significant decline in the motivation index (at the 10 and 15 percent levels respectively); and this effect was not different by partnership (P-value = 0.534).

We next examine the FA's propensity to work in a team after bonuses were introduced and find that the share of partnered Soc-FAs declined by 12.5 percentage points compared to control FAs. This negative impact of the social bonus on 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 (compared 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.

In Column 6, we construct a measure of free riding in teams based on an incentivized dictator game played by FAs in the follow up survey. Each FA was asked to split the winnings received from another randomly chosen and unknown FA with this sending FA. The average winning from this game was PKR 58.52. The dependent variable "Shares with a partner" is an indicator that takes value 1 if an FA shared a positive amount of the total winning with his partner, and zero otherwise.

The effects of the credit and social bonus on free riding are small in magnitude, and the estimates are not statistically different from zero nor 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. In Panel B, Column 6 we estimate the impact of the credit and social bonus on free riding for partnered and non-partnered FAs, separately. Among partnered FAs, the social bonus more than doubled the share of FAs who did not split the winnings with their partners in the dictator game, suggesting a considerable increase in free riding among partnered Soc-FAs (statistically significant at the 10 percent level). For non-partnered FAs, in contrast, the impact of the social bonus on free-riding behavior was close to zero and not statistically significant at the 10 percent level. This difference in free riding between partnered and non-partnered Soc-FAs is statistically significant at the 5 percent level. We do not observe changes in free riding behavior among Cr-FAs whether partnered or not.

In sum, and consistent with the assumptions of the model, we find that the social bonus undermined intrinsic motivation and exacerbated free-riding among partnered FAs, causing a decline in both the propensity to work in a team and the quality of teamwork.

# 7 Conclusion

In this paper, we provide evidence of the role of complementarities across tasks in a multi-goal development organization. NRSP, a nonprofit organization in Pakistan implemented two pay for performance incentives, each focusing either on the performance of a microcredit program run by the organization or on the mission of social and economic empowerment of its clients.

We find that the credit bonus improved NRSP's microcredit program but only for outcomes directly incentivized by the bonus. Moreover, by encouraging effort on the credit-related tasks, the credit bonus undermined the mission by worsening CO quality and thus empowerment. In contrast, the social bonus significantly advanced the mission without worsening the quality of the microcredit program. In fact, among staff working alone, the social bonus was as effective as the credit bonus at improving credit outcomes. This suggests that effort in the social-related task was a strategic complement to effort in the credit-related task in achieving the sustainability goal, while effort exerted on the credit-related task was a strategic substitute to the social-related task in achieving the mission goal.

Thus far, one may conclude that a contract that rewards effort related to the mission is likely to be more effective at achieving both the sustainability and the mission objectives of a multi-goal organization. However, the social bonus also undermined intrinsic motivation, and among staff

working in teams, this worsened the free-riding problem and thus performance.

Taken together, these results suggest that a fixed wage contract may be optimal in multi-goal institutions with motivated workers. In addition, they underscore the importance of understanding the nature of task complementary when designing incentive schemes.

Our results also highlight the challenge that many anti-poverty programs, development organizations, and governments face. Pay for performance incentives are often seen as a way of attracting, retaining and motivating workers who are responsible for last mile service delivery or program implementation in situations where teamwork is important and direct supervision is not cost-effective. Our results suggest that understanding task complementarity can be critical and that often, a fixed wage contract may dominate performance incentives.

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Table 1: Relationship between worker efforts and probability of success

| | | $\pi_c(e_c, e_s)$ | | | | | | $\pi_s(e_c, e_s)$ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $N$ | | $S$ | | $C$ | | $N$ | | $S$ | | $C$ | |
| | | $e_c$ | | $e_c$ | | $e_c$ | | $e_c$ | | $e_c$ | | $e_c$ | |
| | | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| $e_s$ | 0 | $\underline{\pi}_c$ | $\overline{\pi}_c$ | 1 | 1 | 0 | 0 | 0 | 0 | $\underline{\pi}_s$ | 0 | 0 | $\underline{\pi}_s$ |
| | $\underline{e}$ | $\underline{\pi}_c$ | $\overline{\pi}_c$ | $\underline{\pi}_c$ | $\overline{\pi}_c$ | $\underline{\pi}_c$ | $\overline{\pi}_c$ | $\underline{\pi}_s$ | $\underline{\pi}_s$ | $\underline{\pi}_s$ | 0 | 0 | $\underline{\pi}_s$ |
| | $\overline{e}$ | $\underline{\pi}_c$ | $\overline{\pi}_c$ | 0 | 0 | 1 | 1 | $\overline{\pi}_s$ | $\overline{\pi}_s$ | $\overline{\pi}_s$ | $\underline{\pi}_s$ | $\underline{\pi}_s$ | $\overline{\pi}_s$ |

Table 2: Choice of $e_c$ by team mates under credit bonus

Panel A: Effort in social-related task is $e_s = \underline{e}$

| | 0 | 1 |
|---|---|---|
| 0 | $\underline{\pi}_c^2 b$,$\underline{\pi}_c^2 b$ | $\underline{\pi}_c \overline{\pi}_c b$,$\underline{\pi}_c \overline{\pi}_c b - \psi(1, \underline{e})$ |
| 1 | $\underline{\pi}_c \overline{\pi}_c b - \psi(1, \underline{e})$,$\underline{\pi}_c \overline{\pi}_c b$ | $\overline{\pi}_c^2 b - \psi(1, \underline{e})$,$\overline{\pi}_c^2 b - \psi(1, \underline{e})$ |

Panel B: Effort in social-related task is $e_s = \overline{e}$

| | 0 | 1 |
|---|---|---|
| 0 | $b - \psi(0, \overline{e})$,$b - \psi(0, \overline{e})$ | $b - \psi(0, \overline{e})$,$b - \psi(1, \overline{e})$ |
| 1 | $b - \psi(1, \overline{e})$,$b - \psi(0, \overline{e})$ | $b - \psi(1, \overline{e})$,$b - \psi(1, \overline{e})$ |

Table 3: Model predictions

| | $NN$ | | $NS$ | | $NC$ | | $CN$ | | $CS$ | | $CC$ | | $SN$ | | $SS$ | | $SC$ | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $y_c$ | $y_s$ | $y_c$ | $y_s$ | $y_c$ | $y_s$ | $y_c$ | $y_s$ | $y_c$ | $y_s$ | $y_c$ | $y_s$ | $y_c$ | $y_s$ | $y_c$ | $y_s$ | $y_c$ | $y_s$ |
| Employee working alone | | | | | | | | | | | | | | | | | | |
| Credit - No Bonus | + | 0 | + | − | + | + | + | 0 | + | − | + | + | 0 | 0 | 0 | 0 | 0 | 0 |
| Social - No Bonus | 0 | + | 0 | + | + | + | − | + | + | + | − | + | − | + | − | + | 0 | + |
| Credit - Social | + | − | + | − | 0 | 0 | + | − | 0 | − | + | 0 | + | − | + | − | 0 | − |
| Employee working in a team | | | | | | | | | | | | | | | | | | |
| Credit - No Bonus | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Social - No Bonus | 0 | 0 | 0 | 0 | + | + | − | − | − | 0 | − | + | 0 | 0 | 0 | 0 | 0 | + |
| Credit - Social | 0 | 0 | 0 | 0 | − | − | + | + | + | 0 | + | − | 0 | 0 | 0 | 0 | 0 | − |

Table 4: 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 |
| 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 |
| F-test statistics[c] | - | - | - | 1.020 | 0.948 | 1.006 |
| P-value | - | - | - | 0.450 | 0.530 | 0.465 |

*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 include FAs whose CO meetings were visited by the CrO at least once during the bonus period. [c] The F-test statistics (and P-values) for the joint equality of means across the full set of variables are calculated by using the standard errors.

Table 5: Impact of bonus on microcredit

| | 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) |
| **Panel A:** Average treatment effect | | | | | | |
| Credit bonus (TC) | 24.1* | 0.084* | 0.673 | -284.0 | 0.008 | 0.238 |
| | (0.062) | (0.088) | (0.702) | (0.996) | (0.530) | (0.198) |
| Social bonus (TS) | 9.406 | -0.020 | 0.616 | -444.8 | -0.003 | 0.002 |
| | (0.592) | (0.646) | (0.824) | (0.962) | (0.754) | (0.998) |
| *P-value of F-test:* | | | | | | |
| TC = TS | 0.280 | 0.044 | 0.966 | 1.000 | 0.340 | 0.110 |
| R-squared | 0.544 | 0.566 | 0.383 | 0.399 | 0.364 | 0.449 |
| **Panel B:** By partnership | | | | | | |
| Credit bonus (TC) | 14.88 | 0.117** | -0.429 | -9801 | 0.023 | 0.277* |
| | (0.490) | (0.026) | (0.816) | (0.810) | (0.238) | (0.098) |
| Social bonus (TS) | 27.26 | 0.037 | 3.389 | 29389 | 0.020 | 0.297 |
| | (0.222) | (0.332) | (0.196) | (0.392) | (0.302) | (0.142) |
| Partnered FA (P) | -18.92 | 0.031* | -3.214* | -40066 | 0.034 | -0.049 |
| | (0 .244) | (0.082) | (0.096) | (0.150) | (0.162) | (0.698) |
| P x TC | 22.76 | -0.069 | 2.729 | 22211 | -0.027 | -0.081 |
| | (0.408) | (0 .142) | (0.208) | (0.472) | (0.322) | (0.646) |
| P x TS | -33.18 | -0.110** | -5.150* | -55657 | -0.045* | -0.566** |
| | (0.244) | (0.032) | (0.094) | (0.156) | (0.086) | (0.012) |
| *P-value of F-test:* | | | | | | |
| TC + P x TC | 0.060 | 0.468 | 0.352 | 0.702 | 0.898 | 0.362 |
| TS + P x TS | 0.772 | 0.200 | 0.536 | 0.516 | 0.138 | 0.086 |
| TC = TS | 0.274 | 0.074 | 0.098 | 0.430 | 0.794 | 0.896 |
| TC+PxTC=TS+PxTS | 0.000 | 0.118 | 0.034 | 0.086 | 0.352 | 0.028 |
| R-squared | 0.572 | 0.589 | 0.463 | 0.460 | 0.405 | 0.508 |
| 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 a 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 her/his 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. The P-values are reported in parentheses 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 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) |
| **Panel A:** Average treatment effect | | | | | | | |
| Credit bonus (TC) | 0.284 | -0.127* | -0.105* | 1.020 | -0.194* | -0.079 | -0.384*** |
| | (0.120) | (0.064) | (0.062) | (0.164) | (0.070) | (0.232) | (0.010) |
| Social bonus (TS) | 0.225* | -0.030 | -0.027 | 0.056 | -0.040 | -0.047 | -0.051 |
| | (0.016) | (0.436) | (0.632) | (0.860) | (0.720 ) | (0.350) | (0.738) |
| *P-value of F-test:* | | | | | | | |
| TC = TS | 0.766 | 0.126 | 0.024 | 0.148 | 0 .188 | 0.438 | 0.020 |
| R-squared | 0.230 | 0.271 | 0.286 | 0.430 | 0.293 | 0.096 | 0.442 |
| **Panel B:** By partnership | | | | | | | |
| Credit bonus (TC) | 0.181 | -0.121** | -0.084** | 1.494 | -0.168 | -0.054 | -0.382*** |
| | (0.372) | (0.034) | (0.018) | (0.182) | (0.270) | (0.434) | (0.004) |
| Social bonus (TS) | 0.430*** | -0.059 | 0.012 | -0.326 | 0.013 | -0.024 | 0.122 |
| | (0.008) | (0.326) | (0.738) | (0.620) | (0.922) | (0.760) | (0.402) |
| Partnered FA (P) | -0.173 | -0.080 | -0.039 | -0.824 | 0.023 | 0.004 | -0.113 |
| | (0.226) | (0.406) | (0.556) | (0.220) | (0.724) | (0.926) | (0.552) |
| P x TC | 0.264 | -0.028 | -0.047 | -1.30 | -0.050 | -0.057 | 0.015 |
| | (0.210) | (0.778) | (0.592) | (0.230) | (0.738) | (0.366) | (1.00) |
| P x TS | -0.356* | 0.051 | -0.068 | 0.662 | -0.096 | -0.041 | -0.304 |
| | (0.070) | (0.666) | (0.440) | (0.384) | (0.530) | (0.494) | (0.122) |
| *P-value of F-test:* | | | | | | | |
| TC + P x TC | 0.146 | 0.214 | 0.154 | 0.644 | 0.100 | 0.132 | 0.184 |
| TS + P x TS | 0.226 | 0.876 | 0.440 | 0.222 | 0.424 | 0.210 | 0.194 |
| TC = TS | 0.202 | 0.346 | 0.008 | 0.066 | 0.280 | 0.604 | 0.002 |
| TC+PxTC=TS+PxTS | 0.200 | 0.164 | 0.096 | 0.590 | 0.348 | 0.142 | 0.344 |
| R-squared | 0.338 | 0.305 | 0.360 | 0.483 | 0.297 | 0.107 | 0.496 |
| 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 and a 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 her/his 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. ***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 CO-quality index implies better performance on social mobilization. The P-values are reported in parentheses 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: Impact of bonus on FA motivation and teamwork

| | Best about NRSP: ability to help (1) | Identify with NRSP mission (2) | Find work important (3) | Motivation index (4) | Works with a partner (5) | Shares with a partner (6) |
|---|---|---|---|---|---|---|
| **Panel A:** Average treatment effect | | | | | | |
| Credit bonus (TC) | -0.141 | -0.068 | 0.005 | -0.060 | 0.012 | -0.011 |
| | (0.214) | (0.482) | (0.974) | (0.364) | (0.880) | (0.834) |
| Social bonus (TS) | -0.234** | -0.152 | -0.136 | -0.167* | -0.125*** | -0.012 |
| | (0.1930) | (0.212) | (0.154) | (0.076) | (0.002) | (0.744) |
| *P-value of F-test:* | | | | | | |
| TC = TS | 0.414 | 0.284 | 0.188 | 0.084 | 0.100 | 0.980 |
| R-squared | 0.137 | 0.206 | 0.255 | 0.314 | 0.570 | 0.058 |
| **Panel B:** By partnership | | | | | | |
| Credit bonus (TC) | -0.185 | -0.124* | 0.034 | -0.095 | -0.09 | 0.030 |
| | (0.282) | (0.082) | (0.780) | (0.338) | (0.976) | (0.668) |
| Social bonus (TS) | -0.177 | -0.202 | -0.255 | -0.214* | -0.164 | 0.078 |
| | (0.268) | (0.130) | (0.130) | (0.098) | (0.308) | (0.126) |
| Partnered FA (P) | 0.009 | 0.003 | -0.101 | -0.039 | 0.514* | 0.081 |
| | (0.950) | (0.948) | (0.440) | (0.748) | (0.068) | (0.160) |
| P x TC | 0.116 | 0.1260 | -0.104 | 0.069 | 0.042 | -0.071 |
| | (0.678) | (0.540) | (0.564) | (0.756) | (0.860) | (0.634) |
| P x TS | -0.109 | 0.0971 | 0.224 | 0.088 | 0.074 | -0.170** |
| | (0.552) | (0 .510) | (0.172) | (0.534) | (0.776) | (0.032) |
| *P-value of F-test:* | | | | | | |
| TC + P x TC | 0.726 | 1.000 | 0.576 | 0.762 | 0.768 | 0.542 |
| TS + P x TS | 0.016 | 0.478 | 0.714 | 0.150 | 0.376 | 0.084 |
| TC = TS | 0.246 | 0.162 | 0.062 | 0.254 | 0.254 | 0.548 |
| TC+PxTC=TS+PxTS | 0.208 | 0.436 | 0.722 | 0.398 | 0.234 | 0.662 |
| R-squared | c | c | c | c | 0.353 | 0.079 |
| 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. All specifications control for a 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 with NRSP in the followup survey. ***Identify with NRSP mission*** is a dummy variable which equals one if an FA reported that he identifies with the mission of NRSP. ***Find work important*** is a dummy variable which equals one if an FA reported that he finds NRSP work to be important and satisfying. ***Motivation index*** is calculated by taking an equally weighted mean across the three three intrinsic motivation variables in Columns 1-3. Higher value on the motivation index implies higher intrinsic motivation. ***Shares with a partner*** is a dummy variable which equals one if an FA decides to split the winnings with her/his colleague from the dictator game. ***Works with a partner*** is a dummy variable which equals one if an FA co-manages more than 73 percent of her/his post-treatment CO portfolio with other FAs. The P-values are reported in parentheses 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: Model Predictions

Table A.1: Expected value of goals for cases $NN$ and $CS$

| | Case $NN$ | | Case $CS$ | |
|---|---|---|---|---|
| | $y_c$ | $y_s$ | $y_c$ | $y_s$ |
| **Panel A:** Expected value of goals | | | | |
| Employee working alone | | | | |
| No Bonus | $\underline{\pi}_c\overline{y}_c + (1-\underline{\pi}_c)\underline{y}_c$ | $\underline{\pi}_s\overline{y}_s + (1-\underline{\pi}_s)\underline{y}_s$ | $\underline{\pi}_c\overline{y}_c + (1-\underline{\pi}_c)\underline{y}_c$ | $\underline{\pi}_s\overline{y}_s + (1-\underline{\pi}_s)\underline{y}_s$ |
| Credit Bonus | $\overline{\pi}_c\overline{y}_c + (1-\overline{\pi}_c)\underline{y}_c$ | $\underline{\pi}_s\overline{y}_s + (1-\underline{\pi}_s)\underline{y}_s$ | $\overline{\pi}_c\overline{y}_c + (1-\overline{\pi}_c)\underline{y}_c$ | $\underline{y}_s$ |
| Social Bonus | $\underline{\pi}_c\overline{y}_c + (1-\underline{\pi}_c)\underline{y}_c$ | $\overline{\pi}_s\overline{y}_s + (1-\overline{\pi}_s)\underline{y}_s$ | $\overline{y}_c$ | $\overline{\pi}_s\overline{y}_s + (1-\overline{\pi}_s)\underline{y}_s$ |
| Employee working in a team | | | | |
| No Bonus | $\underline{\pi}_c^2\overline{y}_c + (1-\underline{\pi}_c^2)\underline{y}_c$ | $\underline{\pi}_s^2\overline{y}_s + (1-\underline{\pi}_s^2)\underline{y}_s$ | $\underline{\pi}_c^2\overline{y}_c + (1-\underline{\pi}_c^2)\underline{y}_c$ | $\underline{\pi}_s^2\overline{y}_s + (1-\underline{\pi}_s^2)\underline{y}_s$ |
| Credit Bonus | $\underline{\pi}_c^2\overline{y}_c + (1-\underline{\pi}_c^2)\underline{y}_c$ | $\underline{\pi}_s^2\overline{y}_s + (1-\underline{\pi}_s^2)\underline{y}_s$ | $\underline{\pi}_c^2\overline{y}_c + (1-\underline{\pi}_c^2)\underline{y}_c$ | $\underline{\pi}_s^2\overline{y}_s + (1-\underline{\pi}_s^2)\underline{y}_s$ |
| Social Bonus | $\underline{\pi}_c^2\overline{y}_c + (1-\underline{\pi}_c^2)\underline{y}_c$ | $\underline{\pi}_s^2\overline{y}_s + (1-\underline{\pi}_s^2)\underline{y}_s$ | $\underline{y}_c$ | $\underline{\pi}_s^2\overline{y}_s + (1-\underline{\pi}_s^2)\underline{y}_s$ |
| **Panel B:** Difference in expected value of goals | | | | |
| Employee working alone | | | | |
| Credit - No Bonus | $(\overline{\pi}_c - \underline{\pi}_c)(\overline{y}_c - \underline{y}_c)$ | 0 | $(\overline{\pi}_c - \underline{\pi}_c)(\overline{y}_c - \underline{y}_c)$ | $-\underline{\pi}_s(\overline{y}_s - \underline{y}_s)$ |
| Social - No Bonus | 0 | $(\overline{\pi}_s - \underline{\pi}_s)(\overline{y}_s - \underline{y}_s)$ | $(1-\underline{\pi}_c)(\overline{y}_c - \underline{y}_c)$ | $(\overline{\pi}_s - \underline{\pi}_s)(\overline{y}_s - \underline{y}_s)$ |
| Credit - Social | $(\overline{\pi}_c - \underline{\pi}_c)(\overline{y}_c - \underline{y}_c)$ | $-(\overline{\pi}_s - \underline{\pi}_s)(\overline{y}_s - \underline{y}_s)$ | $-(1-\overline{\pi}_c)(\overline{y}_c - \underline{y}_c)$ | $-\overline{\pi}_s(\overline{y}_s - \underline{y}_s)$ |
| Employee working in a team | | | | |
| Credit - No Bonus | 0 | 0 | 0 | 0 |
| Social - No Bonus | 0 | 0 | $-\underline{\pi}_c^2(\overline{y}_c - \underline{y}_c)$ | 0 |
| Credit - Social | 0 | 0 | $\underline{\pi}_c^2(\overline{y}_c - \underline{y}_c)$ | 0 |

*Notes:* Panel A reports the expected values of each goal under the Credit bonus, Social bonus and the status quo of No bonus (control). Panel B reports the difference in expected values between pairwise comparisons of the different bnus schemes. The row labeled "Credit (Social) - No Bonus" refers to the difference in expected value of offering a credit (social) bonus, relative to no bonus , while the row labeled "Credit - Social" refers to the impacts of offering a credit bonus, relative to offering a social bonus.

# B Appendix: Study Design and Bonus Incentives

Table B.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 $20^{th}$ 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 $20^{th}$ 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.

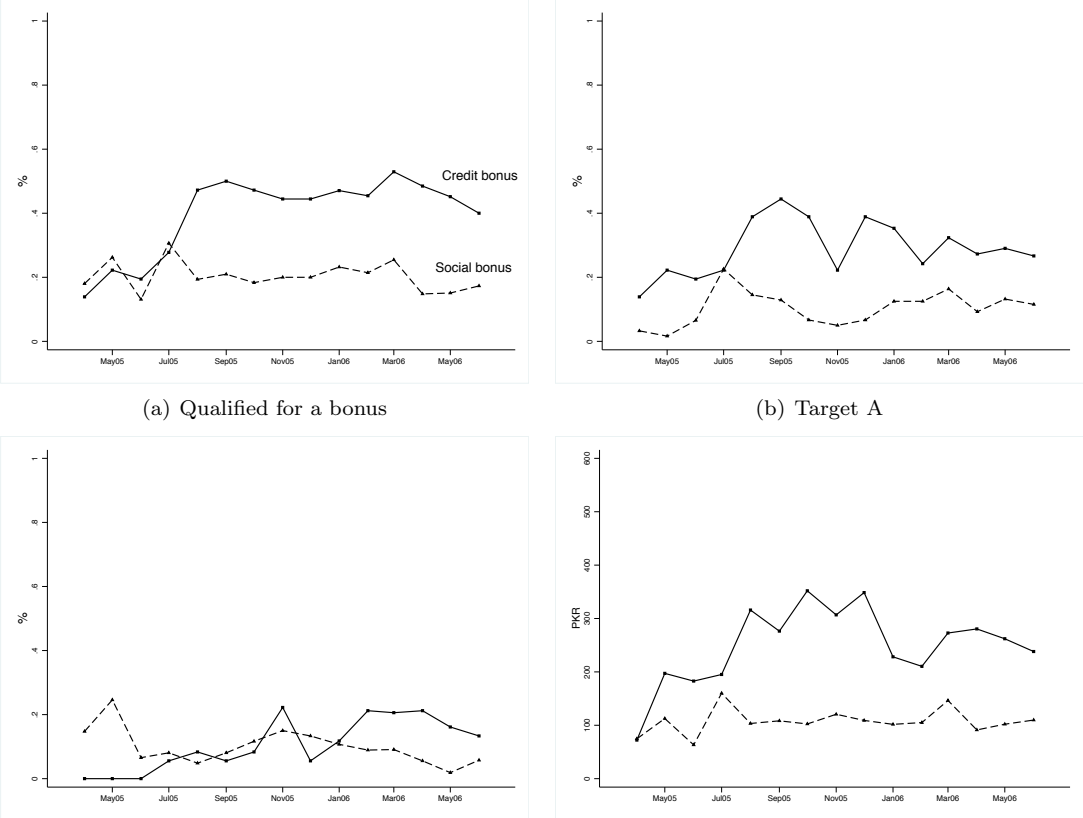
*Notes:* The bonus incentives were announced to the FAs in the treatment FUs in Mach 2005. The monthly bonuses were paid for 15 months during the study period, and terminated in June 2006. The average base monthly salary for an FA was PKR 3,000 (USD 50.54).

Table B.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 B.1: Monthly payments of credit and social bonus




(a) Qualified for a bonus

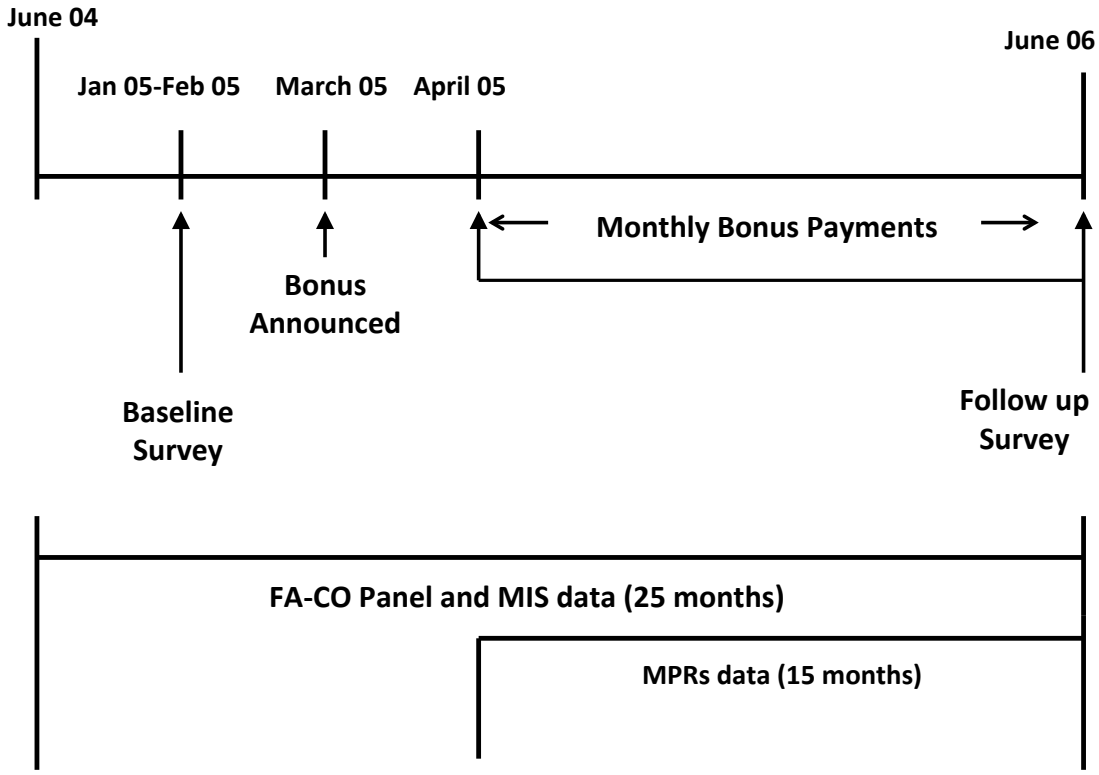
(b) Target A

(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 B.2: Timeline of the study



# C Appendix: Selection into Supervisor Visits

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

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:

$$CrO_{c,t} \;=\; \alpha \;+\; \beta_r + \;\omega_t \;+ \gamma\, TC_c \;+\; \lambda\, TS_c \;+\; \epsilon \tag{3}$$

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 $t$. $\beta_r$ and $\omega_t$ are region and month dummies, respectively. The coefficients $\gamma$ and $\lambda$ 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 C.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 $\gamma$ and $\lambda$ are both close to zero (0.039 and -0.000). The estimates are also 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 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:

$$Y_{c,t} \;= \alpha \;+\; \beta_r + \;\omega_t \;+\; \zeta\, CrO_{c,t} \;+ \gamma\, TC_c \;+\; \lambda\, TS_c \;+\; \phi\, CrO_{c,t} * TC_c + \;\psi\, CrO_{c,t} * TS_c + \epsilon \tag{4}$$

where $Y_{c,t}$ is the characteristics of a CO $c$ in month $t$. The coefficients $\phi$ and $\psi$ 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 C.1, Columns 2-6 report the results on five different CO characteristics: the number of active loans, number of new loans, disbursement, and recovery rates at the 20th and

Table C.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. The P-values are reported in parentheses and are calculated using the t-asymptotic wild cluster bootstrap at the FU level; *p<0.1, **p<0.05, ***p<0.01.

at the end of the month. The estimated coefficient $\phi$ is close to zero (if anything, negative) and not statistically significantly different from zero at conventional levels for all five outcomes. The estimated coefficient $\psi$ 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 into CrO visits to CO meetings that are managed by credit and social bonus FAs (compared 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 $\phi$ and $\psi$ suggest a plausibly negative selection (if anything), which would underestimate our main results on social outcomes (in Table 8).

# D Appendix: Partnership

FAs manage varying degrees 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 can also be useful for NRSP to train inexperienced FAs while on the job by partnering them with a relatively more experienced FA.

Figure D.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. Based on this, we identify FAs as either partnered or non-partnered for the main analysis. Our main results are however robust to using alternate cut-offs for defining partnership. Almost two-fifth of FAs co-manage their entire CO-portfolio with other FAs, while slightly less than one-fourth manage all their COs independently.

Table D.1, columns 1 and 2 present 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 the joint equality of means across the full set of variables between partnered and non-partnered FAs.

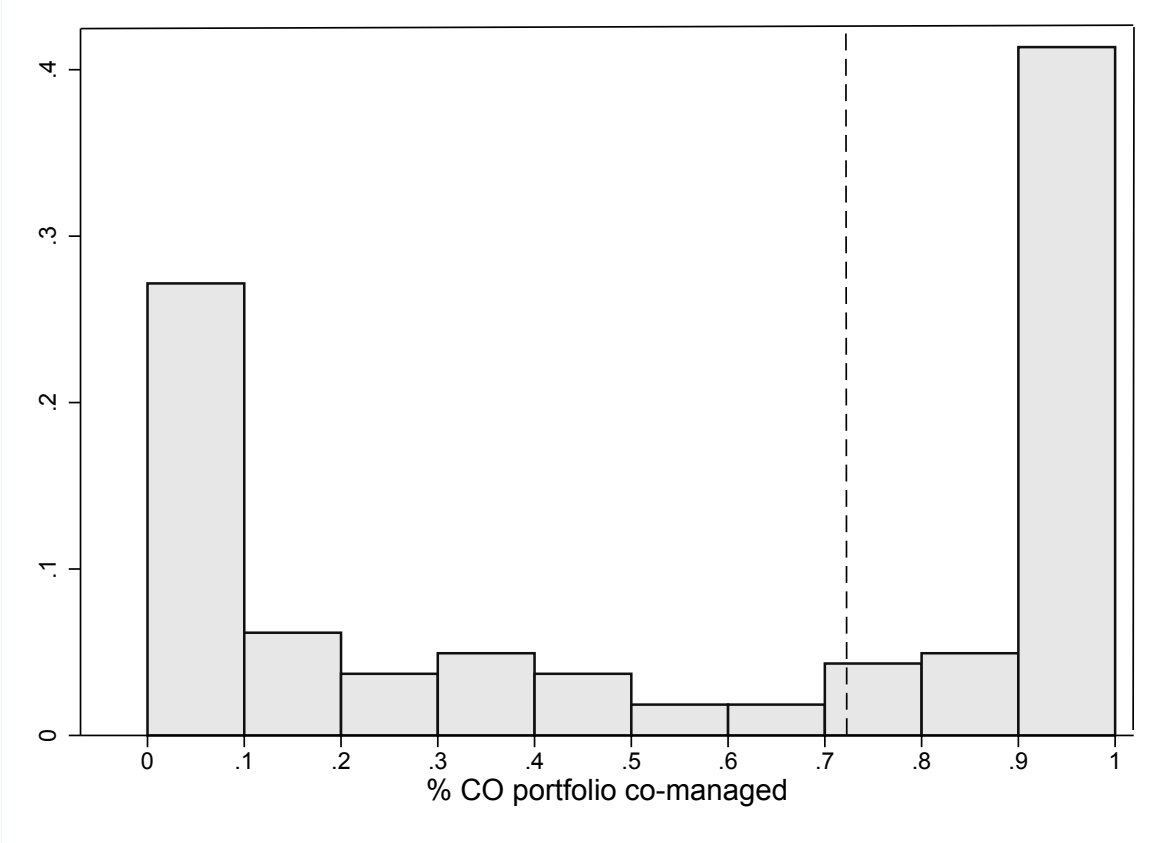
Non-partnered FAs on average co-manage 17 percent of their CO-portfolio with other FAs, while the average co-management rate is 96 percent among partnered FAs. The average number FAs in a partnership team (excluding the FA) is 1.243. More precisely, 71 out of 81 partnered FAs co-manage their COs with one other FA, while the rest (10 partnered FAs) co-manage with two other FAs. FA partnership-teams are also stable throughout the study period (unless one of the partners quit NRSP).

Table D.1, Column 4 reports the correlation between FA's and his partner's characteristics (mean characteristics in case of two partners) 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 with 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. We do observe weak suggestive evidence of positive sorting among partnered FAs on observed characteristics such as gender and education. In the paper, we take the pre-treatment selection into partnership and partnership formation as given. In Table 6, we do not find any statistically significant difference in this pre-treatment propensity of FAs to work in partnership between control FAs and Cr-FAs, control FAs and Soc-FAs, and Cr-FAs and Soc-FAs.

Figure D.1: Distribution of the share of CO-portfolio co-managed with other FAs




*Notes:* The figure depicts the distribution of the share of FA's CO-portfolio in the 9 months before the bonus was announced (June 2004 - March 2005) that was co-managed with other FAs. The dotted line in the graph shows the median value of co-management (73 percent of FA's CO-portfolio). FAs with their share greater than the median value is categorized as "partnered" FA in the analysis. 71 out of 81 partnered FAs co-manage their COs with one other FA, while the rest (10 partnered FAs) co-manage with two other FAs. FA partnership-teams are stable throughout the study period (unless one of the partners quit NRSP).

Table D.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 her/his 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.

# E Appendix: Balance Tests on Restricted Samples

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

| | 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 | 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 | - | - | - |
| F-test statistics[b] | - | - | - | 1.031 | 1.133 | 1.042 |
| P-value | - | - | - | 0.443 | 0.336 | 0.430 |

*Notes:* 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 her/his CO portfolio (median value of co-sharing) with other FAs during the 9 months prior to the bonus announcement. [b]The F-test statistics (and P-values) for the joint equality of means across the full set of variables are calculated by using the standard errors.

Table E.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 | - | - | - |
| Number of credit organizations (COs) | 1020 | 712 | 1156 | - | - | - |
| F-test statistics[b] | - | - | - | 1.014 | 0.903 | 0.963 |
| P-value | - | - | - | 0.460 | 0.584 | 0.517 |

*Notes:* 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 her/his CO portfolio (median value of co-sharing) with other FAs during the 9 months prior to the bonus announcement. [b] The F-test statistics (and P-values) for the joint equality of means across the full set of variables are calculated by using the standard errors.