

**Essays on
Incentives Policies for Improving the Bangladesh Public Sector**

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by

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Abstract

Recently, the government of Bangladesh announced the launch of Vision-2041, a policy-based plan for the realization of Bangladesh as a prosperous and developed country. However, policymakers identified two important but somewhat incompatible challenges to the work to realize Vision-2041: ensuring rapid but stable economic growth, and reducing poverty. Towards rapid and stable economic growth, the government of Bangladesh began reforming the public sector, which is responsible for the preparation and implementation of government policies. Towards the reduction of poverty, the government promoted improvement of the productivity of the agriculture sector by introducing crop diversification and new technologies.

This dissertation presents case studies of two initiatives taken to develop effective policies to meet the above two challenges. In the first case study (chapter 2), the effect of implementation of a reform policy (the 2015 pay scale reform) is examined in terms of improvement of selection and recruitment for the Bangladesh Civil Service (BCS). The second case study (chapter 3) examines the effectiveness of incentives for improving the performance of extension agents in the public agricultural extension service of Bangladesh.

Chapter 2 examines the effect of the 2015 pay scale reform (doubling the salary of civil servants) on the qualifications and Public Service Motivation (PSM) (strong desire to work in the public sector) of applicants and incumbent officers of BCS. A difference-in-differences analysis reveals that the BCS officers hired after the reform are not only academically better qualified but also more motivated to work in public service

than those hired before the reform. The evidence here suggests that salary increases can be an effective measure for enhancing quality of recruited officers.

Chapter 3 provides empirical evidence that financial and non-financial incentives, in combination with increased monitoring, can improve the service delivery of government agricultural extension agents. The effectiveness of those incentives was explored through a Randomized Control Trial (RCT) conducted in the form of a rank-order tournament at 40 sub-district agriculture offices in Bangladesh with 807 agricultural extension officers. To motivate poorly performing extension agents, the rank order was set so as to hinder better performers at the baseline. Even though all of the treatments led to a general improvement in performance, increased monitoring of the two worst-performing agents among those selected for inspection was the most effective means of improving service delivery by poor performers. Chapter 3 also documents the effect of heterogeneous treatment on performance by gender, job tenure, and initial performance of extension officers, as well as initial performance variation by office. The results of the analysis indicate that incentives should be implemented with consideration of context and the baseline characteristics of the government agriculture extension workers.

Based on its examination of two issues related to development and poverty, this dissertation suggests that in order to attract higher quality workers and enhance public service delivery in the public sector of a developing country, at least in the context of the Bangladesh public sector, policymakers should consider incentives as a potentially important policy element.

Dedication

To my father, Md. Abul Kalam Azad, who often long held desire to see the completion of my Ph.D. course was unfulfilled due to his untimely death, and to my mother Sufia Begum, with special mention of my wife Tanzila Rahman and our children, Rifah Tasnia Hafsa and Tahmid Hasan.

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Chapter 1: Introduction

1.1 Introduction

A strong and competent public sector is a necessary backbone of a country; and is a key in reducing of poverty by ensuring sustainable development (Nunberg and Nellis, 1990; UNDP, 2005; Rose-Ackerman and Palifka, 2016). However, the public sector in many developing countries suffers from low morale and low productivity; and from excessive size, inefficiency, insufficient pay, politicization, lack of professionalism, low productivity, and corruption (Nunberg and Nellis, 1990; Shepherd, 2003). Reforming the public sector is a pre-requisite issue for countries that are concerned about stable economic development. Besides this, good governance in the public sector, demanded by donor agencies, is growing in importance in many developing countries. Therefore, to cope with globalization and the acceleration of progress in economic development, an efficient and vibrant public sector is very much necessary. Though many developing countries have tried to reform their public sector, in the end, many of them did not succeed (Shepherd, 2003; UNDP,2005). However, public sector reform is not an easy task in developing countries due to a lack of political commitment (Nunberg and Nellis, 1990; UNDP, 2005). As public service delivery is the main task of the public sector workers, motivating employees to provide effective service delivery is one of the most important challenges, in any reform initiative in developing countries. In developed countries (OECD countries), pay for performance is widely used policy to increase productivity and motivate employees, but it is not common in developing countries, and its effectiveness for motivating employees to exert greater effort is mixed (Hasnain, Manning, and Pierskalla, 2012). In a review of the theoretical and empirical literature

regarding performance pay, Hasnain, Manning, and Pierskalla, (2012) found that performance pay was effective in developed countries, but its effectiveness in developing countries has not been studied rigorously. However, as an important policy tool to improve the productivity of the employees, researchers have started using incentives (e.g. pay for performance) to increase public service delivery in developing countries. Most of the studies on this topic are in the context of frontline workers (education and health sector), and studies on core policymakers¹ (elite civil service officers) and other sectors (e.g. agriculture sector) are scarce (Finan, Olken, & Pande, 2017; Hasnain, Manning and Pierskalla, 2012). Considering the scarcity of studies in this regard, this dissertation outlined the two case studies that examine the effect of incentives on the frontline workers of the Bangladesh public agriculture sector² and elite civil service officers of Bangladesh.

In the history of Bangladesh, the year 2008 was a landmark as it was the first time when Bangladesh got a comprehensive visionary (Perspective Plan) to become a middle-income country by 2021. Fortunately, before 2021, Bangladesh already became a lower-middle-income country. Recently the government is working on formulating another Perspective Plan 2022 to 2041. Under this perspective plan, Bangladesh aspires to become a prosperous and developed country. However, the policymakers identified two main important challenges to achieve the Vision 2041: a. ensuring stable, faster economic growth, and b. reducing poverty (Alam, 2019; World Bank, 2020). To meet these two challenges, policymakers of Bangladesh emphasized on reforming the public sector into

¹ This is because in the context of frontline workers, performance output is easy to measure but for the core policy makers, it is difficult to measure the performance as they are entrusted with doing multiple tasks (Hasnain, Manning and Pierskalla, 2012)

² Most of the previous studies conducted in the frontline workers in education and health sector. In the context of agriculture sector, so far evidence based rigorous studies are absent in this regard.

a sound and innovative public sector to prepare and implement policies, on the one hand. Besides, a sound and innovative public agricultural extension services are necessary to increase agricultural productivity to reduce poverty, on the other hand (General Economic Division, 2012; World Bank, 2020). In 2015, the government of Bangladesh reformed the public sector pay scale by offering higher wages to attract higher quality officers in its public sector (Islam, 2016). This is the first case study of this dissertation in documenting whether the 2015 pay scale reform was successful in attracting higher quality officers in BCS. Increasing the agricultural productivity of the agriculture sector is another important priority of the government to achieve Vision 2041. To increase productivity, the government has emphasized introducing new technologies and crop diversification, and for which efficient public extension services are a pre-requisite. The second case study in this dissertation, presented in chapter three, is relevant for its focus on means of enhancing agricultural extension services through public extension workers.

1.1.1 2015 pay scale reform to attract higher quality officers in the Bangladesh civil service

In the perspective plan (2010-2021) for the achievement of Vision 2021, there is a clear vision: to ensure an efficient, corruption-free and politically neutral public sector to carry out stable and rapid economic growth in Bangladesh (General Economic Division, 2012). In recent years, the government of Bangladesh has taken various initiatives to strengthen its public sector. Those initiatives include the formulation of laws, the offering of incentives by means of pay scale reform, best staff/officer awards for public service delivery, and the strengthening of the anti-corruption agency (Ahmed, 2019). Though deeper and more comprehensive public sector reform is an urgent issue, it is not possible

to reform the whole public sector radically within a short period (Alam and Kijima, 2020; Islam, 2016). Therefore, considering the government priority on fostering a sound and innovative public sector, there is a need to attract highly qualified workers to the public sector. Therefore, the government reformed the pay scale in 2015 so as to offer higher pay than the private sector. The lowest and the highest basic salary have been fixed at Tk. 8,250 (up from Tk. 4,100), and Tk.75,000 (up from Tk. 40,000), respectively (Islam, 2016, Ministry of Finance, 2015). At that point, after the 2015 pay scale reform, public sector pay was much higher³ than private sector (BBS, 2017; Khan, 2015). Previously, the pay scales had been increased several times but not by as much as the 2015 pay scales. Again the value of the increased pay scales was promptly eroded by inflation (Islam, 2016). Expectations after the 2015 pay scale reform were high, the government and civil society and prominent economists of the country expected that the enhanced pay scales would help to curb corruption and to attract meritorious, sincere and efficient individuals to join the public sector of Bangladesh (CPD, 2015). In that light, the second chapter of this dissertation investigates the effect of the reform on the quality and motivational profiles of civil service applicants and incumbent civil service officers. This dissertation compared the cognitive qualities and motivational profiles of incumbent civil service officers and applicants who took the civil service exam before the 2015 pay scale reform and those who took it after the reform. The results show that the 2015 pay scale reform

³ The minimum monthly gross salary in the public sector is 13,875 BDT³ (appx. \$175), whereas in the garments sector it is 5300 BDT (appx. \$68), in the engineering sector it is BDT 12,594 (appx. \$ 159), in the textile sector (cotton) it is BDT 9922 (appx. \$125). Therefore, Public sector wages in Bangladesh is higher than average minimum wages (appx. \$131) in the industrial sector and manufacturing sectors of Bangladesh. See detail in Khan, 2015 (pp.243-246) (The current data are calculated and adapted by following the methods of Khan, 2015 by taking data from BBS, 2016).

was successful in attracting highly qualified officers and applicants with higher motivational profiles than previous. Investigating the effect of large public sector reform on the quality and motivation of elite incumbent civil service officers and applicant pool is a new approach in the public administration and economic literature.

This case study (chapter 2) contributes to broader nascent literature of labor economics as well as of personnel economics of the public sector which investigates the effect of higher wages on applicant's qualities and Public Service Motivation (PSM) by presenting a piece of new evidence on elite civil service applicants in a developing country. Although elite civil service officers (mid-level policymaker) are key players in the public sector to prepare and implement public policies, no other studies investigate the effect of a national level pay scales increase on the quality and motivational profile of both applicants and incumbent civil service officers. Most studies in this area are theoretical (Kreps, 1997; Benabou & Tirole, 2003; Prendergast, 2007); and empirical studies are few (Finan et al., 2017). The only existing empirical literature is Dal Bo et al. (2013) which examines the effect of higher wages on the recruitment of public workers for the municipality offices in Mexico.

1.1.2 Improving the performance of the public agricultural extension service

In its work to achieve Vision 2021 and 2041 through enactment of the 2016 extension policy, the government of Bangladesh emphasizes the importance of agricultural extension services for all the farmers. Traditionally, extension services are provided only to selected groups of middle-class farmers, and public extension agents depend mainly on key farmers to disseminate new technologies. In that situation, under

the current public extension system, marginal farmers (80% of farmers) are deprived of public extension services (ASIRP, 2003).

Agricultural extension agents (known as SAAO/block supervisor) are the key players in the Bangladesh public sector extension agency for the provision of extension services directly to the farmers (ASIRP, 2003; Haque, 2011). Historically, from 1990s, when appointment of public sector extension agents began, those agents did not generally perform satisfactorily. A national level survey, ASIRP (2003), found that around 50% of farmers had not heard of the extension services provided by public sector extension agents, and some of the farmers claimed that they had received services from the block supervisor, but infrequently. In an evaluation report for Extension and Research Project (ERP I and II, 1977-1991), the World Bank found that in a fortnight, although agriculture assistants were supposed to meet 80 farmers, on average they only met 20–25 officers (ASIRP,2003). For a long time there was no reply to the empirical question, why do public sector extension agents not work properly, and how can they be motivated to work harder? The chapter three address these empirical questions.

Due to the current unsatisfactory extension services, an important challenge in the Bangladesh public agriculture sector is to motivate extension agents to increase their performance. In 2016, though the government of Bangladesh formulated a new extension policy to ensure effective public extension services for all types of farmers (DAE, 2018), until 2017, the performance of the public agricultural extension workers was not satisfied which was found in a survey conducted on the public extension agents and managerial

extension personnel in 2017.⁴ The survey did not find satisfactory extension services by the extension agents, and the survey results showed that poor performance of the extension agents is a noteworthy problem in Bangladesh. As the inefficiency remained in the public agricultural extension services sector in Bangladesh for a long time, even there are no evidence-based rigorous studies in this regard. Therefore, urgent effective policies are needed to strengthen public agricultural extension services of Bangladesh. Thus, based on other studies that found that to increase the performance of the public sector workers, incentives can be an efficient tool, an initiative has been taken in the chapter 3 to test the effect of the incentive policy on the performance of the public extension agents of Bangladesh. To do so, a Randomized Control Trial (RCT) has been conducted to know how to motivate public extension agents of Bangladesh to increase their performance which is documented in chapter three. To motivate extension agents, and to increase performance, financial, non-financial incentives, and increased monitoring was offered. It was found in the RCT that incentives were effective to increase the performance of the extension agents, on average. In the RCT, tournament type incentives were offered to motivate the public sector extension agent's performance, which is the novelty of this research, so far literature in this regard is absent.

This case study (chapter 3) contributes to the literature which investigates to improve the agricultural extension services (adoption of new technology) in the developing economies (Bandiera & Rasul, 2006, BenYishay & Mobarak, 2019; Krishnan & Patnam, 2013; Kondylis et al., 2017). These studies examined the importance of social

⁴ To carry out another research, in 2017, a survey was conducted to explore the effects of the 2015 pay scale reform on the public agriculture extension sector by the author. The survey subjects were extension agents and managerial extension personnel in the filed level agriculture offices.

networking to diffuse new agricultural technologies in the developing country's context. This study has attempted to answer how to improve the performance of the frontline public sector workers. This study also contributes to the literature which evaluates the effect of the incentives on the frontline public sector workers for increasing the service delivery (Ashraf et al. 2014 for health workers by both monetary and non-monetary incentives to promote HIV prevention; Glewwe et al. 2010 and Mbiti et al., 2019; Muralidharan & Sundaraman 2011 for school teachers by financial incentives to increase students' test score). This study (chapter 3) estimates the relative effectiveness of the incentives (both financial and non-financial) and monitoring on the incumbent agricultural extension officers.

1.2 Organization of the dissertation

In this dissertation, there are two main chapters including introduction (chapter 1) and conclusion (chapter 4). Chapter 2 documented the incentives effect (2015 pay scale reform) on the quality and motivational profiles of the incumbent civil service officers and civil service applicants of BCS. Following the introduction, this chapter presents the institutional background of BCS and the context of the pay scale reforms in Bangladesh, the conceptual framework, and hypotheses. In the subsequent sections, the data and characteristics of the sample are presented, and the empirical methods and estimation results are discussed thereafter. The final section presents the summary and conclusion. Chapter three of this dissertation discusses the incentives' effect on the performance of public extension agents. Following the introduction, the other sections present the institutional background of agricultural extension services, the methodology, experimental design, and empirical methods. The descriptive statistics, estimation result, the robustness of findings, and the “do no harm” principle for experimentation, concluding remarks and directions for future research are discussed in the subsequent sections.

Chapter 2

Can a Higher Wage Attract Better-Quality Applicants Without Deteriorating Public Service Motivation? Evidence from the Bangladesh Civil Service

2.1 Introduction

A competent civil service, as a core element of state capacity, is essential for the efficient provision of public services and key to reducing poverty in developing countries (Rose-Ackerman & Palifka, 2016). However, the civil service in many developing countries is characterized by low productivity (Nunberg & Nellis, 1990; Shepherd, 2003). It is widely recognized that lower compensation in the public sector is one of the main reasons for this low productivity (Delfgaauw & Dur, 2010; Finan, Olken, & Pande, 2017). Therefore, offering greater financial incentives can be an effective policy instrument to motivate those who were already hired and/or to recruit higher-quality candidates for public sector jobs (De Ree, Muralidharan, Pradhan, & Rogers, 2018). Unlike private-sector jobs, however, it is often the case that the performance of civil servants is difficult to measure objectively.⁵ This is why public sector does not normally adopt performance-based payment and instead tries to recruit people who are willing to work hard without financial incentives (Prendergast, 2007).

⁵ Empirical studies examining the effect of financial incentive on performance in public sector jobs are limited to frontline service providers such as school teachers (De Ree et al. 2018; Duflo et al. 2012) and community health providers (Ashraf et al. 2016; Banerjee et al. 2008).

This desire to work unselfishly in the public sector is known as Public Service Motivation (PSM) (Perry, 1996). It is found that those with high PSM strongly aspire to join the public sector to serve the community (Delfgaauw & Dur, 2008; Francois, 2000). PSM is, therefore, an important predictor for productivity and service delivery in the public sector (Perry & Vandenabeele, 2015). However, whether higher wages attract workers with lower PSM to civil service depends on the correlation between PSM and productivity (Barigozzi, Burani, & Raggi, 2018). If these are positively (negatively) correlated, financial incentives attract (screen out) individuals with not only high quality but also high PSM. Therefore, it is possible that offering a higher wage can screen out those with high PSM from civil service jobs.

The existing empirical literature examining the effect of financial incentives on recruitment shows mixed results and is limited to the case community agents, not higher-level officers. With respect to positive effects, Dal Bo, Finan, & Rossi (2013) find that higher wages attract individuals with higher pro-social motivation for community development agent positions in marginalized municipalities in Mexico.⁶ For negative effects, Deserrano (2019) finds that higher financial incentives attract more applicants but crowd out the most socially motivated people from community health promoter positions in Uganda. Based on a lab-in-the-field experiment with college students in Indonesia, Banuri and Keefer (2016) find that once a higher salary is offered, students with lower

⁶ In a closely related study, Ashraf, Bandiera, and Lee (2018) find that, in the recruitment of community health workers in Zambia, career incentives to ascend the civil-service career ladder to better-paid positions help the public sector to attract candidates with higher PSM.

PSM are more likely to choose to join the public sector.⁷ Thus, in the recruitment for civil service positions with high promotion prospects, there have been no rigorous empirical studies thus far that examine whether higher financial incentives screen out those with higher PSM.

This chapter examines the role of financial incentives in recruiting Bangladesh civil service (BCS) officers. BCS plays a key role in preparing policy and executing, supervising, and monitoring the tasks of the government (Zafarullah, 2003). However, the performance of BCS has not been satisfactory. According to World Bank governance indicators, the efficiency of BCS is low and declining (Khan, 2015). This is believed to be because the quality of the civil servants is not high, particularly due to a low salary (Jahan & Sahan, 2012). In July 2015, the Bangladesh government doubled the civil service pay scales (Rahman & Al-Hasan, 2018),⁸ after which the number of applicants increased dramatically (Hossain, 2019a; Islam, 2019).

This chapter contributes to the literature by answering the question if the financial incentive attracts people with higher educational achievement but lower PSM to the public sector. Using the reform as a natural experiment, this chapter estimates the impact of the higher wage on the qualifications and the motivational profiles of BCS applicants and incumbent officers. It is based on the data collected by face-to-face interviews with

⁷ Using a lab experiment on Indian college students, Hanna and Wang (2017) find that those who cheat on a dice task and those with lower pro-social preferences are more likely to prefer entering government service after graduation, regardless of cognitive ability.

⁸ Just before the pay-scale reform, the average monthly wage was 17,969 BDT (\$ 225) in the private sector and 22,040 BDT (\$ 276) in the public sector. The wage differential between public and private wage increased from 10.6 percent in 2013 to 22.7 percent in 2015 (Rahman and Al-Hasan, 2018).

civil service applicants and incumbent officers who took the BCS examination before the reform and those who took it after. The estimation results show that BCS officers who were hired after the reform are better, both in academic records and PSM, than those before the reform.

This chapter contributes to the broader literature on labor economics and on public sector personnel economics, which investigates the effect of higher wages on recruitment (Dal Bo et al., 2013; Deserranno, 2019; Ashraf et al., 2018). To the best of the author's knowledge, no other study has investigated the effect of a national-level pay-scale increase on the applicant pool of the elite civil service in developing countries. This chapter provides new evidence regarding the effect of the national-level compensation policy on the type of civil service applicants.⁹

To conduct the study in this chapter, a large survey was conducted on around 300 elite civil service officers (mid-level elite officers) and around 120 non-qualified civil service applicants. The number of samples of BCS officers is nationally representative as they were 40% of the total officers of 33, 34, and 35th BCS batches (sample batches of this study). List of non-qualified civil service applicants was also collected from coaching center. Another list of non-qualified applicants was prepared after collecting names of non-qualified friends (applicants) from qualified BCS officers. This is a unique data set

⁹ There are empirical studies examining the performance of civil service officers in developing countries. Bertrand et al. (2018) find that the Indian Administrative service (IAS) officers entering the civil service at a later age have lower promotion prospects, which results in lower performance as measured by stakeholders' evaluation and suspension records. Rasul and Rogger (2018), examining the Nigerian civil service, show that offices' use of more management practices on performance incentives is negatively correlated with the performance measure of the development projects' completion rate.

in the literature which was collected from elite civil service officers (policymakers) as the data and research is scarce in the context of public sector policymakers. Once again, this research is the first research that documented how to measure the quality and motivational profile of elite civil service officers.

Following this introduction, this chapter presents the institutional background of BCS and the pay scale reforms in the next section. The section that follows explains the conceptual framework and postulate hypotheses. The data and characteristics of the sample are presented in the next section, and the empirical methods and estimation results are discussed thereafter. The final section presents the summary and conclusions.

2.2 Institutional Background of Bangladesh Civil Service (BCS) and Pay Scale Reforms

BCS is vertically divided into four classes (Class I to IV). Class-I officers conduct managerial and professional activities and are further divided into two categories: BCS cadre officers and Non-BCS gazette officers. In general, promotion prospects are higher for BCS cadre officers than for non-BCS gazette officers (Khan, 2015; Ferdous, 2015). BCS is vertically divided into 28 service cadres. The 28 cadres are divided into two main categories: managerial (general) cadres and technical cadres (Islam, 2016; Khan, 2015; Kim & Monem, 2009). Civil service officers' status and ranking are set by the grades (20 is the lowest and 1 is the highest) (Ministry of Finance, 2015).

The recruitment of civil service officers is managed and administered by the Bangladesh Public Service Commission (BPSC), an independent constitutional body. All ministries apprise BPSC of their vacant posts through the Ministry of Public Administration (MOPA). The civil service examination consists of (1) preliminary

examination, (2) the written examination, and (3) the viva voce examination¹⁰ (Jahan, 2012 & MOPA, 2014). Until 2018, 56% of the positions were allocated according to quota provisions for privileged groups such as freedom fighters' descendants, women (10%), and people from backward districts and indigenous communities and physically challenged individuals (Khan, 2015).¹¹

After the independence of Bangladesh, the government made several attempts to increase the civil servant pay-scales to align the salary with the cost of living. However, since the inflation rate was higher than the pay increases, the benefit from the increased pay eroded within a few months (Islam, 2016; Khan, 2015). In July 2015, the government reformed the civil servant pay structures, which was the first time this was done based on inflation and living costs. Previously, most applicants came from the arts and humanities, whereas after the 2015 pay scale reform, students from other departments, especially engineering, have begun to apply for civil service general cadre (administrative and managerial than technical cadre) jobs (Azad, 2018; Hossain, 2019b; Mujumdar, 2017).

2.3 Conceptual Framework and Hypotheses

The research question of this chapter is if the financial incentive attracts people with higher educational achievement but lower PSM to the public sector. Roy's (1951)

¹⁰ BPSC members chair the viva board, which consists of a psychologist from a recognized university and higher government officials from a ministry nominated by the Ministry of Public Administration (Khan, 2015). The viva board members assess the candidates based on their intellectuality, emotional stability, smartness, leadership attributes, and involvement in other activities, such as sports, debate competitions, and hobbies (MOPA, 2014). In 2013, the number of applicants for the BCS exam was 221,575, of which 9,515 passed the written exam and 2,175 were selected for appointment. In 2015, 244,107 people applied for the BCS exam; 6,088 of them passed the written exam and 2,158 were selected for appointment (BPSC, 2015).

¹¹ During the survey, there were all types of quotas including 10% women quota. Our sampled applicants and BCS officers enjoyed the quota privileges who were eligible.

model shows that candidates select a job if his/her expected return from the job is higher than the reservation wage. The expected return depends on the skills needed for a particular job and expected wage from the job. The expected returns include utility gains and satisfaction from the job. Therefore, even for the same job, the expected returns can differ based on the preference of job characteristics. Those who have higher PSM are expected to have higher satisfaction from public rather than the private sector jobs in a given wage. When the public sector wage was lower than that in private sector, those with high PSM and low reservation wage tend to apply for the public sector jobs.

Since the 2015 pay scale reform drastically increased salaries in the public sector compared with the private sector, it can equally attract people with high PSM and high reservation wage and those with low PSM and high reservation wage. As long as the number of higher-qualified candidates with high PSM increases and the selection committee can detect candidates with low PSM, the quality of civil service officers is expected to improve after the reform without sacrificing PSM.

2.4 Data and Empirical method

2.4.1 Data and sample

From 2012 to 2015, the BPSC invited applications for the 33rd, 34th, and 35th BCS examinations (advertised in February 2012, February 2013, and September, 2014, respectively). The news about the pay scale reform that the government for civil servants had already been released before the advertisement of the 35th BCS examination,¹² and

¹² The news of the 2015 pay scale reform was published in August 2014 (Daily Nation, 2014). There was an analysis of the pay scales by the leading think tank of Bangladesh on September 8, 2014 (CPD, 2015).

thus, its applicants are considered as the post-reform cohort. Those who took the 33rd and 34th BCS examinations were pre-reform cohorts.

Data from both BCS personnel and the applicants who did not pass the BCS examination were collected by the authors. The survey was conducted from October 15 to December 20, 2017. As the information on the applicants for civil service examination is confidential, it was not possible to acquire a complete list of applicants. Therefore, to prepare a nationally representative sample, data were collected from three groups: (1) 303 junior-level BCS (administration cadre) officers who applied for the BCS examinations in 2012, 2013, and 2015; this sample size is the 40% of the total BCS (Administration cadre) officers¹³ (2) 108 applicants who attended a coaching center and applied for the BCS examinations held in 2012, 2013, and/or 2015, but did not pass; and, (3) 22 friends of group (1) above, who took the BCS examination in 2012, 2013, and/or 2015 but did not pass.

For the results to be nationally representative, data were collected from 32 districts covering all eight divisions of Bangladesh.¹⁴ Based on the number of officers in the district administration office, 8 to 15 BCS officers from each office were randomly sampled, to obtain a total of 303. Of these, the number of officers who took the examination in 2012, 2013, and 2015 was 90, 98, and 115, respectively. Interviewers were properly trained to explain the purpose of the research and the confidentiality of responses

13 In the BCS (Administration cadre), the number of officers recruited are 290, 279, and 280 in 2012, 2013, and 2015, respectively (BPSC, 2015). Only BCS (administration cadre) officers are selected as sample. This is because there are few officers recruited for other cadre services in 2012, 2013, and 2015.

14 Based on the number of districts within the division, 2 to 5 district offices from each division were randomly selected.

to the participants, so that they would be willing to provide honest answers to the questions. The interviews were conducted individually and separately.

The list of applicants who took the examination in 2012, 2013, and 2015 was collected from an established coaching center¹⁵ in Dhaka. From the list, 108 individuals were randomly selected. The interviews normally took place at the respondent's home or office, as requested by the respondent. The BCS officers in the sample were first interviewed and the list of their friends' names and cellphone numbers was collected by asking whether they have friends who applied for the BCS examination in the same year but did not pass. Thereafter, 22 individuals were selected from the list.

2.4.2 Measures of qualities

To measure the raw qualities of the civil service applicants, both their cognitive and non-cognitive abilities were assessed. The cognitive abilities were measured by the highest grade (A+) on their Secondary School Certificate (SSC) examination and whether he/she is a graduate from an engineering university/department. The SSC examination is a centralized public examination held after 10 years of schooling (NUFFIC, 2012). In Bangladesh, those who apply to engineering universities need to receive at least 90% marks both in the secondary and higher secondary public exams. Whether one studies in the engineering department is a good proxy of a good academic record. The monthly real

15 In Bangladesh, there are a few coaching centers that offer intensive programs for the preparation of BCS exam. Generally, after graduation, a good number of applicants take the BCS examination after preparation via a coaching center. The coaching centers are few, and mostly located in Dhaka. Anyone can enroll in the coaching centers by paying around \$125. The course duration is 1-6 months (most commonly 3 months) for preliminary, written, and viva voce examinations.

gross income in the previous job is also used as a measure of work-related skills as a high grade in school does not guarantee that one has higher productivity in the workplace. As a measure of non-cognitive ability, the Big-Five Personality Traits are used to capture different dimensions of the sampled individuals' personalities, which are necessary to perform effectively in the workplace.

Public Service Motivation (PSM) is considered to be an important characteristic for public-sector workers to provide public services effectively (Perry & Wise, 2005; Francois, 2000; Kwon, 2012; Naff & Crum, 1999). PSM is measured through Perry's (1996) PSM scale. Since PSM is closely related to pro-social behavior and social preferences (Dal Bo et al., 2013), the pro-social behavior and the social preferences of the applicants are used in the analyses. For measuring pro-social behavior, the applicants are asked whether they participated in either volunteer or charity activities before applying for the civil service examination. By using non-incentivized hypothetical questions, social preference measures such as patience, risk-aversion, and altruism are elicited.¹⁶

2.4.3 Descriptive Statistics

This section presents the average characteristics of the civil service applicants and incumbent civil service officers who applied for the BCS examination before and after the pay scale reform (pre- and post-reform cohorts). Panel A consists of socio-demographic and parental characteristics while Panel B shows educational background. Panel C indicates variables related with personality traits. The first two columns of Table

¹⁶ See Appendix 2.A for how the Big-Five index, PSM, pro-social behavior, and pro-social preference are measured including other variables.

2.1 show the average characteristics of applicants who took the exam before and after the reform. The third column shows the results of the t-test (p-value) if the mean characteristics are statistically different between these two groups. The fourth and fifth columns indicate the mean characteristics of BCS officers who took the exam before and after the reform, respectively. The last column indicates whether the means of these two groups are different.

The first three columns of Table 2.1 show that applicants who took the exam after the reform are less likely to be married, to have quota privilege, and to have experience in working in the private sector, and are more likely to have a father who owns a business, to obtain the highest grade in the SSC exam, and to have attended school in an urban area than applicants who took exam before the reform. According to the last three columns, BCS officers who took the exam after the reform are less likely to be married or agreeable, and are more likely to have the highest grade in SSC, to study engineering, and to have had a higher income in the previous job. In terms of parental education and labor-force participation, there is no difference between the post-reform and pre-reform cohorts. As shown in Panel C, there are no significant differences in personality traits of pre- and post-reform cohorts both in applicant pool and BCS officers.

Table 2.2 presents the PSM (Panel A), pro-social behaviors (Panel B), and social preferences (Panel C). Regarding the applicant pool, there is no difference in PSM index between pre-and post-reform cohorts. Among civil service officers, however, the post-reform cohort has higher PSM than the pre-reform cohort. On average, pro-social behaviors of pre- and post-reform cohorts are comparable in both the applicant pool and among BCS officers. Panel C suggests mixed results. While applicants in the post-reform

cohort tend to have worse social preferences than those in the pre-reform cohort, BCS officers in the post-reform cohort tend to be more patient and more altruistic to the poor than those in the pre-reform cohort, which are desirable characteristics for public servants.

2.4.4 Estimation Models

The descriptive statistics showed that both in the applicant pool and among BCS officers, educational qualification measured by the SSC exam improved on average after the reform. In terms of PSM, there is no difference between the pre and post cohorts in the applicant pool, while the PSM of BCS officers after the reform is higher than in those before. It was also found that BCS officers who took the exam after the reform tend to have better social preferences than those before the reform. In this section, to test if even after controlling for other characteristics, BCS officers after the reform are more motivated than those before the reform, following estimation models are used.

The effect of financial incentive on the qualities and motivational profiles of the BCS applicant pool is estimated by the following Ordinary Least Square models, similar to those of Dal Bo et al. (2013), Deserranno (2019), and Donato et al. (2017):

$$Y_{it} = \alpha + \beta Post_t + \rho X_{it} + e_{it} \dots\dots\dots Eq. 1$$

where Y_{it} is educational quality (highest grade in the SSC examination or engineering graduate), the income at the previous job, personality traits, PSM, pro-social behavior, or social preferences. $Post_t$ takes the value 0 if individual i took the BCS examination before the 2015 pay scale reform and 1 otherwise. X is a set of the individual i 's characteristics, determined before he or she took the SSC examination, including age, sex,

location of childhood (whether raised in an urban area), schooling years, and occupation of parents. While α , β , and ρ are coefficients to be estimated, e is an error term.

The effect of the pay-scale reform on the applicant pool is estimated by β . The sample was used in this chapter is applicants who applied just before and just after 2015. It is not likely that all the difference in characteristics of applicants come from time trend. As long as there was no change in policy and economic conditions which can be confounders of occupation choice of applicants just before and after 2015, it is argued that it is likely to be the effect of the pay-scale reform. As described in Appendix 2.B, there were no major changes in the BCS recruitment policy, education policies, and labor market situation in Bangladesh (ADB & ILO, 2016; Hossain & Mohammad, 2015; Khan et al., 2014) which can affect the characteristics of the applicant pool. Since BCS officers were over-sampled, sampling weights are applied in all the analyses to represent the applicant pool accurately. The standard errors are clustered at the survey location (districts and training centers where interviews were conducted) and by interviewer.

The effect of the reform on BCS officers' qualities and motivation profiles is estimated by the difference-in-difference (DID) approach:

$$Y_{it} = \alpha + \beta Post_t + b Post_t \times O_i + c O_i + \rho X_{it} + e_{it} \dots \dots \dots \text{eq. 2}$$

where O_i takes the value 1 if the individual passed the examination (i.e., is a BCS officer) and 0 otherwise. While α , β , b , c , and ρ are coefficients to be estimated, e is an error term. If officers in the post-reform cohort have lower PSM (motivational profiles) on average, the coefficient of the interaction term, b , will be negative.

If the pay scale reform not only increased salary but also screening method, the beta coefficient cannot identify the effect of increased salary on officers' characteristics. As explained in Appendix 2.B, the recruitment process was not change largely after the pay scale reform. Furthermore, in this DID model, what to be identified is just that a difference between officers and non-qualified applicants increased or decreased after the reform. As discussed in the next section that a common trend assumption holds, therefore, the identification strategy is valid.

For identifying DID estimates, the common trend assumption must hold. Officers are of better academic quality than those who did not pass the examination, based on the fact that they passed the examination. The pre-reform trend (2012-2013) in quality should be comparable for officers and non-officers. It is tested whether the coefficient of an interaction term between the 2013 group and those who passed the examination (officers) is significantly different from zero by using the sample of those who took the examination either in 2012 or 2013. Both for the SSC examination grade and PSM index, the coefficients are not significant, suggesting that the common trend assumption is not violated.

In this study, gender analyses has been done both for the applicant pool and BCS officers. In that case, Male (=1 if male and 0 otherwise) variable is interacted with *Post* variable in the estimation models of the applicant pool, and with *Post*×*O* variable in the estimation models of the BCS officers.

2.5 Estimation Results

2.5.1 Effect of the reform on BCS applicant pool

Table 2.3 shows the estimated coefficients of *Post* in Equation 1 for all the qualities and motivation profiles of Bangladesh civil service applicants. In 18 out of 21 models, there is no evidence that the pay-scale reform affected the characteristics of the applicant pool. The results show that the higher wage attracted people who are more pro-social, less present-biased, and less risk-averse than those in the pre-reform cohort. These results are not expected but these characteristics are preferable for BCS officers. In the case of applicant pool, it is found that gender matters. The appendix table 2.5 and 2.6 exhibit that the female applicants showed more openness (more interested in new experiences and innovation) than male applicants, but male applicants showed more interested in policy making, participated more in the voluntary activities, and were more most risk-averse.

To summarize, there is no evidence that the higher wage attracted applicants with higher quality and with lower motivational profiles.¹⁷ Rather, applicants in the post-reform cohort tend to be more engaged in volunteer and charity work, less present-biased, and less risk averse. More specifically, the effect of the 2015 pay-scale reform on the civil service applicant pool is not significant on average. The more important question is whether the reform changed the quality of BCS officers or not, which is discussed in the next section.

¹⁷ See Full estimation results for BCS applicant pool in Appendix tables 2.1 and 2.2.

2.5.2 Effect of the reform on BCS officers

Table 2.4 shows the estimated results on characteristics of BCS officers. As seen in the positive coefficient of $Post_t \times O_i$, BCS officers recruited after the pay-scale reform have higher SSC examination scores and an engineering background. Furthermore, BCS officers in the post-reform cohort have higher PSM index, particularly committed to public service, than those in the pre-reform cohort. The results on pro-social behavior and social preference show that BCS officers who applied for the examination after the reform tend to be more patient and altruistic to the poor. Regarding the personality traits, it is found that BCS officers recruited after the reform are less extraverted and more conscientious. These traits are well suited to being a BCS officer. In the case of gender analyses (Appendix Table 2.7-2.8), it was found that the previous log real income was higher for the female officers, and female officers scored higher in the PSM index and commitment to the public interest modules of PSM than male officers, though male officers scored higher for self-sacrifice module of PSM.

In sum, BCS officers who joined the civil service after the pay scale reform have higher educational qualification, higher PSM, and better social preferences (patience and altruism) than those who joined before.¹⁸ Although there is no impact on the applicant pool on average, the increased number of applications from highly qualified individuals resulted in an improvement in the characteristics of BCS officers hired after the reform.

¹⁸ See Full estimation results for incumbent BCS officers in Appendix tables 2.3 and 2.4.

2.6 Concluding remarks

This chapter empirically examined whether financial incentives can be used as a policy instrument to recruit high-quality civil-service officers with high public-sector motivations by using the case of the 2015 pay scale reform in Bangladesh, which doubled the salaries of civil servants. Unlike the existing studies, this chapter examines the effectiveness of financial incentives on recruiting elite civil service officers. This is a main contribution of this chapter to the literature. The empirical results are encouraging: post-reform BCS officers have higher educational quality than pre-reform officers and higher PSM. Compared to pre-reform BCS officers, they are also more motivated to public service, more altruistic to the poor, and have higher social preferences. The results for the applicant pool show that applicants in the post-reform cohort are more engaged in volunteer and charity activities, less present biased, and less risk averse than applicants in the pre-reform cohort. Although Dal Bo et al. (2013) found that financial incentive improved the educational qualification of the applicant pool by examining frontline public sector workers, there is no evidence that financial incentive can improve educational quality of applicant pool for elite civil service jobs examined in this chapter.

Since the performance of the work done by BCS officers is difficult to measure, this chapter did not examine the effect of the reform on the performance of the civil service per se. There is no guarantee that better quality individuals at the recruitment stage continuously perform in the long run, as Bertrand et al. (2018) find in the context of the Indian elite civil service, where those with lower promotion prospects are less motivated and inefficient in providing public service. As the promotion prospect in BCS is highly politicized and 84% of sampled BCS officers expressed concerns about promotion, the

government may need to introduce promotion criteria not based on lobbying and political choices. This can motivate officers to provide public service until retirement. This can also have a positive effect on recruiting better-quality individuals for the civil service, as also found in Morgan et al. (2012).

Unfortunately, there is no enough data to conclude the effect of the pay-scale reform on the quality of service provision and corruption in Bangladesh at this point. According to Transparency International Bangladesh (TIB), the corruption perception index (CPI) shows that corruption decreased from 2015 to 2016 but increased again in 2018. Furthermore, CPI is an aggregate measure. The reform's effects can trickle down to grassroots in some services but not in the other services. Therefore, a future research is required to answer to this question. As expected also that the performance of the public sector would be improved after getting higher salary. However, whether the performance of BCS has improved due to the reform and whether the effects of the reform on the applicant pool in other sectors (local government) and cadre services (such as Tax, Customs, and Foreign Affairs) are similar to those found in this chapter (on BCS administrative cadre) remains a topic for future research. Author has also the plan to further study in this regards.

Finally, as the civil service examination is conducted by the Bangladesh Public Service Commission, the list of applicants is confidential. Therefore, the list of applicants collected from the coaching centers may not perfectly representative to the actual applicant pool. It is important to keep this in mind as a caveat of this chapter.

Table 2.1 Socio-demographic condition, educational background, and personality traits of the applicants and incumbent civil service officers who took the Bangladesh Civil Service (BCS) exam before and after the 2015 Pay Scale Reform

Variables	Applicants who took BCS exam before the reform	Applicants took BCS exam after the reform	p-value	Incumbent BCS officers who took BCS exam before the reform	Incumbent BCS officers who took the BCS exam after the reform	p-value
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Mean Characteristics (Socio-demographic condition)						
Number of obs.	279	154		188	115	
Married	0.60 (0.49)	0.28 (0.45)	0.00	0.79 (0.41)	0.46 (0.50)	0.00
Male	0.80 (0.40)	0.73 (0.44)	0.11	0.69 (0.46)	0.68 (0.47)	0.84
Raised in urban area	0.58 (0.49)	0.64 (0.48)	0.23	0.74 (0.44)	0.70 (0.46)	0.48
Schooling years of father	12.25 (4.08)	12.38 (3.34)	0.72	13.3 (3.96)	13.4 (3.39)	0.82
Father does business	0.21 (0.41)	0.37 (0.48)	0.00	0.17 (0.38)	0.24 (0.43)	0.13
Father is 1st/2nd class government officer	0.19 (0.39)	0.26 (0.44)	0.10	0.27 (0.44)	0.34 (0.48)	0.13
Schooling years of mother	9.52 (3.39)	9.62 (2.26)	0.71	10.37 (3.49)	10.93 (3.46)	0.18
Mother has job	0.11 (0.31)	0.07 (0.25)	0.17	0.16 (0.37)	0.21 (0.41)	0.32
Previous Log Real Income	10.25 (0.39)	10.24 (0.45)	0.87	10.21 (0.43)	10.45 (0.43)	0.00
Enroll in coaching center	0.63 (0.63)	0.68 (0.68)	0.36	0.40 (0.49)	0.38 (0.49)	0.78
Quota privilege	0.22 (0.42)	0.11 (0.32)	0.00	0.46 (0.50)	.50 (0.50)	0.58
Did private sector job	0.33 (0.47)	0.18 (0.38)	0.00	0.34 (0.48)	0.27 (0.45)	0.17

Table 2.1 Socio-demographic condition, educational background, and Personality traits of the applicants and incumbent civil service officers took the Bangladesh Civil Service (BCS) exam before and after the 2015 Pay Scale Reform, (**contd.**)

Variables	Applicants took BCS exam before the reform	Applicants took BCS exam after the reform	<i>p</i> - value	Incumbent BCS officers took BCS exam before the reform	Incumbent BCS officers took BCS exam after the reform	<i>p</i> - value
	(1)	(2) (3)	(4)	(5)		(6)
Panel B: Mean Characteristics (Educational Background)						
Highest Grade in SSC exam	0.19 (0.47)	0.32 (0.39)	0.00	0.24 (0.43)	0.51 (0.50)	0.00
Schooling Years	16.90 (0.30)	16.92 (0.31)	0.38	16.87 (0.33)	16.84 (0.49)	0.52
Schooling in urban area	0.33 (0.47)	0.43 (0.50)	0.05	0.50 (0.50)	0.50 (0.50)	0.88
Engineering graduate	0.07 (0.26)	0.08 (0.28)	0.73	0.10 (0.30)	0.28 (0.45)	0.00
Panel C: Mean Characteristics (Personality traits)						
Big 5 Index	0.06 (0.37)	-0.00 (0.37)	0.09	0.09 (0.43)	0.04 (0.45)	0.43
Extraversion	3.80 (0.65)	3.84 (0.56)	0.54	3.79 (0.74)	3.64 (0.67)	0.07
Agreeableness	4.03 (0.46)	3.99 (0.54)	0.37	4.08 (0.46)	3.93 (0.56)	0.02
Conscientiousness	3.63 (0.55)	3.54 (0.65)	0.13	3.59 (0.62)	3.65 (0.68)	0.42
Neuroticism	2.67 (0.67)	2.69 (0.66)	0.87	2.67 (0.77)	2.67 (0.74)	0.99
Openness	3.19 (0.47)	3.26 (0.49)	0.14	3.22 (0.55)	3.16 (0.56)	0.32

Note: Numbers in brackets are standard deviations. Sampling weight is used during calculation.

Table 2.2 Public Service Motivation Score, Pro-Social Behavior and Social Preferences of the applicants and incumbent civil service officers who took BCS exam before and after the 2015 Pay Scale Reform

Variables	Applicants took BCS exam before the reform	Applicants took BCS exam after the reform	<i>p</i> - value	Incumbent BCS officers took BCS exam before the reform	Incumbent BCS officers took BCS exam after the reform	<i>p</i> - value
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Public Service Motivation						
Number of obs.	279	154		188	115	
PSM Index	-0.17 (0.45)	-0.23 (0.41)	0.14	-0.21 (0.51)	-0.04 (0.52)	0.02
Attraction to Policy Making	3.90 (0.50)	3.7 (0.63)	0.01	3.93 (0.52)	4.01 (0.57)	0.23
Commitment to the Public Interest	3.79 (0.52)	3.86 (0.45)	0.13	3.74 (0.54)	4.03 (0.56)	0.00
Social Justice	3.02 (0.35)	2.99 (0.35)	0.47	3.02 (0.42)	3.00 (0.52)	0.65
Civic Duty	3.96 (0.45)	3.95 (0.37)	0.74	3.91 (0.54)	3.98 (0.53)	0.26
Compassion	3.06 (0.46)	2.96 (0.40)	0.02	3.02 (0.56)	3.04 (0.57)	0.77
Self-Sacrifice	4.00 (0.42)	4.04 (0.31)	0.80	4.02 (0.46)	4.11 (0.59)	0.14

Table 2.2 Public Service Motivation Score, Pro-Social behavior and Social Preferences of the applicants and incumbent civil service officers who took BCS exam before and after the 2015 Pay Scale Reform (**contd.**)

Variables	Applicants took BCS exam before the reform	Applicants took BCS exam after the reform	<i>p</i> - value	Incumbent BCS officers took BCS exam before the reform	Incumbent BCS officers took BCS exam after the reform	<i>p</i> - value
	(1)	(2)	(3)	(4)	(5)	(6)
Panel B: Pro-social characteristics						
Participated in Volunteer activities	0.65 (0.48)	0.70 (0.46)	0.27	0.63 (0.48)	0.66 (0.47)	0.59
Panel C: Social Preferences						
Least patient	0.75 (0.43)	0.82 (0.39)	0.09	0.72 (0.45)	0.54 (0.50)	0.03
Present bias	0.06 (0.24)	0.02 (0.14)	0.02	0.09 (0.28)	0.09 (0.28)	0.89
Risk averse (Most)	0.70 (0.46)	0.57 (0.50)	0.01	0.70 (0.46)	0.60 (0.49)	0.11
Altruism to the poor family	5.88 (2.82)	5.42 (2.63)	0.09	6.15 (3.24)	7.26 (2.83)	0.00

Note: Numbers in brackets are standard deviations. Sampling weight is used during calculation.

Table 2.3. Effect of the 2015 Pay Scale Reform on Applicant Pool

Outcome variables	Coeff. of Post (standard error)	# obs R2
	(1)	(2)
=1 if grade of SSC exam is A+	0.06 (0.07)	433 0.09
Engineering graduate	0.03 (0.02)	433 0.12
log real income in previous job	-1.03 (1.01)	433 0.12
Big 5 index	-0.04 (0.05)	433 0.03
Extraversion	0.07 (0.07)	433 0.04
Agreeableness	-0.01 (0.15)	433 0.06
Conscientiousness	-0.03 (0.10)	433 0.05
Neuroticism	-0.05 (0.14)	433 0.09
Openness	0.03 (0.11)	433 0.07
PSM index	-0.01 (0.08)	433 0.09
Interested in Policy making	-0.09 (0.13)	433 0.13
Commitment to pub service	0.09 (0.10)	433 0.07
Social Justice	0.02 (0.07)	433 0.04
Civic duty	-0.04 (0.09)	433 0.04
Compassion	-0.03 (0.06)	433 0.05
Self-sacrifice	-0.01 (0.05)	433 0.07

Table 2.3. Effect of the 2015 Pay Scale Reform on Applicant Pool (contd.)

Outcome variables	Coeff. of Post (standard error)	# obs R2
	(1)	(2)
=1 if Participated voluntary/charity activities	0.15*** (0.05)	433 0.13
=1 if Least Patient	-0.02 (0.06)	433 0.12
=1 if Present Bias	-0.07** (0.03)	433 0.08
=1 if Most risk- averse	-0.23** (0.11)	433 0.09
Altruism to poor (0-10)	-0.54 (0.49)	433 0.05

Notes: The standard error were clustered at the survey locations (districts and training center where interviewed were undertaken) and enumerators are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Other controls are: age, male, urban, schooling years and occupation of father and mother.

Table 2.4 Effect of the 2015 Pay Scale Reform on BCS Officers

Outcome variables	Coeff. of Post x O (s.e)	Coeff. of Post (s.e)	Coeff. of O (s.e.)	# obs R2
	(1)	(2)	(3)	(3)
=1 if grade of SSC exam is A+	0.17* (0.09)	0.02 (0.08)	0.07 (0.05)	433 0.10
Engineering graduate	0.21*** (0.04)	-0.02 (0.02)	0.02 (0.04)	433 0.13
log real income in previous job	-0.11 (1.12)	-0.74 (1.27)	2.41** (0.91)	433 0.09
Big 5 index	-0.02 (0.07)	-0.02 (0.04)	0.09 (0.08)	433 0.03
Extraversion	-0.30*** (0.11)	0.13 (0.08)	0.06 (0.11)	433 0.04
Agreeableness	-0.19 (0.14)	0.05 (0.16)	0.05 (0.09)	433 0.04
Conscientiousness	0.20* (0.12)	-0.10 (0.11)	-0.09 (0.09)	433 0.04
Neuroticism	0.02 (0.20)	0.02 (0.18)	-0.01 (0.14)	433 0.04
Openness	-0.21 (0.16)	0.10 (0.14)	0.11 (0.07)	433 0.04
PSM index	0.25** (0.10)	-0.10 (0.09)	0.01 (0.07)	433 0.08
Interested in Policy making	0.23 (0.16)	-0.19 (0.16)	0.19* (0.11)	433 0.15
Commitment to public service	0.29** (0.11)	0.02 (0.12)	-0.02 (0.10)	433 0.07
Social Justice	-0.05 (0.10)	0.01 (0.08)	0.03 (0.05)	433 0.03
Civic duty	0.12 (0.11)	-0.06 (0.11)	-0.11** (0.05)	433 0.03
Compassion	0.15 (0.11)	-0.07 (0.08)	-0.06 (0.08)	433 0.05
Self-sacrifice	0.12 (0.08)	-0.06 (0.06)	-0.00 (0.07)	433 0.04

Table 2.4 Effect of the 2015 Pay Scale Reform on BCS Officers (**contd.**)

Outcome variables	Coeff. of Post x O (s.e)	Coeff. of Post (s.e)	Coeff. of O (s.e.)	# obs R2
	(1)	(2)	(3)	(4)
Civic duty	0.12 (0.11)	-0.06 (0.11)	-0.11** (0.05)	433 0.03
Compassion	0.15 (0.11)	-0.07 (0.08)	-0.06 (0.08)	433 0.05
Self-sacrifice	0.12 (0.08)	-0.06 (0.06)	-0.00 (0.07)	433 0.04
=1 if Participated voluntary/charity activities	-0.07 (0.08)	0.15** (0.06)	0.00 (0.09)	433 0.12
=1 if Least Patient	-0.28*** (0.09)	0.09** (0.04)	0.01 (0.07)	433 0.11
=1 if Present Bias	0.04 (0.05)	-0.08* (0.03)	0.05 (0.04)	433 0.08
=1 if Most risk- averse	0.05 (0.11)	-0.21* (0.11)	0.07 (0.08)	433 0.08
Altruism to poor (0-10)	1.98** (0.67)	-1.01* (0.53)	0.52 (0.70)	433 0.07

Notes: The standard error were clustered at the survey locations (districts and training center where interviewed were undertaken) and enumerators are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Other controls are: age, male, urban, schooling years and occupation of father and mother.

Appendix: Full Estimation Results

Appendix Table 2.1. Effect of the 2015 pay scale reform on the educational qualifications, market skill, & personality of applicant pool

	=1 if grade of SSC exam is A+	Engineering graduate	log real income in previous job	Big 5 index	Extraversion	Agreeableness	Conscientiousness	Neuroticism	Openness
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post	0.06 (0.07)	0.03 (0.03)	-1.03 (1.01)	-0.04 (0.04)	0.03 (0.07)	-0.01 (0.13)	-0.03 (0.09)	0.03 (0.14)	0.03 (0.11)
Age	-0.02 (0.01)	0.01 (0.01)	0.49*** (0.18)	0.00 (0.01)	-0.01 (0.02)	0.01 (0.01)	0.01 (0.01)	0.01 (0.02)	-0.01 (0.01)
Male	-0.06 (0.07)	0.08** (0.03)	1.27** (0.57)	0.07 (0.05)	0.12 (0.08)	-0.05 (0.10)	-0.00 (0.08)	-0.12 (0.08)	0.05 (0.08)
Raised in urban area	0.13** (0.06)	0.10*** (0.03)	0.90* (0.53)	-0.03 (0.04)	-0.13* (0.07)	-0.02 (0.09)	0.06 (0.05)	-0.10 (0.06)	-0.05 (0.07)
Father's education	-0.01 (0.01)	0.00 (0.00)	0.03 (0.10)	-0.00 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.02 (0.01)	0.00 (0.01)	0.01 (0.01)
Mother's education	0.01 (0.01)	0.01 (0.01)	0.16 (0.12)	0.01 (0.01)	0.01 (0.02)	0.02* (0.01)	-0.02 (0.02)	0.02 (0.01)	-0.00 (0.02)

Appendix Table 2.1. Effect of the 2015 pay scale reform on the educational qualifications, market skill, & personality of applicant pool (contd.)

	=1 if grade of SSC exam is A+	Engineering graduate	log real income in previous job	Big 5 index	Extraversion	Agreeableness	Conscientiousness	Neuroticism	Openness
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Father's occupation (government)	0.08 (0.08)	0.05 (0.04)	-0.11 (1.03)	-0.03 (0.05)	0.04 (0.09)	-0.01 (0.06)	0.08 (0.06)	-0.16 (0.14)	-0.03 (0.08)
Father's occupation (business)	0.06 (0.08)	0.02 (0.03)	0.29 (0.85)	-0.07 (0.06)	0.07 (0.11)	-0.03 (0.06)	-0.08 (0.07)	-0.11 (0.12)	0.10** (0.05)
Mother has job	0.19** (0.09)	-0.01 (0.06)	-0.24 (0.66)	0.04 (0.09)	0.08 (0.12)	0.19 (0.12)	0.21 (0.13)	-0.39*** (0.13)	0.06 (0.12)
Constant	0.67* (0.36)	-0.46** (0.20)	-12.66** (5.35)	-0.04 (0.32)	3.92*** (0.52)	3.68*** (0.51)	3.53*** (0.41)	2.53*** (0.64)	3.42*** (0.43)
Observations	433	433	433	433	433	433	433	433	433
R-squared	0.09	0.09	0.12	0.03	0.03	0.04	0.03	0.04	0.03

Notes: The standard error were clustered at the survey locations (districts and training center where interviewed were undertaken) and enumerators are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Appendix Table 2.2. Effect of the 2015 pay scale reform on the PSM, pro-social behavior, & social preferences of applicant pool

	PSM index	Interested in Policy making	Commitment to pub service	Social Justice	Civic duty	Compassion	Self- sacrifice	=1 if Participated voluntary and charity activities	=1 if Least Patient	=1 if Present Bias	=1 if Most risk- averse	Altruism to poor (0-10)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Post	-0.03 (0.08)	-0.14 (0.13)	0.10 (0.10)	-0.01 (0.07)	-0.01 (0.09)	-0.02 (0.06)	-0.03 (0.04)	0.13** (0.05)	0.01 (0.06)	-0.07** (0.03)	-0.20* (0.10)	-0.50 (0.53)
Age	0.00 (0.01)	-0.01 (0.02)	0.01 (0.02)	-0.00 (0.01)	0.00 (0.01)	0.02* (0.01)	-0.01 (0.01)	0.02** (0.01)	-0.02 (0.01)	-0.01* (0.01)	-0.03** (0.01)	0.01 (0.07)
Male	0.17*** (0.05)	0.35*** (0.12)	0.08 (0.06)	0.03 (0.04)	0.04 (0.05)	-0.02 (0.05)	0.05 (0.04)	0.35*** (0.04)	-0.09 (0.08)	-0.04 (0.04)	-0.04 (0.07)	0.02 (0.44)
Raised in urban	-0.11*** (0.04)	0.04 (0.04)	-0.15*** (0.05)	-0.07* (0.03)	0.00 (0.07)	-0.07 (0.05)	-0.11** (0.04)	-0.01 (0.07)	-0.08* (0.05)	0.01 (0.02)	-0.09 (0.08)	0.72** (0.33)
Father's education	-0.01 (0.01)	-0.01 (0.01)	0.01 (0.01)	-0.01** (0.00)	-0.01 (0.01)	-0.01 (0.01)	-0.00 (0.01)	0.00 (0.01)	0.00 (0.01)	0.01** (0.00)	0.01 (0.01)	-0.03 (0.05)
Mother's education	0.01 (0.01)	0.00 (0.01)	-0.00 (0.01)	0.01 (0.01)	0.01 (0.02)	0.00 (0.01)	-0.00 (0.01)	0.00 (0.01)	-0.02 (0.01)	-0.01 (0.01)	0.00 (0.01)	-0.02 (0.09)
Father's occupation (government)	0.12* (0.07)	-0.00 (0.07)	0.08 (0.09)	0.07 (0.05)	0.11 (0.07)	0.01 (0.07)	0.07 (0.05)	-0.06 (0.06)	-0.12 (0.08)	-0.05 (0.03)	-0.14** (0.06)	0.37 (0.40)
Father's occupation (business)	0.05 (0.07)	-0.12 (0.10)	0.17*** (0.06)	-0.02 (0.05)	0.05 (0.06)	0.02 (0.08)	0.07 (0.06)	0.08 (0.05)	-0.00 (0.05)	-0.03 (0.03)	-0.15*** (0.06)	0.06 (0.44)
Mother has job	0.04 (0.08)	-0.04 (0.08)	-0.14* (0.08)	0.10* (0.06)	0.02 (0.08)	0.03 (0.10)	0.11 (0.10)	0.17* (0.09)	-0.16 (0.12)	0.07 (0.05)	-0.17 (0.16)	0.11 (0.58)
Constant	-0.35 (0.30)	3.96*** (0.52)	3.25*** (0.45)	3.04*** (0.33)	3.88*** (0.31)	2.54*** (0.42)	4.31*** (0.28)	-0.29 (0.30)	1.52*** (0.35)	0.33** (0.17)	1.68*** (0.41)	5.85*** (2.19)
Observations	433	433	433	433	433	433	433	433	433	433	433	433
R-squared	0.07	0.10	0.06	0.03	0.02	0.04	0.04	0.12	0.09	0.06	0.07	0.02

Notes: The standard error were clustered at the survey locations (districts and training center where interviewed were undertaken) and enumerators are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Appendix Table 2.3. Effect of the 2015 pay scale reform on the educational qualifications, market skill, & personality of BCS officers

	=1 if grade of SSC exam is A+	Engineering graduate	log real income in previous job	Big 5 index	Extraversion	Agreeableness	Conscientiousness	Neuroticism	Openness
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post x O	0.17* (0.09)	0.21*** (0.06)	-0.11 (1.12)	-0.02 (0.07)	-0.30*** (0.11)	-0.19 (0.14)	0.20* (0.12)	0.02 (0.20)	-0.21 (0.16)
Post	0.02 (0.08)	-0.02 (0.03)	-0.74 (1.27)	-0.02 (0.04)	0.13 (0.08)	0.05 (0.16)	-0.10 (0.11)	0.02 (0.18)	0.10 (0.14)
O	0.07 (0.05)	0.02 (0.04)	2.41*** (0.91)	0.09 (0.08)	0.06 (0.11)	0.05 (0.09)	-0.09 (0.09)	-0.01 (0.14)	0.11 (0.07)
Age	-0.02 (0.01)	0.01 (0.01)	0.37** (0.15)	-0.00 (0.01)	-0.00 (0.02)	0.01 (0.02)	0.01 (0.01)	0.01 (0.02)	-0.01 (0.01)
Male	-0.04 (0.06)	0.09*** (0.03)	1.64*** (0.54)	0.08** (0.04)	0.13* (0.07)	-0.04 (0.09)	-0.01 (0.08)	-0.12 (0.08)	0.07 (0.08)
Raised in urban	0.12** (0.06)	0.09*** (0.03)	0.50 (0.59)	-0.04 (0.04)	-0.14* (0.08)	-0.03 (0.08)	0.07 (0.05)	-0.10 (0.07)	-0.07 (0.07)
Father's education	-0.01 (0.01)	0.00 (0.00)	0.03 (0.10)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.02 (0.01)	0.00 (0.01)	0.01 (0.01)
Mother's education	0.00 (0.01)	0.01 (0.01)	0.13 (0.13)	0.01 (0.01)	0.01 (0.02)	0.02* (0.01)	-0.02 (0.02)	0.02 (0.01)	-0.00 (0.02)

Appendix Table 2.3. Effect of the 2015 pay scale reform on the educational qualifications, market skill, & personality of BCS officers (contd.)

	=1 if grade of SSC exam is A+	Engineering graduate	log real income in previous job	Big 5 index	Extraversion	Agreeableness	Conscientiousness	Neuroticism	Openness
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Father's occupation (government)	0.07 (0.07)	0.04 (0.04)	-0.17 (0.86)	-0.04 (0.06)	0.05 (0.09)	-0.00 (0.06)	0.08 (0.06)	-0.16 (0.14)	-0.03 (0.08)
Father's occupation (business)	0.06 (0.08)	0.02 (0.02)	0.40 (0.85)	-0.06 (0.05)	0.06 (0.12)	-0.04 (0.06)	-0.07 (0.07)	-0.11 (0.12)	0.10** (0.05)
Mother has job	0.15* (0.09)	-0.04 (0.06)	-0.86 (0.70)	0.02 (0.10)	0.10 (0.12)	0.20* (0.11)	0.21* (0.12)	-0.39*** (0.12)	0.06 (0.12)
Constant	0.83** (0.40)	-0.34 (0.22)	-10.00** (4.72)	0.05 (0.33)	3.84*** (0.53)	3.65*** (0.55)	3.53*** (0.37)	2.53*** (0.61)	3.44*** (0.40)
Observations	433	433	433	433	433	433	433	433	433
R-squared	0.10	0.13	0.16	0.03	0.04	0.04	0.04	0.04	0.04

Notes: The standard error were clustered at the survey locations (districts and training center where interviewed were undertaken) and enumerators are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Appendix Table 2.4. Effect of the 2015 pay scale reform on the PSM, pro-social behavior, & social preferences of BCS officers

	PSM index	Interested in Policy-making	Commitment to pub service	Social Justice	Civic duty	Compassion	Self-sacrifice	=1 if Participated voluntary and charity activities	=1 if Least Patient	=1 if Present Bias	=1 if Most risk-averse	Altruism to poor (0-10)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Post x O	0.26** (0.10)	0.23 (0.16)	0.29*** (0.11)	-0.05 (0.10)	0.12 (0.11)	0.15 (0.11)	0.12 (0.08)	-0.07 (0.08)	-0.28*** (0.09)	0.04 (0.05)	0.05 (0.11)	1.98*** (0.67)
Post	-0.10 (0.09)	-0.19 (0.16)	0.02 (0.12)	0.01 (0.08)	-0.06 (0.11)	-0.07 (0.08)	-0.06 (0.06)	0.15** (0.06)	0.09** (0.04)	-0.08** (0.03)	-0.21* (0.11)	-1.01* (0.53)
O	0.01 (0.07)	0.19* (0.11)	-0.02 (0.10)	0.03 (0.05)	-0.11** (0.05)	-0.06 (0.08)	-0.00 (0.07)	0.00 (0.09)	0.01 (0.07)	0.05 (0.04)	0.07 (0.08)	0.52 (0.70)
Age	-0.00 (0.01)	-0.02 (0.02)	0.01 (0.02)	-0.00 (0.01)	0.00 (0.01)	0.02* (0.01)	-0.01 (0.01)	0.02** (0.01)	-0.01 (0.01)	-0.01** (0.01)	-0.03** (0.01)	-0.05 (0.08)
Male	0.17*** (0.05)	0.38*** (0.11)	0.08 (0.05)	0.03 (0.04)	0.02 (0.05)	-0.03 (0.05)	0.05 (0.04)	0.35*** (0.04)	-0.09 (0.07)	-0.03 (0.04)	-0.03 (0.06)	0.13 (0.35)
Raised in urban	-0.12** (0.05)	0.00 (0.05)	-0.14*** (0.05)	-0.07** (0.03)	0.02 (0.08)	-0.06 (0.05)	-0.11** (0.04)	-0.01 (0.06)	-0.08* (0.05)	0.00 (0.02)	-0.10 (0.07)	0.63** (0.32)
Father's education	-0.01 (0.01)	-0.01 (0.01)	0.01 (0.01)	-0.01** (0.00)	-0.01 (0.01)	-0.01 (0.01)	-0.00 (0.01)	0.00 (0.01)	0.00 (0.01)	0.01*** (0.00)	0.01 (0.01)	-0.03 (0.05)
Mother's education	0.00 (0.01)	-0.00 (0.01)	-0.00 (0.01)	0.01 (0.01)	0.01 (0.02)	0.00 (0.01)	-0.00 (0.01)	0.00 (0.01)	-0.01 (0.01)	-0.01* (0.01)	0.00 (0.01)	-0.04 (0.10)
Father's occupation (government)	0.11 (0.07)	-0.02 (0.07)	0.08 (0.09)	0.07 (0.05)	0.11* (0.06)	0.01 (0.07)	0.07 (0.05)	-0.06 (0.06)	-0.11 (0.08)	-0.05* (0.03)	-0.14** (0.06)	0.31 (0.42)
Father's occupation (business)	0.06 (0.07)	-0.11 (0.10)	0.18*** (0.06)	-0.02 (0.05)	0.05 (0.06)	0.02 (0.08)	0.07 (0.06)	0.08 (0.05)	-0.01 (0.05)	-0.02 (0.03)	-0.15** (0.06)	0.14 (0.45)
Mother has job	0.01 (0.09)	-0.11 (0.09)	-0.16* (0.09)	0.10 (0.07)	0.04 (0.08)	0.03 (0.10)	0.10 (0.10)	0.18* (0.09)	-0.14 (0.12)	0.05 (0.04)	-0.19 (0.14)	-0.22 (0.58)
Constant	-0.22 (0.29)	4.29*** (0.51)	3.36*** (0.45)	3.05*** (0.35)	3.81*** (0.33)	2.55*** (0.43)	4.36*** (0.29)	-0.32 (0.29)	1.40*** (0.38)	0.41** (0.16)	1.78*** (0.45)	7.39*** (2.50)
Observations	433	433	433	433	433	433	433	433	433	433	433	433
R-squared	0.09	0.15	0.07	0.03	0.03	0.05	0.04	0.12	0.11	0.08	0.07	0.07

Notes: The standard error were clustered at the survey locations (districts and training center where interviewed were undertaken) and enumerators are reported in parentheses. *** p<0.01, ** p<0.05, * p<0

Appendix Table 2.5 Effect of the 2015 pay scale reform on the educational qualifications, market skill, & personality of Applicant Pool (gender analysis)

VARIABLES	=1 if grade of SSC exam is A+	Engineering graduate	Log real Income	Big-five Index	Extraversion	Agreeableness	Consciousness	Neuroticism	Openness
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post	0.02 (0.11)	0.04 (0.05)	0.09 (0.14)	-0.00 (0.07)	0.06 (0.11)	0.11 (0.13)	-0.21 (0.17)	-0.02 (0.12)	0.28* (0.15)
Post × Male	0.04 (0.12)	0.00 (0.06)	-0.15 (0.14)	-0.06 (0.07)	-0.02 (0.14)	-0.18* (0.11)	0.20 (0.15)	0.08 (0.15)	-0.32*** (0.11)
Age	-0.02 (0.01)	0.01 (0.01)	-0.00 (0.02)	0.00 (0.01)	-0.01 (0.02)	0.01 (0.02)	0.01 (0.01)	0.01 (0.02)	-0.01 (0.01)
Male	-0.07 (0.08)	0.08** (0.04)	0.18* (0.10)	0.09 (0.06)	0.13 (0.08)	0.01 (0.08)	-0.06 (0.08)	-0.15 (0.10)	0.15** (0.07)
Constant	0.69* (0.36)	-0.47** (0.21)	10.06*** (0.52)	-0.10 (0.33)	3.95*** (0.47)	3.60*** (0.53)	3.52*** (0.41)	2.54*** (0.62)	3.40*** (0.42)
Observations	433	433	221	433	433	433	433	433	433
R-squared	0.07	0.08	0.03	0.02	0.03	0.03	0.02	0.01	0.03
(1). Male post =Female post (p value)	0.78	0.64	0.82	0.79	0.82	0.11	0.21	0.80	0.04
(2).Male Pre=Female pre (p value)	0.34	0.02	0.07	0.10	0.11	0.91	0.40	0.17	0.03
(3). (1)-(2) (p value)	0.96	0.74	0.39	0.64	0.74	0.13	0.17	0.65	0.02

Notes: The standard error were clustered at the survey locations (districts and training center where interviewed were undertaken) and enumerators are reported in parentheses. *** p<0.01, ** p<0.05, * p<0. Other controls are: urban and occupation of father and mother.

Appendix Table 2.6. Effect of the 2015 pay scale reform on the PSM, pro-social behavior, & social preferences of applicant pool (gender analysis)

VARIABLES	PSM Index	Interested in policy making	Commitment to public service	Social Justice	Civic duty	Compassion	Self-Sacrifice	=1 participated in voluntary/charity activities	=1 if Least patient	=1 if Present bias	=1 if most risk averse	Altruism to poor (0-10)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Post	0.00 (0.10)	-0.28* (0.15)	0.21* (0.12)	-0.04 (0.06)	0.05 (0.09)	0.04 (0.10)	0.04 (0.07)	0.22*** (0.08)	-0.07 (0.14)	-0.10 (0.06)	-0.31*** (0.10)	-1.09 (0.81)
Post × Male	-0.04 (0.10)	0.16 (0.11)	-0.09 (0.12)	0.03 (0.07)	-0.07 (0.08)	-0.08 (0.11)	-0.09 (0.07)	-0.12 (0.07)	0.12 (0.14)	0.03 (0.06)	0.14 (0.14)	0.77 (0.73)
Age	0.00 (0.01)	-0.01 (0.02)	0.01 (0.01)	-0.00 (0.01)	0.00 (0.01)	0.02* (0.01)	-0.01 (0.01)	0.02* (0.01)	-0.02 (0.01)	-0.01** (0.01)	-0.03** (0.01)	0.01 (0.07)
Male	0.19** (0.07)	0.31** (0.14)	0.11 (0.09)	0.02 (0.05)	0.07 (0.07)	0.00 (0.06)	0.08 (0.06)	0.38*** (0.06)	-0.14 (0.09)	-0.05 (0.05)	-0.09 (0.07)	-0.22 (0.47)
Constant	-0.39 (0.30)	3.93*** (0.53)	3.30*** (0.40)	3.00*** (0.31)	3.83*** (0.33)	2.52*** (0.46)	4.30*** (0.27)	-0.23 (0.29)	1.62*** (0.34)	0.35** (0.17)	1.68*** (0.42)	6.00*** (2.14)
Observations	433	433	433	433	433	433	433	433	433	433	433	433
R-squared	0.06	0.10	0.04	0.02	0.01	0.04	0.03	0.10	0.07	0.05	0.04	0.02
(1). Male post =Female post (p value)	0.39	0.00	0.21	0.32	0.56	0.49	0.60	0.70	0.84	0.40	0.07	0.22
(2).Male Pre=Female pre (p value)	0.01	0.02	0.25	0.63	0.30	0.99	0.22	0.00	0.11	0.32	0.18	0.64
(3). (1)-(2) (p value)	0.80	0.06	0.15	0.50	0.38	0.57	0.33	0.02	0.50	0.27	0.03	0.20

Notes: The standard error were clustered at the survey locations (districts and training center where interviewed were undertaken) and enumerators are reported in parentheses. *** p<0.01, ** p<0.05, * p<0. Other controls are: urban and occupation of father and mother.

Appendix Table 2.7 Effect of the 2015 pay scale reform on the educational qualifications, market skill, & personality of BCS officers (gender analysis)

VARIABLES	=1 if grade of SSC exam is A+	Engineering graduate	Log real Income	Big-five Index	Extraversion	Agreeableness	Consciousness	Neuroticism	Openness
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post×O	0.15 (0.13)	0.16* (0.08)	0.42*** (0.14)	0.10 (0.11)	-0.28* (0.15)	-0.13 (0.17)	0.33* (0.17)	0.16 (0.23)	-0.26 (0.19)
Post×O×Male	0.04 (0.12)	0.07 (0.10)	0.02 (0.15)	-0.17* (0.09)	-0.02 (0.17)	-0.08 (0.14)	-0.15 (0.16)	-0.26* (0.15)	0.06 (0.13)
Post	0.02 (0.08)	-0.02 (0.03)	-0.22** (0.09)	-0.03 (0.04)	0.13* (0.08)	0.03 (0.16)	-0.13 (0.11)	0.04 (0.18)	0.11 (0.14)
O	0.08 (0.05)	0.02 (0.04)	-0.08 (0.07)	0.09 (0.08)	0.06 (0.10)	0.07 (0.09)	-0.07 (0.09)	-0.03 (0.13)	0.11* (0.06)
Age	-0.02* (0.01)	0.01 (0.01)	-0.00 (0.02)	-0.00 (0.01)	-0.01 (0.02)	0.01 (0.02)	0.01 (0.01)	0.01 (0.02)	-0.02 (0.01)
Male	-0.05 (0.07)	0.08*** (0.03)	0.15 (0.10)	0.10** (0.04)	0.13 (0.08)	-0.04 (0.09)	0.01 (0.09)	-0.10 (0.08)	0.05 (0.08)
Constant	0.87** (0.40)	-0.34 (0.23)	10.21*** (0.54)	0.01 (0.32)	3.87*** (0.49)	3.65*** (0.58)	3.45*** (0.37)	2.43*** (0.59)	3.55*** (0.41)
Observations	433	433	221	433	433	433	433	433	433
R-squared	0.09	0.12	0.07	0.03	0.04	0.03	0.02	0.01	0.03
(1). Male post =Female post (p value)	0.11	0.99	0.05	0.58	0.02	0.89	0.46	0.78	0.49
(2).Male Pre=Female pre (p value)	0.44	0.01	0.12	0.03	0.09	0.68	0.23	0.12	0.01
(3). (1)-(2) (p value)	0.32	0.63	0.00	0.59	0.14	0.97	0.89	0.75	0.39

Notes: The standard error were clustered at the survey locations (districts and training center where interviewed were undertaken) and enumerators are reported in parentheses. *** p<0.01, ** p<0.05, * p<0. Other controls are: urban and occupation of father and mother.

Appendix Table 2.8 Effect of the 2015 pay scale reform on the PSM, pro-social behavior, & social preferences of BCS officers (gender analysis)

VARIABLES	PSM Index	Interested in policy making	Commitment to public service	Social Justice	Civic duty	Compassion	Self-Sacrifice	=1 participated in voluntary/charity activities	=1 if Least patient	=1 if Present bias	=1 if most risk averse	Altruism to poor (0-10)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Post × O	0.36*** (0.14)	0.32 (0.22)	0.35** (0.15)	0.06 (0.09)	0.11 (0.13)	0.17 (0.13)	0.15 (0.11)	0.04 (0.10)	-0.38*** (0.12)	0.12* (0.07)	0.01 (0.12)	1.76* (0.91)
Post × Male × O	-0.14 (0.13)	-0.14 (0.16)	-0.12 (0.14)	-0.14 (0.10)	0.03 (0.10)	-0.03 (0.13)	-0.05 (0.11)	-0.18 (0.11)	0.13 (0.12)	-0.12* (0.07)	0.05 (0.12)	0.33 (0.70)
Post	-0.10 (0.09)	-0.19 (0.16)	0.06 (0.14)	-0.00 (0.07)	-0.06 (0.10)	-0.07 (0.08)	-0.06 (0.05)	0.16** (0.06)	0.10** (0.03)	- (0.03)	-0.21* (0.12)	-0.98* (0.51)
O	0.01 (0.08)	0.18* (0.11)	-0.04 (0.12)	0.04 (0.05)	- (0.05)	-0.06 (0.08)	0.00 (0.07)	0.02 (0.10)	-0.00 (0.08)	0.06 (0.04)	0.06 (0.09)	0.50 (0.71)
Age	-0.00 (0.01)	-0.02 (0.02)	0.01 (0.01)	-0.00 (0.01)	0.00 (0.01)	0.02 (0.01)	-0.01 (0.01)	0.02** (0.01)	-0.01 (0.01)	- (0.01)	-0.03* (0.02)	-0.05 (0.08)
Male	0.19*** (0.05)	0.41*** (0.13)	0.08 (0.06)	0.05 (0.05)	0.02 (0.05)	-0.03 (0.06)	0.05 (0.05)	0.36*** (0.05)	-0.11 (0.08)	-0.02 (0.04)	-0.03 (0.07)	0.12 (0.38)
Constant	-0.25 (0.28)	4.18*** (0.52)	3.42*** (0.42)	3.00** (0.33)	3.80** (0.35)	2.56*** (0.44)	4.39*** (0.26)	-0.23 (0.28)	1.44** (0.39)	0.42** (0.17)	1.72** (0.47)	7.33*** (2.40)
Observations	433	433	433	433	433	433	433	433	433	433	433	433
R-squared	0.08	0.14	0.05	0.02	0.02	0.05	0.03	0.10	0.09	0.07	0.04	0.06
(1). Male post = Female post (p value)	0.18	0.11	0.09	0.50	0.30	0.20	0.11	0.00	0.04	0.26	0.98	0.04
(2). Male Pre = Female pre (p value)	0.00	0.02	0.26	0.57	0.52	0.82	0.22	0.00	0.10	0.45	0.18	0.71
(3). (1)-(2) (p value)	0.04	0.60	0.05	0.65	0.23	0.24	0.03	0.72	0.00	0.64	0.72	0.14

Notes: The standard error were clustered at the survey locations (districts and training center where interviewed were undertaken) and enumerators are reported in parentheses. *** p<0.01, ** p<0.05, * p<0. Other controls are: urban and occupation of father and mother.

Appendix 2.A: Variables

- Age: Calculated from self-reported birthdate
- Male (male=1, 0 otherwise),
- Married (married=1, 0 otherwise)
- Raised in an urban area: equals 1 if the applicant raised in the district and capital area up to secondary education.
- Years of schooling: Measured by years. In the context of Bangladesh education system, completed primary school=5 years, completed secondary school=10 years, College graduate=12 years, university graduate=16 years, and post graduate=17 years.
- Father's education: Schooling years of father
- Mother's education: Schooling years of mother
- Father's occupation (business): equals 1 if the father of the respondent is in business.
- Father's occupation (government): equals 1 if the father is a first/second class government officer
- Mother has job: equals 1 if mother work outside the home for a wage.
- Highest grade in the Secondary School Certificate (SSC) examination: equals 1 if the individual got grade A+ (90-100% marks) in the secondary school certificate examination.
- Enrolled in coaching center: equals 1 if the applicants/officers took BCS examination preparation in the coaching center.
- Engineering major: equals 1 if the individual graduated from the engineering faculty of a technical university.
- Quota Privilege: This variable takes 1 if the applicants have quota privilege for getting

BCS job and zero otherwise.

- Took BCS exam in 2013: It equals 1 if one applied for BCS exam in 2013 and zero otherwise.
- Experience in Private sector jobs: It equals 1 if the applicants/officers worked for private sector jobs before applying to the civil service examination and zero otherwise.
- The Big-five Personality Traits: The Big-Five factor model developed by John (1990) contains 44 items, which are in turn divided into five dimensions of personality: extraversion; agreeableness; conscientiousness; neuroticism, and openness (Almlund et al., 2011). The responses were collected on 5-point Likert scales, showing the extent to which the applicants and officers agreed or disagreed with the statements. In this dissertation, a shorter list of questions containing 10 questions, with 2 questions per dimension was used following Donato et al. (2017) and Rammstedt & John (2007).
- Extraversion: Extravert represents the traits of an individual related to activity and energy, mainly sociable (Benet-Martínez & John, 1998). Computed as the average response to the two questions related to extraversion.

I like to interact and talk with people.

I am sometime shy and unable to communicate with other easily (Reversed).

Cronbach's alpha for these two questions: 0.4

- Agreeableness: Agreeableness represents the traits of an individual related to altruism, tender mindedness, trust and modesty (Benet-Martínez & John, 1998). Computed as the average response to the two questions related to Agreeableness.

I like to cooperate with others although it is difficult.

I tend to find fault with others (reversed).

Cronbach's alpha for these two questions: 0.12

- Conscientiousness: Conscientiousness represents the traits of an individual related to hardworking, organized, responsible and goal directed behavior (Benet-Martínez & John, 1998). Computed as the average response to the two questions related to extraversion.

I do any task with regard to every detail: not superficial and partial.

Anybody can depend on me (in general).

Cronbach's alpha for these two questions: 0.4

- Neuroticism: Neuroticism represents the traits of the individual related to anxiety, sadness, irritability, nervousness, emotional instability (Benet-Martínez & John, 1998).

Computed as the average response to the two questions related to Neuroticism.

I can be tensed a lot in any matter.

I am emotionally stable, not easily upset (reversed).

Cronbach's alpha for these two questions: 0.3

- Openness: Individual having openness behavior shows openness to new aesthetic, cultural and intellectual experiences (Dal Bo et al., 2013). Computed as the average response to the two questions related to Openness.

I like to think deeply or carefully about any task.

I Prefer work that is routine (reversed).

Cronbach's alpha for these two questions: 0.4

- Big-Five Personality Index: It is an equally weighted average of the z-score of each module of the Big-Five Personality inventory (see details in Alam and Kijima, 2020).

In the case of Neuroticism module, the reverse score was considered as it is a negative trait (See more details in Benet-Martínez and John, 1998).

- PSM (Public Service Motivation) index: To construct PSM index 12 statements from the 40 statements of Perry's 1996 scale of Public service motivation (Perry, 1996) were elicited, and created an equally weighted average of the z-scores of each module of the PSM.

- Attraction to Policy Making: Computed as the average response to the following two questions.

I am interested in making public programs and policies which are beneficial for the country.

I like to share my views on public policies with others.

- Commitment to the Public Interest: Computed as the average response to the following two questions.

An official's obligation to the public should always come before loyalty to superiors.

I would prefer seeing public officials do what is best for the whole community even if it harmed my interests.

- Social Justice: Computed as the average response to the following two questions.

I am not afraid to go to bat for the rights of others even if it means I will be ridiculed.

I do not believe that government can do much to make society fairer (reversed).

- Civic Duty: Computed as the average response to the following two questions.

I believe everyone has a moral commitment to civic affairs no matter how busy they are.

I have an obligation to look after those less well off.

- Compassion: Computed as the average response to the following two questions.
I have little compassion for people in need who are unwilling to take the first step to help themselves (reversed).
It is difficult for me to contain my feelings when I see people in distress.
- Self-Sacrifice: Computed as the average response to the following two questions.
I believe in putting duty before self.
Making a difference in society means more to me than personal achievements.
- Participated in volunteering or charity activities: equal 1 if the individual did voluntary works or charity activities before applying in the civil service, 0 otherwise.
- Patience and Present Bias: To measure the patience and present bias, hypothetical 4 questions were asked.
 - Q1: If he buys a shirt and wins a prize, he can receive the prize money 2000 BDT instantly or 2500 BDT after one month. Would he like to wait for one month? Yes/No. Q2: If Q1=No, The respondent is asked if he is offered 3000 BDT after one month, would he like to wait for one month? Yes/No.
 - Q3: If he buys a shirt and wins a prize, he can receive the prize money 2000 after one month or 2500 after two months. Would he like to wait for two months? Yes/No. Q4: If Q3=No, The respondent is asked if he is offered 3000 BDT after two months, would he like to wait for two month? Yes/No. By using the response to Q2, if one did not agree to wait for two months, they were considered as nsidere ree to wIf one answered Yes in Q1 and No in Q3, or Yes in Q2 and No in Q4, they were identified as 1 and No in Q3,

- Most-risk averse: To measure the risk taking behavior, the respondents were asked 3 lottery questions to choose (A) or (B): (1) (A) 2000 BDT with certainty or (B) 50% chance of winning 4000 and 50% chance of zero, (2) (A) 2000 BDT with certainty or (B) 50% chance of winning 8000 and 50% chance of zero, (3) (A) 2000 BDT with certainty or (B) 50% chance of winning 10000 and 50% chance of zero. Those who did not want to take the risk in lottery 3 are identified as the most risk-averse.
- Altruism: In this article, altruism were defined as the level of the unselfishness of the respondents to a poor family. To do so, the respondent is asked a hypothetical question: if the respondent is given 10 tokens (1 token values 100 BDT), how many tokens does he want to give to poor families and how many tokens does he want to keep for himself. Those who agreed to give more tokens to poor families are considered as more altruistic.
- Consumer Price Index (CPI) of Bangladesh: CPI data were collected from World Bank (2017b). In this regard, the previous wages of the last job were converted to real value at the price level of 2017. BCS officers who applied for the exam in 2012, 2013, and 2014 were appointed to the first post 2.5 years later. So the income of previous job before joining to BCS was measured at price level of 2014, 2015, and 2017, respectively. CPI in 2014, 2015, and 2017 is 136.05, 152.32, and 161.14, respectively.
- **Hypothetical questions on preferences (Patience, Risk averse and Altruistic behavior)**

Now vs. 1 month (2000 vs 2500)

1. Suppose you bought a soap and you have just won a prize. The prize is 2000 BDT. If you wait for 30 days, you can receive 2500 BDT (you will receive money in 30 days for sure).

Would you like to wait for 30 days? 1=Yes 0=No.

If the answer is yes, please skip the questions 2, 3, if no, please answer next question.

Now vs. 1 month (2000 vs 3000)

2. The same scenario as above, but now if you wait for 30 days, you can receive 3000 BDT (you will receive money in 30 days for sure). Would you like to wait for 30 days? 1=Yes, 0=No, If the answer is yes, please skip the question 3, If the answer is no, Please ask next question.

3. The same scenario as above, but now how much do you need for you to wait for 30 days, instead of receiving a prize today? (Please write the amount)BDT

1 month vs. 2 months (2000 vs. 2500)

4. Suppose you bought a shampoo and you have just won a prize. The prize is 2000 BDT and you can get the prize in 1 month from now. If you wait for 2 months (instead of receiving in 1 month from now), you can receive 2500 BDT. Would you like to wait for an additional 1 month (2 months from now)? 1=Yes 0=No

If the answer is yes, please skip the questions 5 and 6, if no, please ask next question

1 month vs. 2 months (2000 vs. 3000)

5. The same scenario as above, but now if you wait for 2 months, you can receive 3000BDT. Would you like to wait for an additional 1 month (2 months from now)? 1=Yes 0=No. If the answer is yes, please skip the questions 6, if the answer is no, please answer next question (6)

6. The same scenario as above, but now how much do you need for you to wait for an additional 1 month (2 months from now), instead of receiving the prize in 1 month?.....BDT

7. Now you have a partner X. Suppose you are given 10 tokens by a charity organization. Each token you keep is worth 100 BDT, while each token your partner receives is worth 300 BDT. You are independent to distribute the tokens (i.e. you can donate to your partner or you can keep it for you). How many tokens will you give to your partner and how many tokens will you keep for you?

When Your Partner is your family member, For Partner:For You:.....

When Your Partner is a stranger, For Partner:For You:.....

When Your Partner is a stranger but poor people, For Partner:For you.....

8.1 Suppose I were to offer you a choice between the following two choices: Choice A: 2000 BDT with certainty. Choice B: A business with a 50% chance of winning 4000 BDT and a 50% chance of winning nothing. Which would you choose, Choice 1=A or 2= B?

8.2 Suppose I were to offer you a choice between the following two choices: Choice A: 2000 BDT with certainty. Choice B: A business with a 50% chance of winning 8000 BDT and a 50% chance of winning nothing. Which would you choose, Choice 1= A or 2= B?

8.3 Suppose I were to offer you a choice between the following two choices: Choice A: 2000 BDT with certainty. Choice B: A business with a 50% chance of winning 10,000 BDT and a 50% chance of winning nothing. Which would you choose, Choice1=A or 2=B?

Appendix 2.B

Reform in the labor market situation:

During 2010-2013, labor force participation has risen substantially. In this time, female labor force participation rate has been increased compared to male. Labor force having tertiary education was increased but still low. Real wage increase rate was stable during 2010-2013. Interestingly, labor force participation in agriculture has been decreased but increase in the manufacturing sector, this is may be due to rapid growth of Ready Made Garment sectors (ADB and ILO, 2016). However, considering the labor reform issue, it was found that the Bangladesh government enacted Labor Act, 2006, subsequently it was amended in 2013. However, the law was enacted mainly for ensuring right of the workers (labor) in the manufacturing sectors (Ministry of Labor and Employment, n.d). As BCS officers are not the potential candidates in the manufacturing sector as labor, this reform might have no effect on the BCS applicant pool.

Reform in the Education Sector:

In Bangladesh, after the liberation in 1971, the Bangladesh government have taken initiatives to reform the education sector several times. First attempt was undertaken by forming the Quadrat-E Khoda Commission in 1974. This commission suggested to change the traditional memorizing system education as well as to strengthen the research activities. Subsequently, in 1979 *Jatiyo Shikkha Upodeshta Parishad* (National Education Advisory Council), in 1997 *Jatiyo Shikka Nity Pranayan Committee* (National Education policy Preparation Committee), in 2002 Bari Commission, in 2003 Moniruzzaman Mia Commission, and finally in 2009 again Moniruzzaman Commision were formed, and these commission mainly emphasized on the improvement of the quality of higher education. However, the recommendations of these commissions are rarely implemented by the government. In sum, during the pay scale reform

(2014-2015 financial year) and the time when 35th batch (took exam after the reform) entered to high school/higher secondary school, higher education (2008-2010), there was no major change in education system (Hossain & Mohammad Khan, 2015; Khan, Rana, & Haque, 2014).

Reform in the recruitment and pay scale:

We do not find any other reform and policy changes which could affect applicant pool of BCS after 2015 other than pay scale reform. However, a new rule as Bangladesh Civil Service (Age, qualification and Examination for direct recruitment) Rules, 2014 were approved by the government in September 18, 2014. Compared to previous rules ordered in 1982, there was not any major changes in the new Rules ordered in 2014. In the new rules, 200 marks for the preliminary exam were introduced and previously it was 100 (Establishment Division, 1982; Ministry of Public Administration, 2014). The latest reform was on the pay scale reform in 2015. There were not any major changes in the application and selection procedures.

Chapter 3

Incentives to Improve Government Extension Agent Performance: A Randomized Control Trial in Bangladesh

3.1 Introduction

Agriculture is an important sector for a developing economy, as it is a major source of employment, income, and foreign exchange (de Janvry, Sadoulet, and Suri, 2017). However, farmers in developing countries face many obstacles in enhancing productivity, such as a lack of access to new agricultural technologies (Birkhaeuser, Evenson, and Feder, 1991; de Janvry et al., 2017; Jack, 2013; Lee, 2005). Although extension services are publicly provided through agents in developing countries, one extension agent must cover 500–5,000 farmers (Davis, 2008). Under this situation, farmers rarely have adequate and timely access to relevant advice (Anderson and Feder, 2007). Therefore, efficiencies in the public agricultural extension system must be improved.

Although there is anecdotal evidence about the low morale of public agricultural extension agents due to low salaries and insufficient supervision, few studies rigorously examine whether incentives and monitoring can enhance service delivery. Empirical literature on public service delivery in health and education sectors has found performance pay (Basinga et al., 2011; Mbiti et al., 2019; Muralidharan and Sundaraman, 2011), social recognition (Ashraf, Bandiera, and Jack, 2014; Ashraf, Bandiera, and Lee, 2014), and monitoring with penalties (Banerjee et al., 2008; Dhaliwal and Hanna, 2017) to be effective. However, other studies found negative consequences of performance pay, which changes behaviors to focus on work related with incentives (Glewwe et al., 2010) and to manipulate records to avoid

punishment (Dhaliwal and Hanna, 2017). Therefore, determining effective incentives to increase service delivery by public sector workers is inconclusive.

In rural Bangladesh, more than 87% of the population depends on agriculture for income (World Bank, 2016, 2017a). In 2016, the Bangladesh government formulated a new agricultural extension policy to ensure sufficient services for all farms. Under this policy, programs were launched that aimed to increase agricultural productivity, crop diversification, and cultivation of cash crops. To address climate change and ensure a clean environment, the government emphasized the diffusion of green technology (i.e., natural fertilizers versus chemical fertilizers) (DAE, 2018). To implement a new policy successfully, there is an urgent need to improve agricultural extension worker performance. By conducting a randomized control trial (RCT) to provide tournament-type incentives to public agricultural extension officers in Bangladesh, this chapter explores three questions: (1) Does introducing incentives to the public agricultural extension system help increase service delivery? (2) If yes, what kind of incentive, financial or non-financial, works better? (3) Is increasing monitoring as effective as providing incentives?

The results show that financial incentives, non-financial incentives, and increased monitoring have positive effects on service delivery, and their effectiveness is not significantly different on average. However, for poorly performing agents, increased monitoring has an advantage in improving performance. An analysis of the heterogeneous treatment effect indicates that the effect is greater among agents in offices with high variations in initial performance than among those with low variations.

This chapter contributes to the literature in three ways. First, considering the diffusion of new agricultural technologies, the existing studies examine the effectiveness of farmer-to-farmer extension services and information sharing (Bandiera and Rasul, 2006; BenYishay and Mobarak, 2019; Conley and Udry, 2010; Kondylis, Mueller, and Zhu, 2017; Krishnan and Patnam, 2013; Munshi, 2004; Shikuku, 2019; Takahashi, Mano, and Otsuka, 2019; Tripp, Wijertne, and Piyadasa, 2005) and how to select key farmers who can widely diffuse technology information (Beaman et al., 2018; Emerick and Dar, 2020). This chapter examines how to enhance service delivery by providing incentives to public agricultural extension agents. Recent studies focus on farmer-to-farmer extension services (key farmers to ordinary farmers) and the role of social networks (e.g., neighbors, friends, peer farmers, and relatives) in disseminating new agricultural technology information.

Second, this chapter examines the effects of incentives on service deliveries by public sector workers. Some empirical studies examine the effect of financial incentives, non-financial incentives, and monitoring on test scores, absenteeism, and the service delivery of health workers (Ashraf, Bandiera, and Lee, 2014; Banerjee et al., 2008; Dhaliwal and Hanna, 2017; Mbiti et al., 2019). This chapter also indicates that incentives given to agricultural extension officers increase service delivery and tests the effectiveness of financial incentives, non-financial incentives, and increased monitoring.

Third, this chapter empirically tests the effect of rank-order tournaments on performance. Although the financial incentive introduced and examined by many RCT studies is performance pay, a reward system based on a rank-order tournament is used by many companies to compensate employees due to ease of implementation. Empirical studies examine the effect of the rank-order tournament on employee performance based on cases in the private

sector of developed countries (Conyon, Peck, and Sadler, 2001; DeVaro, 2006; Eriksson, 2007; Knoeber and Thurman, 1994). So far, the literature is absent in this regard that examines the effect of the rank-order tournament in the public sector of a developing country.

The rest of the chapter is organized as follows. Section 3.2 presents the institutional background of agricultural extension services. Section 3.3 discusses the methodology, experimental design, and empirical methods. Section 3.4 reports the descriptive statistics, baseline balance, estimation results, robustness of evidence, and discusses the “do no harm” principle for experimentation. Finally, Section 3.5 concludes and presents directions for future research.

3.2. Institutional background and public agricultural extension services in Bangladesh

3.2.1 Institutional arrangement for agricultural extension services

The Department of Agriculture Extension (DAE) is the central public organization that provides agricultural crop extension services to all farmers in Bangladesh. The department has 2,000 extension personnel (managerial-level civil service officers) and 14,092 field-level extension agents stationed in 492 upazila (sub-district) agriculture offices (Huber and Davis, 2017). District offices act as a controlling office for upazila agriculture offices, while the upazila agriculture offices deliver extension services at the field level. The deputy director (DD)¹⁹ and upazila agriculture officer (UAO) lead the district- and sub-district-level agriculture offices, respectively.

¹⁹ Deputy Director (DD) is appointed from mid-level Bangladesh Civil Service (Agriculture) cadre officers who are recruited under the competitive civil service exam. Their post at an entry level is Agriculture Extension Officer (AEO) (9th grade). After 5-8 years, AEOs get promotion as Upazila Agriculture Officer (UAO) and become head of Upazila Agriculture office (6th grade). After 10-15 years, UAOs get promotion as Deputy Director (head of the District agriculture offices).

A field-level extension agent, known as a sub-assistant agriculture officer (SAAO), is responsible for delivering extension services to 1,200 farmer families (one block) on average. SAAOs are permanent and pensioned employees (ASIRP, 2003; Huber and Davis, 2017; Rashid and Qijie, 2016). Regional agriculture offices, along with district and upazila offices, are responsible for SAAOs' promotion and transfer within the region (DAE, 2018). The performance report of SAAOs is sent to the DAE and Ministry of Agriculture via the district agriculture office.

In Bangladesh, public agriculture extension services are provided by group discussions, field demonstrations, field visits, motivational tours, training for contact farmers, a celebration of field days, individual consultation with farmers, farmer field schools, and electronic media and devices (radio, television, phone) (DAE, 2018; Haque, 2011). It is common for SAAOs to provide extension services through field demonstrations, individual consultancy, and field visits with farmers. Generally, the contents and types of extension services provided by SAAOs vary based on agricultural seasons and locations. At the beginning of each season, the DAE sets targets for each type of extension service for the district agriculture offices. District offices specify the targets to each upazila agriculture office, which in turn assign targets to block-level officers.

Beyond the government, NGOs and private organizations provide extension services to farmers (ASIRP, 2003; Nippard, 2014). NGOs deliver extension services to micro-credit clients to bolster the poultry business and social forestry. Private organizations providing extension services are limited to selling seed and fertilizers, promoting fish hatchery, and extending irrigation facilities to farmers (ASIRP, 2003). Thus, private organizations' extension services are not substitutes for public services.

3.2.2 Incentives and monitoring in the Public sector agricultural extension services

The minimum qualification for an SAAO is a diploma in agriculture. To recruit SAAOs, the DAE advertises in the national paper, which states the location (district) of vacancy where applicants reside. The selection is based on written and oral examinations. Once selected, extension officers are posted to districts other than their home district. After a few months, extension officers are posted in their home districts, some even in their village. The salary is fixed and increases based on job tenure and promotion. Prior to 2015, when pay scale reform was implemented, the entry-level salary of an SAAO was lower than the average income for a similar occupation (BBS, 2017). In 2015, pay became more than doubled and high in the rural setting.²⁰

Extension worker absenteeism is common.²¹ Insufficient transportation budgets are believed to be a major challenge for extension agents; however, this should not be a problem if they reside in their jurisdictional area. It is common for female extension workers to reside outside their jurisdictional village after marriage. Due to social norms and customs (purdah system), it is not easy for female farmers to work with male extension workers. To solve this dilemma, in 1996, the government enacted a policy appointing female extension workers to provide extension services to rural women. However, in a national level survey on agricultural

²⁰ Extension workers tend to work hard to achieve the target on projects from donors, because they receive an honorarium, which is partly determined by days of training participated and field days arranged in addition to their salary from the project. From a project, SAAOs receive an honorarium of around 450-500 BDT (about 6-6.5 USD) per day. This suggests that financial incentives based on performance can be an effective policy instrument for improving extension worker performance.

²¹ Workers residing outside their jurisdictional block is the main reason for absenteeism. Though all extension workers must remain in their jurisdiction block, there is no enforcement of this policy (Key Informant Interview, 2017).

extension coverage, ASRIP (2003) found that only 18% of female farmers knew about government extension services.

Promotion prospects for SAAOs are limited. After 20 years of work, an SAAO (11th grade) can apply for a promotion to assistant agriculture extension officer (AAEO) (10th grade). Based on performance, both UAO and DD nominate SAAOs for foreign- and national-level trainings and for the Best SAAO of the Year award (DAE, 2018).²² Employer recognition is important for workers' careers (Dewatripont, M., Jewitt, I., Tirole, J., 1999). This incentive may not ensure promotions or privileges while extension officers enjoy the honor. Nonetheless, the Best SAAO of the Year is selected annually, and only one extension officer receives the award. Therefore, current incentives may not be effective in improving SAAO performance, on average.

The performance of SAAOs is monitored in two ways: infrequent and planned block inspections and weekly meetings (referred to as weekly conferences). Every month, district- and upazila-level officers announce an inspection tour. However, according to key informant interviews, geographical dispersion makes monitoring all blocks difficult for officers. Controlling officers hardly maintain a tour plan. When extension officers are older than monitoring officers (UAO/DD), monitoring officers have difficulty to encourage extension officers to achieve the target.

²² In a field diary, SAAOs keep a record of extension services (i.e., how many farmers communicated for specific extension services and how many of them adopted those services). To select the Best SAAO of the Year, both UAO and Deputy Director (DD) from district Agricultural Office inspect the blocks of the candidates and physically verify the performance reported (DAE, 2018). The best SAAO of the division (nation) receives the crest from the divisional officers (prime minister).

All SAAOs for each upazila agriculture office are to attend the weekly meeting and to record their weekly achievements in specific books maintained in the upazila agriculture offices. If the performance is unsatisfactory, UAOs use the weekly meeting to encourage SAAOs to increase service deliveries.²³ However, SAAOs do not lose their jobs nor are they suspended if they do not achieve the targets. While there is a policy to issue a showcase letter when SAAOs have a low achievement rate, it is rarely issued by the UAO. During the weekly meeting, UAOs can mention, in front of colleagues, low-performing SAAOs who do not achieve the target and request that they must improve performance.

Often, SAAOs strive to achieve seasonal targets at the end of a season. This makes it difficult for upazila and district offices to conduct inspection in all the SAAOs to visit/check the status of extension services in the field by SAAOs, especially as this is when upazila and district agriculture offices are preparing the next season's plan. Therefore, changing the target period from the season (4 months) to each month can make monitoring and tracking more efficient and may enhance work performance of SAAOs.

In summary, a key problem to providing extension services efficiently is poorly motivated SAAOs. A scheme exists to enhance SAAO performance through awards, training opportunities, and promotion prospects. However, this may not be effective in encouraging poor-performing SAAOs to achieve their target, since it is rare for them to be fired or severely punished due to poor performance. Therefore, encouraging poor performers is a major issue in the Bangladesh public sector.

²³ When there is important message from the DAE and ministry, district-level officers join the meeting to deliver a motivational speech for SAAOs and share the latest directives (DAE, 2018). The performance of SAAOs is also tracked by the Annual Confidential Report (ACR) written by AEOs, which is submitted to UAO (DAE, 2018). Any poor performances indicated in the ACR affects promotion prospects.

3. 3 Methodology

3.3.1 Experimental design

Based on the institutional background, this chapter aims to motivate poor-performing SAAOs to enhance service delivery by providing tournament-type incentives. Tournament-type rewards, rather than performance pay, align with the current DAE system, which is also tournament type (i.e., Best SAAO of the Year), and is easy for the DAE to adopt and adapt. The weekly meetings were utilized where SAAOs fill a service delivery diary. In the meeting, annual or seasonal targets (the number of farmers to whom SAAOs provide information on specific practices and technologies) set by upazila agriculture offices are announced. Adding tournament-type rewards each month to a weekly meeting emphasizes the monthly target rather than the seasonal target. The incentive's effect on SAAOs' service delivery is determined.

According to tournament theories (Connelly et al., 2014; Eriksson, 2007), more able players tend to exert more effort to win the prize than less able players. For enhancing less able players' performance, tournament organizers handicap (restrict) more able players through rules (Knoeber and Thurman, 1994). In the experiment, it was tested whether the impact of handicapping better performers helps improve poor performers' service delivery.

Tournament theory also predicts that high variation of initial performance among competitors leads to increase in service delivery among more able officers. In contrast, low variation of initial performance among competitors results in similar effects on all competitors. Additionally, experimental setting, winning probability is different by the size of the office, since the number of winners from each office is same. Therefore, the effect of the experiment on the performance of the poor performers should differ by the initial variation of performance among competitors and by number of officers within an office.

Rewards can be financial (cash) or non-financial (honor as positive and possibly censure as negative). Benabou and Tirole (2003) and Frey (1993) theoretically show that tighter monitoring motivates workers to increase effort in the short term, but it is not the case in the long term. Demougin and Fluet (2001) show that low-powered financial incentives with precise monitoring are effective in increasing worker effort. Since the comparative effectiveness of financial and non-financial incentives remains understudied, determining which is more effective in the public agriculture sector in Bangladesh is the empirical question.²⁴ The effect of four incentives (Fame, Money1, Money2, and Inspection) on SAAO's effort is evaluated.

This chapter examines all SAAOs working in 40 upazila agriculture offices in ten districts of four divisions.²⁵ After sorting upazilas by division and district, eight upazila agriculture offices are assigned to each treatment and control group. Since an upazila is equivalent to a sub-district and there were no district-level events and trainings during the experiment and evaluation period, it is unlikely for SAAOs in control offices to be discouraged by not receiving incentives. In all study offices, including the control offices, UAOs asked SAAOs to indicate the number of farmers they provided information in the month prior to the weekly meeting. UAOs also requested them to achieve a monthly target rather than seasonal.

²⁴ One exception is Ashraf, Bandiera, and Lee (2014), which compared the effectiveness of financial and non-financial incentives on public health worker performance in Zambia. Non-financial incentives (social recognition) rather than financial incentives (commission on sales) were effective to motivate health workers to sell more.

²⁵ From October to mid-November 2017, another survey on SAAOs were conducted in the same four divisions covering 11 districts (2-3 districts from each division). In this survey, four upazilas were selected in each district. In each upazila agricultural office, the list of SAAOs were prepared who were hired around 2015 (2011-2018) and randomly selected 280 SAAOs (5-10 officers from each office). This survey contains detailed information on SAAOs. To select four divisions and 11 districts, the divisions and districts affected by floods in 2017 and districts whose cropping patterns were different due to topographical reasons (wetland and hilly) were dropped first. In these flood-affected areas, rehabilitation programs for farmers were undertaken rather than regular extension services. One upazila office refused to participate, resulting in 40 offices studied. In the analysis, SAAOs who did not work in the sample office in the previous season were excluded.

This makes the experiment officially implemented, which is crucial for SAAOs participation in the experiment.²⁶

At the beginning of the first weekly meeting in January 2018, UAOs requested SAAOs to furnish complete information on service delivery in December 2017. This was considered the initial performance before the experiment. At the beginning of the first weekly meeting in February 2018, UAOs requested the same for January. After calculating the performance based on service delivery in December 2017 and January 2018, UAOs selected the best (or worst) two SAAOs in the office.²⁷

For Fame and Money1 treatments, the two best performers are selected based on the highest percentage increase in service deliveries in one month. For Money2, the two best performers are selected based on the highest number of services delivered in one month. For Inspection, the two worst performers are selected based on the lowest percentage increase in service deliveries in one month.²⁸ To motivate initially poor-performing officers, following tournament theory prediction, good performers were handicapped before the experiment in Fame, Money1, and Inspection, bringing low performers an advantage. It is unclear if handicapping better performers has negative effects on their efforts a priori. Average and heterogeneous treatment effects for poor- and better-performing officers were estimated. By

²⁶ Since subjects of this chapter are incumbent public extension officers, official support from the DAE were needed. A senior officer from the DAE were hired. Letters were sent to all sampled upazila agriculture officers for their consent to conduct the experiment. All sampled upazila agriculture offices indicated their interest to participate in the experiment. During the experiment announcement, enumerators were present in agriculture offices. Enumerators were trained how UAOs make announcements, and AEOs convinced SAAOs to participate so that the experiment was properly conducted in all offices.

²⁷ Detailed explanation on how to calculate the service delivery (performance) is provided in the Appendix 3.B.

²⁸ Bengali scripts were prepared for all treatment and control offices. The English translation is attached in Appendix 3.A.

comparing the impact of Money1 and Money2 on poor performers, the effectiveness of handicapping better performers in improving the performance of poor performers was tested.

For the Fame treatment, the UAO announced that he/she would select the two best SAAOs and send those names to the district offices informing the DD that they are the two best. SAAOs desiring to be promoted to UAO make more efforts to improve performance.

For the Inspection treatment, the UAO announced that he/she would select the two worst SAAOs to be inspected by the DD (Deputy Director). As indicated above, regular inspection is conducted by Agriculture Extension Officers (AEOs) and UAOs (Upazila Agriculture Officers), not DDs. Inspection by the DD is rare and implies severe punishment (censure) for SAAO's poor performance. Unlike other treatments, the Inspection treatment reveals information about the worst two SAAOs in the office. To avoid censure and/or to achieve higher career goals, SAAOs try to avoid being selected as the worst. Furthermore, being labeled as the worst can induce shame.

In the Money1 and Money2 treatments, the UAO announced that he/she would select the two best SAAOs and explained that a foreign university, in partnership with the upazila agriculture office, would provide monetary incentives to them. The rewards were 3,000 BDT (about 40 USD) for the best performer and 1,000 BDT (about 12 USD) for the second best. The monthly salary of SAAOs is 16,000 BDT; thus, this monetary incentive was significant.

The timing of the rewards and their certainty are different under each treatment. For example, the reward for Money1 and Money2 is provided immediately after the selection. The reward for Fame (future promotion) is uncertain and provided more than 10 years after the experiment. Consideration of a new incentive differs the treatment effect. Therefore, using the

SAAOs' preferences, such as present biasness and risk aversion, the heterogeneous treatment effect on performance was tested.²⁹

Since performance measures (see details in Appendix-3.B) are self-reported service deliveries, SAAOs might overstate their service delivery data to receive the reward or avoid an inspection by higher authority. The over-reporting problem is unlikely, as UAOs warned the SAAOs that they would issue a showcause letter for over reporting. Need to mention that as the service deliveries are easily visible in the field, UAOs can check it during their inspection. After collecting data, all the upazila agriculture offices checked the data whether there were any over-stated service delivery data by the SAAOs. Besides, traditionally, upazila agriculture office collect self-reported service deliveries data of SAAOs in every week, and it is expected SAAOs do not provide over-stated service deliveries data. At least in the context of public sector, it is well practiced that when controlling officer order seriously to the sub-ordinate not to provide any false information (example: service delivery data in this research context), sub-ordinate follow that order seriously.

3.3.2 Estimation model

McKenzie (2012) indicates an analysis of covariance (ANCOVA) estimation of treatment effects is better than difference-in-difference (DID) estimation when autocorrelation is low. In this chapter, the autocorrelation is 0.50 for the control group and 0.428 for the treatment group, and the sample size is more than 800, which means that ANCOVA has higher

²⁹ This analysis is conducted by merging another survey's data. Since the experiment is designed as a policy change at DAE, socio-economic background and other information from the SAAOs were not collected before the experiment. The merged data has 170 observations and is called the restricted sample.

power than DID. Therefore, an ANCOVA estimation model is used as the main specification to estimate the treatment effects on the performance of extension officers:

$$Y_{ist} = \beta_F F_s + \beta_{M1} M1_s + \beta_{M2} M2_s + \beta_I I_s + \gamma X_{ist-1} + \delta Y_{ist-1} + e_{ist} \dots\dots\dots (1)$$

where Y_{ist} is the service delivery of SAAO i in sub-district s at time t (after the experiment). F , $M1$, $M2$, and I are dummy variables for the four treatments: Fame, Money1, Money2, and Inspection, respectively. β s are treatment effects to be estimated separately for each incentive. X_{ist-1} presents a set of SAAO characteristics. Y_{ist-1} indicates the lagged dependent variable at time $t-1$ (before the experiment) and e_{ist} is the error term. Standard errors are clustered at the upazila agriculture office level.

Since there may be a heterogeneous treatment effect by SAAOs' initial performance as predicted by tournament theory, interaction terms are added between treatment status and performance index at the baseline. To estimate the heterogeneous treatment effect of the experiment on performance, the following model is used:

$$Y_{ist} = \beta_F F_s + \beta_{M1} M1_s + \beta_{M2} M2_s + \beta_I I_s + \beta_{FZ} F_s \times Z_{ist-1} + \beta_{M1Z} M1_s \times Z_{ist-1} + \beta_{M2Z} M2_s \times Z_{ist-1} + \beta_{IZ} I_s \times Z_{ist-1} + \pi Z_{ist-1} + \gamma X_{ist-1} + \delta Y_{ist-1} + e_{ist} \dots\dots\dots (2)$$

where Z_{ist-1} is an indicator variable equaling 1 if the initial performance index is below the median, and 0 otherwise. The coefficients of interaction terms are marginal effects of each incentive for SAAOs with poor performance at the baseline, while those of un-interacted terms are marginal effects for better performance.

The sample is divided into SAAOs in offices with higher variance of initial performance and those in offices with lower variance. This tests tournament theory predictions: (1) high variation of initial performance among competitors leads to increase in service delivery among

more able officers, (2) low variation of initial performance results in no difference in effort level between better performers and poor performers, and (3) the treatment effects are higher in smaller offices than larger offices. Equation 2 were run separately for these sub-samples.

As explained in the previous section, the treatment effect can be heterogeneous based on the SAAO preference. Therefore, different Zs, such as time discount, present bias, risk aversion, altruism to the poor, and public service motivation are applied by using the restricted sample.

To test the robustness of the estimation results by eliminating time-invariant unobserved individual characteristics of SAAOs, the treatment effects on the performance are estimated by the following model.

$$Y_{ist} = \beta_F F_s \times T_t + \beta_{M1} M1_s \times T_t + \beta_{M2} M2_s \times T_t + \beta_I I_s \times T_t + \rho T_t + \alpha_{is} + e_{ist} \dots\dots\dots(3)$$

where T_t takes value 1 if the data is after the experiment and 0 otherwise. α_{is} is the SAAOs' fixed effects.

3.4 Descriptive Statistics and Estimation Results

3.4.1 Descriptive Statistics and Baseline balance

Table 3.1 shows the baseline socio-economic characteristics (age, gender, tenure) of the SAAOs, the number of SAAOs in upazila agricultural office, and performance variance within the office. More than 80% of the SAAOs are male and have been in the position for an average of 15 years. The number of SAAOs in an upazila agricultural office (office size) is approximately 23. Except for performance variance, these characteristics are comparable across the control and treatment groups. Distribution of initial performance within an office is larger in Inspection and Money1 than in Money2 and Fame. The number of officers in the offices with Inspection treatment is slightly higher than with Fame and Money2 treatments.

Table 3.2 shows total performance index before and after the experiment for the control and treatment groups. There are no differences in total performance index before the experiment, while after the experiment, performance is significantly higher for the treatment groups. Before the experiment, performance index was significantly different for Money1 and Money2 treatments than for Fame treatment. The increase in performance index for Inspection is significantly greater than for Money1, while there is no significant difference among other treatments.³⁰ The last four columns compare performance index between male and female agents and between more and less-experienced agents. There are no differences in performance index before the experiment by gender or tenure. However, female and less-experienced extension agents increased service delivery after the experiments. This suggests that gender and tenure affect the impact of incentives on performance, as examined in the analysis of heterogeneous treatment effects by adding interaction terms with these variables.

3.4.2 Estimation Results

Column 1 in Table 3.3 presents the estimated effect of treatments on the total performance of the SAAOs. All four treatments have a positive and significant effect on the level of agricultural extension services provided by the agents. Inspection, Fame, Money2, and Money1 treatments increase the average performance by 0.49, 0.43, 0.41, and 0.38, respectively. Evidence indicates that these estimates are statistically different from each other.³¹

³⁰ Appendix Tables 3.1 and 3.2 show the performance of the treatments and control groups by each outcome variables for the pre-treatment and post-treatment period respectively.

³¹ Appendix Table 3.4.1 where outcome variable is each service delivery measure show same results qualitatively.

Other columns show the heterogeneous treatment effects on performance by the initial poor performers, gender, and job tenure. First, the tournament theory were tested that when better-performing officers are not handicapped (Money2), poor performers do not improve performance. The results were compared from Money2 with Fame, Money1, and Inspection that handicap better performers. Column 2 shows that Money1 and Inspection effect performance significantly greater for poor performers than better performers. Since Money1 and Inspection treatments handicap better performers, this finding is consistent with the tournament theory prediction. While Fame also handicaps better performers, there is no significant difference between poor and better-performing officers. An explanation could be that poor performing officers care less about future careers. In Money2, there is no significant difference between the poor and better performers. It is not clear why better-performing officers did not exert more effort when not handicapped. Among treatments, there is no significant difference in treatment effects on the poor performers, indicating that handicapping better performers is an effective method to incentivize poor performers to increase efforts.

Columns 3 and 4 show the results for SAAOs in offices with higher and lower variances of initial performance,³² respectively. Even when handicapped (except Money2), better performers increase their efforts more than poor performers if the initial performance variation is high. None of the experiments indicate that the incentive effects on performance are greater for better performers than for poor performers. For Inspection, poor performers increase service delivery more than better performers initially. In offices with lower performance variance, financial incentives without handicapping better performers (Money2) increases the

³² Table 3.3. (columns 3-6) Shows sub-sample analyses. These sub-samples are not stratified when assigning treatment arms. Estimation results is interpreted with caution.

performance of better performers more than of poor performers. Furthermore, performance by poor performers is enhanced the most by Inspection than the other treatments.

Columns 5 and 6 show the office size (number of competitors), and the treatment effects are greater in larger offices, which contradicts the tournament theory prediction. In larger offices, Inspection has the greatest impact for the poor performers. In smaller offices, Money1 has a greater impact on poor performers than Money2.

Column 7 presents differences in treatment effects by gender. Money2 is significantly greater for male agents than female agents. Among female agents, Inspection is significantly higher than Money2 and Fame. Since the worst two performers are selected in Inspection, this suggests that selecting the worst instead of best performers should be considered an effective incentive mechanism, especially for female agents.

Column 8 shows significant differences between more-experienced and less-experienced officers for Money1 and Money2 treatments. Less-experienced officers increase service deliveries more than more-experienced officers. There is no differential effect between Fame and Inspection on performance by experience. As only monetary incentives are effective to improve less-experienced officer performance, they may think their pay is too low to increase service delivery without additional rewards.

The results on heterogeneous treatment effect by officers' preference are given in Table 3.4. There are no heterogeneous treatment effects on performance by time discount (patience), altruism (to the poor), risk aversion, personality, or public service motivation.³³ However, Fame and Inspection incentivize agents who are not present biased and can demotivate the

³³ For these analyses, the restricted sample is used. The descriptive statistics and estimation results are given in Appendix Table 3.5 and 3.6, respectively. The description of the variables used in the restricted sample are given in Appendix 3.C.

biased agents (column 8). This result is expected, as rewards of these treatments are not paid immediately like Money1 or Money2.

In summary, the four treatments motivate extension agents to improve performance on average. While the results do not indicate a comparative effectiveness of financial and non-financial rewards on performance of public sector extension agents, there are significant heterogeneous treatment effects on performance. The findings indicate that poor performers make more effort for the awards when better performers are handicapped, as tournament theory predicts. Regarding predictions of differential effects due to office characteristics (performance variation and office size), Inspection (possible punishment on worst performers) works best to improve poor performers in offices with higher variance and smaller number of officers.

3.4.3 Robustness

With panel data, an officer fixed effects model is applied by eliminating time-invariant unobserved individual characteristics of SAAOs. Appendix Table 3.3 provides the results for total performance index as an outcome variable and for the heterogeneous treatment effects, and Appendix Table 3.4.1 and 3.4.2 show each service delivery measure as outcome variables. The estimation results are qualitatively similar to the ANCOVA results, which confirms that the main results are robust.

Six months after the experiment, a short interview was conducted with the UAOs and AEOs to determine the consequences of the experiment. No dissatisfaction existed among SAAOs regarding the experiment. No offices indicated that the experiment had negative effects on performance of SAAOs. Three offices introduced similar incentives to increase extension services. This suggests that the chapter of this dissertation supports the “do no harm” principle.

3.5 Concluding remarks

This chapter examined methods to improve service delivery of public agricultural extension officers in Bangladesh, especially for low performers. For this purpose, a randomized control trial was conducted. Since improving service delivery of poor-performing agents is more urgent than improving best-performing agents, the effects of introducing financial and non-financial incentives and increased monitoring (inspection) were tested to determine if they motivate low-performing extension agents to increase performance. All treatments motivated poor-performing extension agents to improve performance, and increased monitoring had a stronger effect than financial incentives.

There are two policy implications of this chapter. First, if the purpose of introducing incentives is to motivate poor-performing agents, increasing monitoring of the worst-performing public workers is more effective than rewarding the best performers. As identifying and revealing the worst performers may not be acceptable in some settings and have negative consequences, careful application is needed. For example, this chapter found that the effect of inspection treatment is stronger among female extension agents than among males. If this is due to a strong aversion to being selected as the worst performers in the office among women, the number of female extension agents (and applicants) may decrease, which can prevent female farmers from accessing new agricultural technologies in the future. Second, clarifying work duties, an emphasis on short-term (monthly) rather than long-term targets (annual), and a frequent reward system can increase work efforts by public workers. In many developing countries, fiscal budgets in the agricultural sector have been declining. Introducing financial incentives may not be feasible. It is, therefore, important for control officers to manage extension workers creatively using non-financial incentives. This also indicates that not only

the work morale of field workers but also the managerial abilities of control officers are key for improving service delivery.

In this study, it was found that male extension workers improved performance more than that of the female extension agents. The likely reason might be the social norms and purdah system of Bangladesh where female extension workers may feel shy/embarrassed to work with male farmers. To increase service delivery, the possible two strategies³⁴ are : i. to use female organizations for easy communication and ii. Female extension workers can help female clients of microfinance institute. Besides these two strategies, a designated female friendly office room in their jurisdiction block (village) and selecting a capable contact farmers in the farmers group may help female extension workers to increase service delivery.

To work with female group, female extension workers can form female farmers groups. Female extension workers can motivate female farmers group for preparing homestead vegetable garden. When forming/adjust farmer's groups, female farmers can be added in the group; in that case it would be easy for the female extension officers to communicate with the female farmers. In the case of microfinance institutions, as in the village level there are many NGOs (microfinance institutions) worked with female clients, female extension officers can be a resource persons to train up the female clients of NGOs regarding use of new crop technology. In the case of office room, as it is difficult for the female extension agents to reside in the village, an office room in the Union Parishad (village level local government) for the female extension agents may be useful to communicate with the farmers easily. During office hours, farmers can visit them in the office. Also in practice, female SAAOs mainly spend much time

³⁴ To know the mechanism of how to improve the performance of female extension agents, an interview from one male agriculture officer and one female agriculture officer was taken.

preparing skilled contact farmers so that male farmers mostly communicate with the male contact farmers. In that case, workload reduces for female SAAOs.

A female agriculture officer gave information that female SAAOs mainly spend much time to prepare a skilled contact farmers so that male farmers mostly communicate with the male contact farmers. More specifically, extension workers generally work with the groups. In the group there must have some leader farmer (contact farmer). As female extension agents do not reside in villages (if posting not at won village) and cannot spend much time in the field, they provide more training to the contact farmers (they try to pick up right/hardworking contact farmers) so that people can get extension services from the contact farmers in the absence of SAAOs. In that case, work load are reduced for female SAAOs. In the case of using a mobile phone by the female extension officers to provide extension services, it is also difficult considering the social context. A female officer informed that when the mobile number of female extension officer's become available, the young bad people called them even at night for an unnecessary talk. However, form the controlling office side, a key informant informed that the situation is changing day by day, and he found many hard-working female extension officers that do not feel shy/embarrassed to work with male farmers group. However, this context can be an interesting research topic in future.

The limitation of this chapter is that the incentives effects on the performance of the SAAOs were examined only for the short-term. The comparative effectiveness of increased monitoring over financial and non-financial incentives found in this chapter may decay over time. This is an important research area to be pursued further. As previously mentioned, future research can also aim to improve the managerial ability of control officers in the field.

Table 3.1: Descriptive Statistics on Baseline Characteristics of SAAOs and Upazila Agricultural Office by Treatment Status

Variables	Control	Fame (T1)	Money1 (T2)	Money2 (T3)	Inspection (T4)	T1/T2	T1/T3	T1/T4	T2/T3	T2/T4	T3/T4
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Male extension agents	0.88 (0.32)	0.83 (0.37)	0.82 (0.38)	0.86 (0.34)	0.83 (0.38)	0.82	0.33	0.88	0.24	0.70	0.40
Job experience (Years)	14.31 (13.05)	15.28 (2.36)	14.70 (12.01)	13.81 (12.71)	15.75 (12.43)	0.68	0.30	0.73	0.52	0.44	0.16
Number of SAAOs in Upazila Agricultural Office	23.77 (7.20)	22.93 (6.37)	23.79 (8.51)	22.66 (6.00)	24.85 (8.88)	0.32	0.70	0.03	0.18	0.27	0.01
Performance variance within office	0.16 (0.05)	0.13*** (0.06)	0.21*** (0.10)	0.17** (0.06)	0.22*** (0.12)	0.00	0.00	0.00	0.00	0.35	0.00
Number of SAAOs	171	152	168	159	157						

Notes: Numbers in the parentheses are standard deviations. ***, **, and * indicate that there is a significant difference in means between treatment and control groups at 1%, 5%, and 10% level.

Table 3.2: Index of Service Delivery (Total Performance Index) by Treatment Status

Variables	Control	Fame (T1)	Money1 (T2)	Money2 (T3)	Inspection (T4)	T1/T2	T1/T3	T1/T4	T2/T3	T2/T4	T3/T4	Male Agents	Female Agents	More experienced Agents	Less experienced Agents
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Pre treatment	-0.01	-0.09	0.02	0.06	-0.04							-0.001	-0.07	-0.02	-0.003
	(0.54)	(0.52)	(0.49)	(0.53)	(0.58)	0.05	0.01	0.37	0.56	0.33	0.13	(0.53)	(0.56)	(0.53)	(0.54)
Post treatment	-0.33	0.03***	0.04***	0.12***	0.13***							-0.01	0.02	-0.05	0.04***
	(0.47)	(0.38)	(0.42)	(0.52)	(0.58)	0.69	0.09	0.06	0.19	0.13	0.79	(0.53)	(0.49)	(0.51)	(0.53)
Difference (post – pre)	-0.240	0.12***	0.02***	0.06***	0.17***							-0.01	0.08*	-0.03	0.05**
	(0.50)	(0.45)	(0.51)	(0.55)	(0.63)	0.08	0.29	0.44	0.54	0.03	0.10	(0.57)	(0.57)	(0.55)	(0.59)
Number of Observations	171	152	168	159	157							684	123	437	370

Notes: The numbers in the parentheses are standard deviations. ***, **, and * indicate that there is a significant difference in means at 1%, 5%, and 10% level between treatment and control groups (Column 1- 5), between males and females (Column 12 – 13), and between more experienced (above median) and less experienced (below median) extension agents (Column 14 – 15).

Table 3.3: Effects of treatments on the performance (Total performance index)

VARIABLES	Base		Z=1 if scored lower than median				Z=1 if Male	Z=1 if tenure > 15 years
	Full sample	Full sample	Higher variance office	Lower variance office	Larger office size	Smaller office size	Full sample	Full sample
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Fame (T1)	0.41*** (0.09)	0.44*** (0.11)	0.44*** (0.11)	0.43*** (0.08)	0.59*** (0.10)	0.26*** (0.09)	0.33** (0.12)	0.35*** (0.08)
Money1(T2)	0.38*** (0.11)	0.32*** (0.11)	0.28*** (0.10)	0.29*** (0.09)	0.30*** (0.09)	0.35*** (0.10)	0.39*** (0.12)	0.26** (0.11)
Money2 (T3)	0.43*** (0.11)	0.47*** (0.12)	0.31*** (0.10)	0.63*** (0.09)	0.76*** (0.09)	0.19** (0.09)	0.26* (0.15)	0.33*** (0.12)
Inspection (T4)	0.49*** (0.15)	0.39*** (0.14)	0.23** (0.10)	0.54*** (0.09)	0.63*** (0.09)	0.20** (0.09)	0.58*** (0.18)	0.46** (0.18)
Fame (T1) ×Z		-0.05 (0.09)	-0.02 (0.16)	-0.07 (0.12)	-0.14 (0.13)	0.02 (0.13)	0.09 (0.08)	0.00 (0.00)
Money1(T2)×Z		0.12** (0.05)	0.23 (0.14)	0.03 (0.13)	0.14 (0.12)	0.09 (0.14)	-0.02 (0.09)	0.01** (0.00)
Money2 (T3) ×Z		-0.09 (0.09)	0.10 (0.14)	-0.29** (0.13)	-0.18 (0.12)	0.00 (0.14)	0.20* (0.10)	0.01** (0.00)
Inspection (T4) ×Z		0.20** (0.09)	0.35** (0.15)	0.09 (0.12)	0.24* (0.13)	0.16 (0.13)	-0.11 (0.10)	0.00 (0.00)
Z		0.06 (0.08)	-0.07 (0.11)	0.17 (0.09)	-0.02 (0.09)	0.12 (0.10)	-0.05 (0.07)	-0.01** (0.00)
Male	-0.02 (0.03)	-0.03 (0.03)	-0.09 (0.07)	0.04 (0.06)	-0.02 (0.05)	0.01 (0.06)		-0.02 (0.03)
Job Tenure	-0.00** (0.00)	-0.00** (0.00)	-0.00* (0.00)	-0.00* (0.00)	-0.01*** (0.00)	-0.00 (0.00)	-0.00** (0.00)	
Initial Performance index	0.40*** (0.05)	0.46*** (0.08)	0.43*** (0.05)	0.53*** (0.06)	0.40*** (0.05)	0.50*** (0.05)	0.40*** (0.05)	0.40*** (0.05)
Constant	-0.27*** (0.09)	-0.29*** (0.10)	-0.13 (0.10)	-0.43*** (0.08)	-0.33*** (0.08)	-0.26*** (0.09)	-0.25** (0.11)	-0.21*** (0.08)
Observations	807	807	399	408	395	412	807	807

Table 3.3: Effects of treatments on the performance (Total performance index) (**contd.**)

VARIABLES	Base		Z=1 if scored lower than median				Z=1 if Male	Z=1 if tenure > 15 years
	Full sample	Full sample	Higher variance office	Lower variance office	Larger office size	Smaller office size	Full sample	Full sample
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
R-squared	0.30	0.32	0.29	0.36	0.43	0.30	0.31	0.31
Fame=Money1 (p-value)	(0.70)							
Fame=Money2 (p-value)	(0.75)							
Fame=Inspection (p-value)	(0.52)							
Money1=Money2 (p-value)	(0.57)							
Money1=Inspection (p-value)	(0.42)							
Money2=Inspection (p-value)	(0.68)							
Marginal effects when Z=1 or 0								
Fame1		0.39	0.42	0.36	0.45	0.28	0.42	0.35
Fame0		0.44	0.44	0.43	0.59	0.26	0.33	0.35
Money11		0.44	0.51	0.32	0.44	0.44	0.37	0.54
Money10		0.32	0.28	0.29	0.30	0.35	0.39	0.30
Money21		0.38	0.41	0.34	0.58	0.35	0.46	0.61
Money20		0.47	0.31	0.63	0.76	0.19	0.26	0.37
Inspection1		0.59	0.58	0.45	0.87	0.36	0.47	0.46
Inspection 0		0.39	0.23	0.54	0.63	0.20	0.58	0.46
Fame0=Fame1 (p value)		(0.57)	(0.89)	(0.54)	(0.29)	(0.91)	(0.25)	(0.25)
Money11=Money10 (p value)		(0.02)**	(0.11)	(0.82)	(0.23)	(0.55)	(0.83)	(0.04)**
Money21=Money20 (p value)		(0.34)	(0.46)	(0.03)**	(0.14)	(0.97)	(0.05)*	(0.05)*
Inspection0= Inspection1 (p value)		(0.03)**	(0.02)**	(0.44)	(0.07)*	(0.22)	(0.29)	(0.65)

Table 3.3: Effects of treatments on the performance (Total performance index) (**contd.**)

VARIABLES	Base		Z=1 if scored lower than median				Z=1 if Male	Z=1 if tenure > 15 years
	Full sample	Full sample	Higher variance office	Lower variance office	Larger office size	Smaller office size	Full sample	Full sample
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Fame1=Money11 (p-value)		(0.53)	(0.43)	(0.76)	(0.89)	(0.10)	(0.56)	(0.75)
Fame1=Money21 (p-value)		(0.97)	(0.93)	(0.88)	(0.24)	(0.41)	(0.64)	(0.26)
Fame1=Inspection1 (p-value)		(0.16)	(0.16)	(0.01)**	(0.00)***	(0.37)	(0.69)	(0.57)
Money11=Money21 (p-value)		(0.58)	(0.32)	(0.88)	(0.15)	(0.02)**	(0.39)	(0.49)
Money11=Inspection1		(0.30)	(0.47)	(0.00)***	(0.00)***	(0.39)	(0.48)	(0.74)
Money21=Inspection1		(0.18)	(0.09)*	(0.00)***	(0.00)***	(0.08)*	(0.92)	(0.89)
Fame0=Money10 (p-value)		(0.22)	(0.12)	(0.15)	(0.00)***	(0.34)	(0.40)	(0.43)
Fame0=Money20 (p-value)		(0.75)	(0.19)	(0.03)**	(0.10)	(0.47)	(0.45)	(0.92)
Fame0=Inspection0 (p-value)		(0.74)	(0.04)**	(0.18)	(0.75)	(0.49)	(0.08)*	(0.52)
Money10=Money20 (p-value)		(0.19)	(0.73)	(0.01)**	(0.00)***	(0.10)	(0.21)	(0.59)
Money10=Inspection0		(0.56)	(0.61)	(0.01)**	(0.00)***	(0.10)	(0.20)	(0.32)
Money20=Inspection0		(0.60)	(0.39)	(0.37)	(0.18)	(0.91)	(0.05)*	(0.53)

Notes: F1: Fame when Z=1, F0: Fame when Z=0, M11: Money1 when Z=1, Standard errors are clustered at upazila agriculture offices in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 3.4: Effects of treatments on the performance (Total performance index) (ANCOVA) [Restricted Sample]

VARIABLES	Z=1 if least patient	Z=1 reside in the block	Z=1 if obtained A-grade	Z=PSM Index	Z=Big Five Personality	Z=1 if Altruist to poor	Z=1 if Most Risk Averse	Z=1 if Present Bias
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Fame (T1)	0.35** (0.17)	0.27** (0.11)	0.43*** (0.11)	0.35*** (0.08)	0.36*** (0.09)	0.32** (0.13)	0.11 (0.18)	0.40*** (0.09)
Money1(T2)	0.51*** (0.16)	0.43*** (0.14)	0.46*** (0.15)	0.35*** (0.09)	0.36*** (0.09)	0.36*** (0.10)	0.26*** (0.08)	0.37*** (0.11)
Money2 (T3)	0.40** (0.16)	0.51*** (0.13)	0.66*** (0.13)	0.50*** (0.10)	0.50*** (0.11)	0.52*** (0.19)	0.59*** (0.14)	0.50*** (0.14)
Inspection (T4)	0.37 (0.27)	0.40** (0.15)	0.32*** (0.10)	0.40*** (0.12)	0.39*** (0.13)	0.37** (0.18)	0.34** (0.15)	0.50*** (0.16)
Fame (T1) × Z	0.02 (0.15)	0.15 (0.16)	-0.18 (0.18)	0.03 (0.25)	0.21 (0.18)	0.01 (0.03)	0.29 (0.20)	-0.60*** (0.16)
Money1(T2) × Z	-0.24 (0.15)	-0.15 (0.13)	-0.21 (0.18)	0.05 (0.19)	0.01 (0.14)	-0.00 (0.02)	0.15 (0.16)	-0.28 (0.29)
Money2 (T3) × Z	0.23 (0.18)	-0.04 (0.19)	-0.26 (0.17)	-0.24 (0.23)	-0.10 (0.24)	-0.00 (0.03)	-0.10 (0.20)	-0.18 (0.15)
Inspection (T4) × Z	0.05 (0.28)	-0.04 (0.19)	0.12 (0.20)	0.24 (0.20)	0.24 (0.16)	0.00 (0.03)	0.11 (0.19)	-0.68*** (0.21)
Z	0.05 (0.11)	0.03 (0.12)		-0.13 (0.17)	-0.11 (0.13)	-0.01 (0.02)	0.09 (0.11)	0.38*** (0.10)

Table 3.4: Effects of treatments on the performance (Total performance index) (ANCOVA) [Restricted Sample] (**contd.**)

VARIABLES	Z=1 if least patient	Z=1 reside in the block	Z=1 if obtained A-grade	Z=PSM Index	Z=Big Five Personality	Z=1 if Altruist to poor	Z=1 if Most Risk Averse	Z=1 if Present Bias
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Male	-0.19** (0.08)	-0.20** (0.08)	-0.22*** (0.08)	-0.16* (0.08)	-0.16** (0.08)	-0.19** (0.08)	-0.17** (0.08)	-0.15* (0.08)
Job Tenure	-0.00* (0.00)	-0.00* (0.00)	-0.00** (0.00)	-0.00* (0.00)	-0.00* (0.00)	-0.00 (0.00)	-0.01** (0.00)	-0.00** (0.00)
Initial Performance index	0.48*** (0.07)	0.50*** (0.07)	0.48*** (0.07)	0.49*** (0.06)	0.50*** (0.06)	0.50*** (0.07)	0.52*** (0.06)	0.53*** (0.07)
Constant	-0.15 (0.12)	-0.13 (0.11)	-0.19** (0.09)	-0.08 (0.10)	-0.14 (0.10)	-0.04 (0.13)	-0.11 (0.09)	-0.15 (0.11)
Observations	170	170	170	170	170	170	170	170
R-squared	0.49	0.48	0.49	0.49	0.49	0.48	0.49	0.49

Notes: Other controls are Muslim, married, SSC A grade, graduate, rural school, quota privilege. Cluster standard errors by upazila offices are in parentheses.
 *** p<0.01, ** p<0.05, * p<0.1

Appendix Table 3.1: Initial Outcome Variables

Variables	Control	Fame (T1)	Money1 (T2)	Money2 (T3)	Inspection (T4)	Male Extension agents (6)	Female Extension agents (7)	More experienced Extension Agents (8)	Less experienced Extension Agents (9)
Number of Compost Ground prepared	4.72 (2.62)	4.79 (3.07)	5.17 (3.09)	4.99 (3.29)	4.66 (3.04)	4.86 (2.96)	4.88 (3.39)	4.83 (2.98)	4.90 (3.08)
Number of observations	143	152	137	147	143	612	110	381	341
Number of FYM ground preparation	3.67 (2.16)	3.32 (2.82)	3.92 (2.86)	4.07 (2.49)	3.8 (2.76)	3.8 (2.63)	3.25** (2.57)	3.83 (2.52)	3.68 (2.76)
Number of observations	171	152	155	159	170	684	123	437	370
Number of Vermi ground prepared	1.43 (1.43)	1.24 (1.36)	1.31 (1.45)	1.28 (1.45)	1.39 (1.32)	1.322 (1.39)	1.39 (1.49)	1.27 (1.41)	1.41 (1.39)
Number of observations	171	152	155	159	170	684	123	437	370
Percentage of Land used as Ideal Seedbeds (%)	57.55 (25.15)	56.09 (19.81)	53.55 (26.89)	56.13 (21.46)	60.91 (24.48)	56.55 (23.98)	58.42 (22.97)	56.17 (23.72)	57.62 (24)
Number of observations	136	130	145	134	137	587	95	377	305
Number of farmers used Balanced Fertilizer	162.73 (217.52)	139.39 (136.94)	182.88 (156.13)	196.97 (160.71)	136.65 (177.61)	164.56 (179.75)	153.15 (152.91)	167.88 (181.68)	156.81 (168.84)
Number of observations	171	125	155	120	162	623	110	400	333
Appropriate row user for cultivation	107.33 (96.58)	111.45 (76.64)	101.95 (110.11)	94.05 (66.96)	98.64 (162.67)	105.76 (113.80)	84.80* (95.91)	99.09 (112.15)	106.89 (110.67)
Number of observations	140	125	155	120	162	596	106	386	316

Notes: Numbers in the parentheses are standard deviations. ***, **, and * indicate that there is a significant difference in means between treatment and control groups at 1%, 5%, and 10% level. Column1-Column 6 presents the means difference between the treatment and control group. Column 6 and 7: The Means difference in the service deliveries between males and females. Column 8 & 9: The Means difference in the service deliveries between more experienced and less experienced extension agents.

Appendix Table 3.2: Post-Treatment Outcome Variables

Variables	Control	Fame (T1)	Money1 (T2)	Money2 (T3)	Inspection (T4)	Male Extension agents	Female Extension agents	More experienced Extension Agents	Less experienced Extension Agents
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Number of Compost Ground prepared	4.88 (2.08)	5.78*** (3.01)	5.62** (3.23)	5.69*** (2.89)	6.08*** (3.24)	5.57 (2.95)	5.85 (2.93)	5.57 (2.78)	5.66 (3.12)
Number of observations	143	152	137	147	143	612	110	381	341
Number of FYM ground prepared	3.93 (2.46)	4.93*** (2.40)	5.2*** (2.56)	5.70*** (3.05)	4.91*** (3.67)	4.95 (2.92)	4.76 (3.03)	4.80 (2.74)	5.07 (3.14)
Number of observations	171	152	155	159	170	684	123	437	370
Number of Vermi ground prepared	1.49 (1.45)	2.03*** (1.44)	1.94*** (1.52)	1.79* (1.76)	1.79* (1.50)	1.78 (1.54)	1.89 (1.49)	1.66 (1.53)	1.96*** (1.53)
Number of observations	171	152	155	159	170	684	123	437	370
Percentage of Land under Ideal Seedbeds	52.45 (33.28)	65.29** (21.53)	59.21** (21.74)	64.13*** (32.01)	75.60*** (27.12)	62.68 (28.68)	67.39 (26.62)	62.32 (30.00)	64.59 (26.81)
Number of observations	136	130	145	134	137	587	95	377	305
Number of farmers used Balanced Fertilizer	148.22 (114.44)	184.00 (93.41)	223.03*** (118.468)	229.6*** (140.39)	214.57*** (178.68)	196.76 (137.78)	205.96 (130.27)	193.83 (136.54)	203.29 (136.77)
Number of observations	171	125	155	120	162	623	110	400	333
Appropriate row user for cultivation	109.36 (120.80)	172.78*** (84.85)	178.96*** (58.261)	182.96*** (127.102)	219.28*** (175.87)	175.66 (131.13)	164.51 (99.23)	165.93 (118.47)	183.85* (135.92)
Number of observations	140	125	155	120	162	596	106	386	316

Notes: Numbers in the parentheses are standard deviations. ***, **, and * indicate that there is a significant difference in means between treatment and control groups at 1%, 5%, and 10% level. Column1-Column 5 represents the means difference of the service deliveries between the treatment and control group. Column 6 and 7: The means difference in the service deliveries between males and females. Column 8 & 9: The Means difference of the service deliveries between more experienced and less experienced extension agents.

Appendix Table 3.3: Effects of treatments on the performance (Total performance index) (Officer Fixed Effects Model)

VARIABLES	Base	Z=1 if scored lower than median	Z=1 if Male extension agents	Z =1 if tenure<15	Z=Initial performance score	Z=Tenure	Z=Initial Performance variance by office
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Fame (T1) × Post	0.45*** (0.15)	0.50*** (0.16)	0.42** (0.19)	0.42** (0.17)	0.40*** (0.10)	0.50*** (0.17)	-0.27 (0.33)
Money1(T2) × Post	0.36*** (0.13)	0.28** (0.13)	0.28* (0.16)	0.41** (0.16)	0.38*** (0.11)	0.24* (0.14)	-0.32 (0.26)
Money2 (T3) × Post	0.39*** (0.13)	0.43*** (0.15)	0.16 (0.15)	0.39** (0.16)	0.43*** (0.11)	0.37** (0.15)	-0.03 (0.32)
Inspection (T4) × Post	0.50*** (0.16)	0.37** (0.17)	0.61*** (0.14)	0.44** (0.17)	0.49*** (0.15)	0.59*** (0.19)	0.13 (0.31)
Fame (T1) × Z × Post		-0.08 (0.06)	-0.24** (0.11)	-0.36*** (0.13)	-0.07 (0.13)	-0.00 (0.01)	4.86** (2.32)
Money1(T2) × Z × Post		0.15*** (0.04)	0.03 (0.16)	0.07 (0.13)	-0.12 (0.13)	0.01* (0.00)	3.95** (1.55)
Money2 (T3) × Z × Post		-0.07 (0.09)	0.09 (0.17)	-0.13 (0.10)	0.00 (0.13)	0.00 (0.00)	2.72 (1.92)
Inspection (T4) × Z × Post		0.28** (0.11)	0.27* (0.15)	-0.01 (0.12)	-0.03 (0.20)	-0.01 (0.01)	2.55 (1.71)
Post	-0.33*** (0.11)	-0.52*** (0.12)	-0.14 (0.16)	0.13 (0.11)	-0.34*** (0.09)	-0.30*** (0.11)	0.15 (0.22)
Z × Post		0.39*** (0.03)	-0.11 (0.12)	0.06 (0.08)	-0.56*** (0.10)	-0.00 (0.00)	-3.06** (1.39)
Constant	-0.01 (0.02)	-0.01 (0.02)	-0.01 (0.02)	-0.01 (0.02)	-0.01 (0.02)	-0.01 (0.02)	-0.01 (0.02)
Observations	1,614	1,614	1,614	1,614	1,614	1,614	1,614
R-squared	0.10	0.27	0.11	0.11	0.42	0.11	0.13

Notes: Cluster standard errors by upazila offices are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Appendix Table 3.4.1: Standardized Service Delivery Measure (ANCOVA models)

VARIABLES	Compost ground preparation.	FYM ground preparation	Vermi ground preparation	Appropriate fertilizer user	Appropriate row user	Ideal seedbeds preparation
	(1)	(2)	(3)	(4)	(5)	(6)
Fame	0.29* (0.15)	0.40*** (0.12)	0.44** (0.16)	0.30* (0.15)	0.49*** (0.12)	0.48 (0.34)
Money1	0.19 (0.21)	0.39** (0.15)	0.35** (0.17)	0.51*** (0.17)	0.57*** (0.09)	0.30 (0.32)
Money2	0.24 (0.16)	0.54*** (0.18)	0.26 (0.17)	0.54** (0.21)	0.61*** (0.21)	0.45 (0.37)
Inspection	0.41* (0.24)	0.32 (0.25)	0.22 (0.18)	0.53** (0.24)	0.89*** (0.30)	0.76* (0.40)
Male	-0.09 (0.11)	-0.00 (0.11)	0.00 (0.08)	-0.05 (0.07)	0.08 (0.06)	-0.07 (0.11)
Job Tenure	0.00 (0.00)	-0.00 (0.00)	-0.01** (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.01 (0.01)
Initial outcome variables	0.38*** (0.07)	0.40*** (0.06)	0.55*** (0.04)	0.28*** (0.05)	0.28*** (0.06)	0.42*** (0.07)
Constant	-0.16 (0.14)	-0.26* (0.15)	-0.16 (0.13)	-0.28** (0.13)	-0.56*** (0.10)	-0.26 (0.30)
Observations	722	807	807	733	702	682
R-squared	0.16	0.20	0.33	0.13	0.16	0.26
Fame=Money1 (p-value)	0.64	0.97	0.61	0.22	0.58	0.20
Fame=Money2(p-value)	0.78	0.42	0.31	0.26	0.62	0.88
Fame =Inspection (p-value)	0.64	0.73	0.26	0.33	0.21	0.30
Money1=Money2 (p-value)	0.83	0.45	0.62	0.91	0.84	0.47
Money1=Inspection (p-value)	0.45	0.77	0.52	0.94	0.29	0.07
Money2 =Inspection (p-value)	0.52	0.43	0.85	0.97	0.43	0.29

Notes:***, **, and * indicate that there is a significant difference in means between treatment and control groups at 1, 5% and 10% level. The standard error is clustered at sub-district level are in parenthesis. Note: Index for compost ground/FYM ground/Vermi ground preparation: Standardized value of Number of compost grounds/FYM ground, Vermi ground prepared by the farmers with the consultation of SAAO. Index for ideal seedbeds preparation: Standardized value of percentage of total land used as ideal seedbeds by the farmer with the motivation from SAAO. Index for appropriate fertilizer use: Standardized value of the number of farmers used appropriate fertilizer with the consultation of SAAO. Index for appropriate row user: Standardized value of the number of farmers maintain appropriate row for rice cultivation with the consultation of SAAO.

Appendix Table 3.4.2: Standardized Service Delivery Measure (Officer Fixed Effect models)

VARIABLES	Compost ground preparation.	FYM ground preparation	Vermi ground preparation	Appropriate fertilizer user	Appropriate row user	Ideal seedbeds preparation
	(1)	(2)	(3)	(4)	(5)	(6)
Fame × Post	0.27 (0.17)	0.47** (0.18)	0.50*** (0.17)	0.37 (0.32)	0.48** (0.21)	0.54 (0.32)
Money1 × Post	0.10 (0.25)	0.36* (0.19)	0.39** (0.17)	0.35 (0.34)	0.60*** (0.21)	0.41 (0.30)
Money2 × Post	0.18 (0.22)	0.48** (0.21)	0.31** (0.14)	0.30 (0.33)	0.70*** (0.22)	0.51 (0.34)
Inspection × Post	0.42* (0.25)	0.30 (0.21)	0.23 (0.14)	0.58 (0.37)	0.95*** (0.32)	0.75** (0.34)
Post	0.05 (0.13)	0.09 (0.12)	0.04 (0.10)	-0.09 (0.31)	0.02 (0.16)	-0.19 (0.28)
Constant	-0.12*** (0.04)	-0.20*** (0.03)	-0.16*** (0.03)	-0.11** (0.05)	-0.29*** (0.04)	-0.12*** (0.04)
Observations	1,444	1,614	1,614	1,466	1,404	1,364
R-squared	0.06	0.15	0.13	0.06	0.26	0.10
Fame=Money1 (p-value)	0.45	0.55	0.60	0.88	0.51	0.51
Fame=Money2(p-value)	0.63	0.97	0.29	0.63	0.28	0.89
Fame =Inspection (p-value)	0.77	0.58	0.65	0.81	0.63	0.67
Money1=Money2 (p-value)	0.54	0.42	0.14	0.38	0.13	0.43
Money1=Inspection (p-value)	0.28	0.78	0.37	0.37	0.26	0.15
Money2 =Inspection (p-value)	0.38	0.44	0.58	0.24	0.41	0.39

Notes: ***, **, and * indicate that there is a significant difference in means between treatment and control groups at 1, 5% and 10% level. The standard error is clustered at sub-district level are in parenthesis. Note: Index for compost ground/FYM ground/Vermi ground preparation: Standardized value of Number of compost grounds/FYM ground, Vermi ground prepared by the farmers with the consultation of SAAO. Index for ideal seedbeds preparation: Standardized value of percentage of total land used as ideal seedbeds by the farmer with the motivation from SAAO. Index for appropriate fertilizer use: Standardized value of the number of farmers used appropriate fertilizer with the consultation of SAAO. Index for appropriate row user: Standardized value of the number of farmers maintain appropriate row for rice cultivation with the consultation of SAAOs.

Appendix Table 3.5: Descriptive Statistics (Restricted Sample)

Variables	Control	Fame	Money1	Money2	Inspection
	(1)	(2)	(3)	(4)	(5)
Pre-treatment performance index	-0.053 (0.485)	-0.250* (0.485)	0.061 (0.514)	0.183** (0.463)	-6.740 (0.637)
Post treatment Performance Index	-0.337 (0.462)	0.082*** (0.631)	0.069*** (0.387)	0.282*** (0.571)	0.082*** (0.631)
Tenure	9.919 (11.651)	16.69** (12.939)	13.75 (11.267)	15.25* (12.593)	16.69** (12.939)
Male	0.757 (0.435)	0.848 (0.364)	0.778 (0.422)	0.844 (0.369)	0.848 (0.364)
Islam	0.784 (0.417)	0.697 (0.467)	0.750 (0.439)	0.688 (0.471)	0.697 (0.467)
Married	0.568 (0.502)	0.636 (0.489)	0.75 (0.439)	0.563 (0.504)	0.636 (0.489)
=1 if obtained A- grade	0.514 (0.507)	0.606 (0.496)	0.500 (0.507)	0.656 (0.483)	0.606 (0.496)
=1 if Graduate	0.189 (0.397)	0.121 (0.331)	0.250 (0.439)	0.156 (0.369)	0.121 (0.331)
=if raised in village	0.892 (0.315)	0.848 (0.364)	0.917 (0.280)	0.875 (0.336)	0.848 (0.364)
=1 if quota privileged	0.243 (0.435)	0.121 (0.331)	0.139 (0.351)	0.188 (0.397)	0.121 (0.331)
PSM Index	0.104 (0.458)	-0.088 (0.530)	0.012 (0.478)	-0.009 (0.437)	-0.088 (0.530)

Appendix Table 3.5: Descriptive Statistics (Restricted Sample) (contd.)

Variables	Control	Fame	Money1	Money2	Inspection
	(1)	(2)	(3)	(4)	(5)
Big five Index	-0.015	0.101	-0.025	-0.044	0.101
	(0.487)	(0.486)	(0.481)	(0.484)	(0.486)
=1 if least patient	0.622	0.697	0.583	0.531	0.697
	(0.492)	(0.467)	(0.500)	(0.507)	(0.467)
Altruism	5.270	4.455	4.222	4.688	4.455
	(2.815)	(3.624)	(3.145)	(3.095)	(3.624)
=1 if present bias	0.054	0.242**	0.083	0.156	0.242**
	(0.229)	(0.435)	(0.280)	(0.369)	(0.435)
=1 if most risk averse	0.784	0.667	0.778	0.813	0.667
	(0.417)	(0.479)	(0.422)	(0.397)	(0.479)
=if reside in block area	0.405	0.455	0.639**	0.438	0.455
	(0.498)	(0.506)	(0.487)	(0.504)	(0.506)
Number of Observations	37	32	36	32	33

Notes: Standard deviations are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Appendix Table 3.6: Effects of treatments on the performance (Total performance index, TPI) (ANCOVA) [Restricted Sample]

VARIABLES	Base	Z=1 if scored lower than median	Z=1 if Male extension agents	Z =1 if tenure<15	Z= Initial performance score	Z=tenure	Z=Initial Performance variance by office
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Fame (T1)	0.36***	0.33**	0.42**	0.30**	0.33***	0.37***	0.40***
	(0.10)	(0.13)	(0.18)	(0.14)	(0.11)	(0.14)	(0.12)
Money1(T2)	0.36***	0.24*	0.40***	0.37**	0.38***	0.30**	0.48***
	(0.11)	(0.13)	(0.15)	(0.16)	(0.12)	(0.13)	(0.12)
Money2 (T3)	0.52***	0.52***	0.57**	0.65***	0.48***	0.35*	0.81***
	(0.13)	(0.16)	(0.22)	(0.16)	(0.15)	(0.20)	(0.20)
Inspection (T4)	0.42**	0.37**	0.44***	0.39*	0.42***	0.51**	0.30
	(0.16)	(0.15)	(0.13)	(0.21)	(0.15)	(0.19)	(0.19)
Fame× Z		0.12	-0.07	0.15	-0.14	0.00	0.33
		(0.14)	(0.17)	(0.16)	(0.17)	(0.01)	(1.12)
Money1 × Z		0.26*	-0.05	-0.02	-0.27	0.01	-0.69
		(0.13)	(0.18)	(0.16)	(0.17)	(0.01)	(0.61)
Money2 × Z		-0.05	-0.06	-0.23	0.21	0.01	-1.64
		(0.22)	(0.20)	(0.21)	(0.21)	(0.01)	(0.98)
Inspection ×Z		0.11	-0.03	0.09	0.12	-0.00	0.29
		(0.18)	(0.25)	(0.24)	(0.17)	(0.01)	(0.61)
Z		0.10		-0.14			0.92
		(0.10)		(0.16)			(0.58)
Male	-0.04	-0.03	-0.01	-0.01	-0.03	-0.03	-0.02
	(0.07)	(0.07)	(0.11)	(0.08)	(0.07)	(0.08)	(0.07)
Job Tenure	-0.00	-0.00	-0.00	-0.01**	-0.00	-0.01*	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Initial TPI	0.51***	0.61***	0.51***	0.50***	0.52***	0.52***	0.45***
	(0.07)	(0.09)	(0.07)	(0.07)	(0.13)	(0.07)	(0.06)
Constant	-0.24**	-	-0.27**	-0.14	-0.25**	-0.23**	-0.43***
		0.29***					
	(0.09)	(0.10)	(0.11)	(0.17)	(0.10)	(0.11)	(0.13)
Observations	170	170	170	170	170	170	170
R-squared	0.42	0.45	0.42	0.44	0.44	0.43	0.48

Notes: Cluster standard errors by upazila offices are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Appendix 3.A: Experiment Scripts

Script for Fame treatment

There is pressure from higher authorities for every sub-assistant agriculture officer (SAAO) to achieve their monthly target. Therefore, starting next month, with instructions from the Deputy Director (DD), we will select the two best SAAOs who increase their achievement rate the most. After selecting them, I will send a letter to the DD with their names, along with other reports. For example, if Mr. X achieved 90% in December and 100% in January, and Mr. Y achieved 60% in December and 70% in January, then the percentage increase in target achievement for Mr. X and Mr. Y is $100 \times 10 / 90 = 11\%$ and $100 \times 10 / 60 = 17\%$, respectively. Thus, Mr. Y will be considered a better performer than Mr. X. This means agents who performed poorly in the initial period have the potential to become the highest achievers.

Please do not over-report service deliveries. If you do so, a showcase letter will be issued. I will confirm your service deliveries in the field.

Script for Money1 treatment

There is pressure from higher authorities for every sub-assistant agriculture officer (SAAO) to achieve the target monthly. Therefore, starting next month with instructions from the Deputy Director (DD), we will select the two best SAAOs who increased their achievement rate most. To increase service delivery, a foreign university has decided to offer a monetary reward to the two best achievers. The best achiever will get 3,000 BDT, and the second-best achiever will get 1,000 BDT. I will select the two best SAAOs who increase their achievement most. For example, if Mr. X achieved 90% in December and 100% in January and Mr. Y achieved 60% in December and 70% in January, then the

percentage increase in target achievement for Mr. X and Mr. Y is $100 \times 10 / 90 = 11\%$ and $100 \times 10 / 60 = 17\%$, respectively. Mr. Y will be considered a better performer than Mr. X. This means agents who performed poorly in the initial period have the potential to become the best achievers.

Please do not over-report service deliveries. If you do so, a showcase letter will be issued. I will confirm your service deliveries in the field.

Script for Money2 treatment

There is a pressure from higher authorities for every sub-assistant agriculture officer (SAAO) to achieve the monthly target monthly. Beginning next month, according to an instruction from the Deputy Director (DD), we will select the two best SAAOs. To increase service delivery, a foreign university has decided to offer money to the two best achievers. I will select the two best SAAOs based on increased percentage of achievement. For example, Mr. X achieved 90% in December and 100% in January. Mr. Y achieved 60% in December and 70% in January. Mr. X will be considered a better performer than Mr. Y. The best achiever will get 3,000 BDT, and the second best achiever will get 1,000 BDT.

Please do not over-report service deliveries. If you do so, a showcase letter will be issued. I will confirm your service deliveries in the field.

Script for Inspection treatment

There is a pressure from higher authorities for every sub-assistant agriculture officer (SAAO) to achieve their monthly target. Beginning next month, according to an instruction from the Deputy Director (DD), I will prepare a list of SAAOs ranked by

achievement rate. I will select the worst two performers based on who increased their achievement rate the least and send their names to the DD. For example, if Mr. X achieved 90% in December and 100% in January, and Mr. Y achieved 60% in December and 70% in January, then the percentage increase in the target achievement for Mr. X and Mr. Y is $100 \times 10 / 90 = 11\%$ and $100 \times 10 / 60 = 17\%$, respectively. Mr. Y will be considered a better performer than Mr. X. This means agents who performed poorly in the initial period have the potential to become the best achievers.

Please do not over-report service deliveries. If you do so, a showcase letter will be issued. I will confirm your service deliveries in the field.

Appendix 3.B: Variables

For the data analysis, the following variables were used:

- Age of SAAOs: Calculated based on self-reported birthdates of respondents.
- Experience as SAAOs: Number of years working in current job.
- Female: =1 if SAAOs are female, 0 otherwise.
- Young: =1 if the age of the SAAOs is lower than the median age, 0 otherwise.
- Office size: Number of SAAOs in an upazila agricultural office.
- Initial poor performers: =1 if the SAAOs scored below the median score in the initial performance index.
- Initial performance distribution by office: Variance of the initial SAAOs' performance index in each upazila agricultural office.

Service delivery (performance) measures

Performance of SAAOs is a measure of the number of service deliveries in one month prior (2nd week of December 2017 to 1st week of January 2018)³⁵ and after the experiment (2nd week of January 2018 to 1st week of February 2018). In particular, the performance of SAAOs is measured by the number of farmers to whom they provided specific extension services before and after the reform. According to a national-level survey (ASIRP, 2003), around 90% of farmers who received advice from SAAOs adopted the advice provided.³⁶ The experiment took place in the middle of the Rabi season when

³⁵ Compost and vermicompost ground preparation occur year round. For these outcome variables, the service deliveries in the month before and after the treatment were compared. In the case of other outcome variables, such as appropriate fertilizer user, ideal seedbed preparation, and appropriate row user, service deliveries for those services seasonally were compared. The service deliveries in two seasons were compared, such as Kharip-2 (late summer season) (before the experiment) and Rabi (winter season) (after the treatment).

³⁶ Nippard (2014) found that more than 90% of farmers trust the advice of public sector extension agents.

SAAOs provide six main agricultural extension services: (i) compost ground (sites) preparation; (ii) FYM grounds (sites) preparation; (iii) vermicompost grounds (sites) preparation; (iv) rice cultivation with appropriate fertilizer use; (v) rice cultivation with the appropriate row; (vi) ideal seedbeds preparation for rice cultivation. Outcome variables are the numbers of farmers who adopted these practices with the consultation of SAAOs. However, the observation numbers are different for some outcome variables (compost ground preparation, ideal seedbeds preparation, appropriate fertilizer use, and appropriate row user). Though six main services were provided in all agriculture offices during the experiment, some upazila agriculture offices do not provide all extension services. For example, upazila agriculture offices Amtali, Harinakundu, Laxmipur sadar, and Satkhira Sadar do not prepare or emphasize compost ground preparation. Therefore, 85 observations the compost ground data from these upazilas were excluded.³⁷ During the experiment, data for job tenure, age, and gender of extension officers was collected. To ensure a formal and natural experiment, other socio-economic data of the officers were not collected.

Some services are more easily delivered than others; therefore, each extension service was standardized by mean and standard deviation, and an overall performance measure was constructed by taking an average of the standardized values of each service. This is the Total Performance Index (TPI), which was calculated for the initial and the

³⁷ Preparing ideal seedbeds is not popular and are not provided by SAAOs in some upazilas. Therefore, 125 observation for ideal seedbeds were excluded from these upazilas: Betagi, Khoksha, Kumerkhali, Madaripur Sadar, Mirzaganj, Muksedpur, and Patharghata. Similarly, appropriate fertilizer and appropriate row user data from Amtali, Jhikorgacha, Betagi, and Kushtia Sadar were excluded. In these upazilas, rice plants were not mature enough in the seedbeds, and therefore data for appropriate fertilizer and appropriate row user during cultivation was not possible to collect. As the Sharsha upazila agriculture office does not maintain cultivation in appropriate row, data of appropriate row user were excluded. Finally, 74 and 105 observations from these upazilas for appropriate fertilizer and row user were excluded, respectively.

post-treatment periods. In the third chapter, TPI and Index of Service Delivery are used as synonyms.

Compost:

In Bangladesh, farmers make compost by mixing cow dung with crop residue, water hyacinth, dry leaves, vegetables and fruit peels, and weeds. The decomposition process takes six to nine weeks, and compost can be stored for three to six months. During land preparation, compost is applied to enhance the soil (Agriculture Learning, 2018). The measurement of service delivery on compost use is the number of farmers SAAOs motivated to prepare compost in the last month.

Farmyard Manure (FYM):

Farmyard manure refers to the decomposed mixture of animal manure, urine, bedding material, fodder residue, and other organic materials such as crops residue and waste. It has high organic content, which increases water holding capacity and improves friable soil structures (FAO, 2012). The application of partially decomposed manure can increase pests. The measurement of service delivery on FYM is the number of farmers SAAOs motivated to prepare FYM in the last month.

Vermicompost:

Vermicompost is produced using earthworms for composting organic residues and is a widely used organic fertilizer (Agriculture Learning, 2018). The duration of the decomposition process is shorter, and the loss of nutrients during the process is smaller than that of traditional compost (Agriculture Learning, 2018). The measurement of service delivery on vermicompost is the number of farmers SAAOs motivated to prepare vermicompost in the last month.

Ideal Seedbeds:

There are several standards for seedbeds to be considered ideal in Bangladesh. The width of the seedbed should be 1.0-3.5 feet, but the length can vary. There must be a 25-30 cm drainage between seedbeds. In every square meter, 80-100 grams of seeds must be sowed evenly (AIS, 2015). Frequent weeding should be conducted. The measurement of service delivery on ideal seedbeds is the percentage of the total land used as an ideal seedbed in the current season (Rabi Season) (post-treatment period) and in the previous Kharip-2 season (mid-July to mid-November 2018) for the baseline. Construction and management of seedbeds are only at the beginning of each cropping season.

Appropriate Fertilizer use for cultivation:

Farmers who used fertilizer after consulting with SAAOs regarding types and quantity of fertilizers are considered appropriate fertilizer users. The measurement of service delivery on appropriate fertilizer use is the number of appropriate fertilizer farmers during the Rabi season (post-treatment period) and in the previous Kharip-2 season (mid-July to mid-November 2018) for baseline. Fertilizer application is done at the beginning and middle of each cropping season.

Appropriate Transplanting:

Appropriate transplanting in rice cultivation is defined by seedlings transplanted in a row with space of 25x15 cm between rows (AIS, 2015). The measurement of service delivery of appropriate transplanting is the number of appropriate transplanting farmers during the Rabi season (post-treatment period) and in the Kharip-2 season (mid-July to mid-November 2018) for the baseline. Transplanting is conducted only at the beginning of each cropping season.

Appendix 3.C: Variables for Analyses using Restricted Sample

For data analysis, the following variables were used:

- Married: 1=married, 0 otherwise.
- Religion (Islam): 1=Muslim
- Raised in an urban area: 1=raised in the district and capital area up to secondary education.
- A-grade: 1=grade A- (60-70% marks) in the secondary school certificate exam.
- Quota Privilege: See Appendix 2.A.
- Big-Five Personality Index: See Appendix 2.A.
- PSM index: See Appendix 2.A.
- Patience and Present Bias: See Appendix 2.A
- Most-risk averse: See Appendix 2.A
- Altruism: See Appendix 2.A.
- Reside in block area: Equals 1 if the SAAOs reside in their jurisdictional village, 0 otherwise.

Chapter 4: Conclusion and Policy Implications

4.1 Conclusion and Policy implications

Considering incentives as an important policy to increase performance of workers, and to recruit and select higher quality officers in public sector, two case studies were documented in this dissertation. In the first case, a survey was conducted on the civil service applicants and incumbent civil service officers of Bangladesh. In particular, using survey data on the civil service applicants and officers, we examined whether the 2015 pay scale reform attracted higher quality officers in terms of education, previous income, personality, and Public Service Motivation (PSM) in the BCS. In the second case, a Randomized Control Trial (RTC) were conducted to test the effectiveness of financial and non-financial incentives, and increased monitoring for improving performance of incumbent agriculture extension officers. In both cases, this dissertation found that incentives were effective for attracting highly qualified applicants as well as civil service officers in the BCS, and for improving the performance of public agriculture sector frontline workers. This dissertation findings suggest that incentives are an important policy in order to improve the public sector worker's quality and motivation in developing countries like Bangladesh. The policymakers of Bangladesh and other developing countries should consider incentives as a means of improving the efficiency of their public sector. In the subsequent sections, the findings of the two case studies has been summarized along with policy implications.

In Chapter two, the estimation results show that the pay scale reform does not increase the average quality of the applicants but applicants in the post-reform cohort were more pro-socially motivated than applicants in the pre-reform cohort. In the case of incumbent civil service officers, the chapter 2 finds that post-reform BCS officers have

higher educational quality than pre-reform officers and higher PSM. Compared to pre-reform BCS officers, they are also more motivated to public service, more altruistic to the poor, and have higher social preferences. These findings are different from those of previous studies examining the effect of incentives on the quality and motivation of community-level public sector workers. Findings of the chapter two of this dissertation also suggest that the effect of financial incentives on the quality and motivation of the applicant pool of public sector jobs depends on the context.

Chapter 2 again did not examine the effect of the reform on the performance of the civil service. The fact that better quality individuals were joined to BCS at the recruitment stage does not guarantee their long-term improvement in performance, as Bertrand et al. (2018) find in the context of the Indian elite civil service, where those with lower promotion prospects are less motivated and inefficient in providing public service. As the promotion prospect in BCS is highly politicized and corrupt and 84% of our sampled BCS officers expressed concerns about promotion, the government may need to introduce promotion criteria not based on lobbying and political choices, so that officers are motivated to provide public service until retirement. This can also have a positive effect on recruiting better-quality individuals for the civil service as also found in Morgan et al. (2012).

Besides, the pay scale reform may have had negative consequences on the public sector too. After the pay scale reform, a trend was observed: highly qualified applicants (even doctors, engineers, and professionals) showed little or no interest in private-sector jobs; even high salaried applicants have been leaving their private-sector jobs for BCS jobs, an observation confirmed in the second chapter of this dissertation. The government is the largest employer in the economy, but the contribution of the private sector to the

development of the country is larger than that of the government sector (Islam, 2016). For the sake of the development of the country, a major part of the talent of the youth should be used for the development of the private sector, especially for the productive and service sectors (Islam 2017). As Islam (2016) rightly pointed out, it is good to build a strong and capable public sector human capital when a country is in the developing stage through incentives, but in the long run, this may hamper private sector development. Policymakers must consider this possibility in advance, so that the public sector wage is not too high compared with private sector jobs.

In the Chapter three, the estimation results show that financial, non-financial incentives and increased monitoring were effective for increasing the overall performance of the public agricultural extension agents. The estimation results also show the significant positive effects of the treatments on the performance of female and young extension agents, pre-treatment performance of the extension agents, and pre-treatment performance distribution variation by office. Chapter three also find that almost all the treatments were effective for motivating the low-ability extension agents to increase their performance, and increased monitoring had a stronger effect than the financial incentives. The findings of the chapter 3 can help the agricultural policymakers of developing countries to improve the public extension services by considering incentives as an important policy. As many of the developing countries suffer from the poor performance of the public extension agents, evidence from the third chapter of this dissertation suggests that monitoring based on the poor performance can be an effective way of activating poor performing extension agents.

The evidence of chapter 3 also suggests that increased monitoring can be an effective tool to improve performance of the frontline agriculture extension workers. Although Monitoring is sometimes costly, chapter 3's findings do not suggest more inspection in terms of monitoring, rather controlling office can inspect based on the level of performance to warn poor-performing agents. This may reduce burden of more and regular inspection to the performance of SAAOs. During the survey, it was found that most of the Upazila agriculture officers do not follow regular inspection schedule.

Finally, effective service delivery is important for the public sector, thereby to improve public sector service delivery the government sometimes offer incentives for motivating its agents to work hard. In particular, offering incentives are a potential strategy that government can use to improve performance of the workers (effort channel) and to recruit better quality workers (selection channel). In the context of Bangladesh Public Sector, it was found in chapter 2 that financial incentives help to attract better quality officers (selection channel) in Bangladesh Civil Service. The chapter 3 also finds that financial, non-financial incentives and increased monitoring was effective to improve performance (effort channel) of the agricultural extension workers. It is expected that this research will help policy makers of developing countries (at least in the context of Bangladesh) to improve their public sector through effort and selection channel.

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