Incentives and Social Preferences in a Traditional Labor Contract: Evidence from Rice Planting Experiments in the Philippines*

Jun Goto\textsuperscript{a}, Takeshi Aida\textsuperscript{b}, Keitaro Aoyagi\textsuperscript{c}, and Yasuyuki Sawada\textsuperscript{d}

Abstract

This paper investigates the interplay between economic incentives and social norms in formulating rice planting contracts of the Philippines. Intriguingly, in our study area, despite the potential of infestation of opportunistic behaviors by workers, a fixed wage (FW) contract has been dominant for rice planting since the 1960s. To account for such a seemingly-inefficient contractual arrangement, we conduct field experiments by randomly assigning three distinct labor contracts, i.e., FW, individual piece rate (IPR), and group piece rate (GPR) contracts. Individual workers' performance data from field experiments are then combined with data on social preferences elicited by laboratory experiments. Five main empirical findings emerge. First, our basic results show the positive incentive effects in IPR, moral hazard problems in FW, and free-riding behavior in GPR, which are consistent with standard theoretical implications. Second, while, under FW, social preferences such as altruism and guilt aversion play an important role in stimulating incentives, introducing monetary incentives crowds out such intrinsic motivations. Third, other non-monetary factors such as self-selection of team members and social connections significantly change incentives under FW contract. Fourth, as alternative hypotheses, our empirical results are consistent with the hypothesis of intertemporal incentives arising from performance based contract renewal probabilities. Our results are also supportive to implications of the interlinked contract of labor and credit transactions in mitigating moral hazard problems. Yet, we reject the optimality of FW contract due to large effort measurement errors.

Keywords: Social preferences, peer effect, labor contract, field experiment, Philippines

JEL Classification Numbers: D03, C93, C91

1. Introduction

In the last forty years, the fixed wage (FW) contract for rice planters has been the dominant contract in the Central Luzon province of the Philippines. Since the supervisor of rice planting called kabisilya can observe individual work-effort outcome quite accurately, albeit not perfectly, such an FW contract is likely to be inefficient, involving serious moral hazard problems.

In this paper, we explain this puzzle in terms of "social incentives," which mitigates moral hazard problems (Bandiera et al. (2005), Kandel and Lazear (1992), List and Rasul (2011)).\textsuperscript{1} We ask how individual performance depends on co-workers' behavior and their social preferences. By doing so, we also examine whether monetary incentives crowd out intrinsic motivation. To this purpose, we combine an individual performance data from rice planting field experiments of randomly assigned contracts with the data on social preferences constructed from the results of laboratory experiments, which enable us to specify the underlying mechanisms of mitigating agency problems.

2. Experimental Design

In the Central Luzon, hired labor for planting is
traditionally supplied by a loosely-tied labor group which consists of thirty to a hundred members headed by a boss called kabisilya, in order to deal with the tight local labor market during the peak planting season. The total amount of payment from a farmer is equally divided among planting workers who participate for a certain contracted area. So to all workers the rewards are fixed regardless of their performance. In our experiment, all of workers are supposed to take part in three distinct contracts—fixed wage (FW), individual piece rate (IPR), and group piece rate (GPR). Group formation will be based on self-selection or random assignments. In random assignment setting, all planting workers recruited by a kabisilya at a given paddy field are randomly organized into teams. In self-selection setting, workers are asked to organize their planting teams by themselves.

Let \( l_{ij} \) to be the output level chosen by a worker \( i \) in sub-group \( j \), that is measured by the average length of planting time in ten minutes.\(^{2}\) The amount of wage for a worker \( i \) is \( w_i = F + \alpha (l_{ij}) \) in FW, \( w_i = F + \alpha (l_{ij}) \) in IPR, \( w_i = F + \alpha (\sum l_{ij}/n_j) \) in GPR, where \( n_j \) is the number of the group member in \( j \). In practice, we set \( F = 50 \) and \( \alpha = 2 \). Note that the gap in worker performance between FW and IPR contracts reflects the moral hazard problem and that between GPR and IPR exhibits the degree of free-riding.

In addition to the field experiment, we conducted four standard laboratory experiments to elicit each workers’ social preference parameters: public goods game (PGG) with monitoring and disapproval message based on Carpenter and Seki (2010), dictator game (DG), ultimatum game (UG), and risk game.\(^{3}\) Following the interpretation in previous studies, we assume that contribution in PGG reflects reciprocate expected cooperation, and that the frequency of monitoring and sending disapproval message represent his/her monitoring and social sanction propensity, respectively. Moreover, we also suppose that sending amount in DG reflects altruism, the difference in sending amount between UG and DG reflects fairness motivated by guiltiness, and the minimum acceptance level of responder can be interpreted as inequality aversion based on envious preferences (Camerer and Fehr (2004)).

3. The Data

Our two study villages, G village and M village, are located in Nueva Ecija Province in the Central Luzon region, Philippines. We conducted field and laboratory experiments for two weeks during the dry planting season in 2011. The total sample consists of 120 workers in which 58 and 62 workers are from G and M village, respectively. Additional information was also collected included data on individual characteristics such as their own recognition of treatments and health condition in each experiment, and individual and household characteristics. According to descriptive statistics, workers in IPR could achieve the highest productivity (on average 30.8m/10min) followed by the one in GPR (28.6m/10min) and the one in FW (26.4m/10min).

4. Empirical Analysis

Based on Lazear (2000) and Shearer (2004), we estimate the following model:\(^{4}\)

\[
I_{ijt} = \alpha_i + \lambda_{FW} F_{ijt} + \lambda_{GPR} GPR_{ijt} + \mu P_{ijt} + \pi R_t + S_{ijt} \delta + X_{ijt}' \theta + \xi_{ijt}.
\]

(1)

where \( I_{ijt} \) is the productivity of worker \( i \) in team \( j \), measured in the average planting length in meters per ten minutes, in \( t \)-th treatment period; \( \alpha_i \) is time effect and \( F_{ijt} \) and \( GPR_{ijt} \) are dummy variables for fixed wage and piece rate respectively where the IPR contract is taken as the default category; \( P_{ijt} \) is the average of other workers’ ability;\(^{5}\) \( R_t \) is a dummy variable for self-selection team formation; \( S_{ijt} \) is a vector of social preferences measured by laboratory experiments; and \( X_{ijt} \) is a vector of household’s characteristics.

First, we estimate (1) without the average of other workers’ ability, self-selection dummy, or social preference variables. The coefficients on the FW and GPR variables are negative and significant, which indicate moral hazard and free riding problems, respectively. Second, we added self-selection dummy and advanced payments (PHP). The significantly negative coefficient for the self-selection dummy suggests that negative incentive effects arising from self-selection of team members. Intriguingly, we also found the positive incentive effects of advanced payments.\(^{6}\) Third, we added the average of other workers’ ability and social preference variables. The average ability of other team members are positive and significant, indicating positive peer effects among workers in the workplace. The results of DG and UG have positive and significant coefficient. Also, the propensity to monitor in PGG has negative effect. Hence our results indicate that individual social preferences impinge on her productivity and thus underlie her intrinsic motivation. Forth, we estimate (1) separately for each incentive schemes.

\(^{2}\)We measure the length for thirty minutes and then divide it by three.

\(^{3}\)Detailed descriptions of laboratory experiments and actual implementation procedures are available from the authors upon request.

\(^{4}\)The detailed results are available from the authors upon request.

\(^{5}\)Based on Mas and Moretti (2009), we measure each worker’s ability as coefficients on individual fixed effect by regressing the productivity on time and group fixed effects, contract dummies, and household characteristics.

\(^{6}\)Yet, the pro-incentive effect of advanced payments are not robust across different specifications which are not shown in this short version. Hence, these findings is not necessarily supporting the theoretical results by Braverman and Stiglitz (1982) that interlinked contract of labor and credit transactions can mitigate moral hazard problems in labor contract.
ability of other team members affect productivity on under the IPR contract, in FW, the results of DG and UG are positively correlated with individual productivity. Yet, these social preference variables become statistically insignificant in IPR and GPR contracts once we introduce monetary incentives.7 These results reconcile with the hypothesis that extrinsic incentives of IPR would crowd out intrinsic motivation to restrain themselves from temptation of opportunistic behavior in the workplace (Bowles (2008)).

5. Conclusion

In this paper, we combine field and laboratory experiments to examine the interplay between economic incentives and social norms. More specifically, to explain the seemingly inefficient FW contract in rice planting, we conducted randomized control trials of three distinct labor contracts, i.e., FW, IPR, and GPR. The important findings are as follows.8 First, our basic results show the positive incentive effects in IPR, moral hazard problems in FW, and free-riding behavior in GPR, which are consistent with implications of the standard agency theory. Second, under FW, altruistic people with guilt aversion preference are likely to exert efforts and envy aversion stimulates negative work incentives in rice planting. Yet, these roles of social preferences disappear once we introduce IPR, i.e., monetary incentives. These results suggest that extrinsic incentives crowd out intrinsic motivation.

REFERENCES


7While, in the case of FW, the joint significant test of individual social preference variables reject the zero coefficients of these variables at 1% significance level, such a null hypothesis cannot be rejected in IPR and GPR contracts.

8In addition to these findings, the original version also finds: (1) other non-monetary factors such as self-selection of team members and social connections through religious network significantly change incentives under FW contract. (2) as alternative hypotheses, our empirical results are also consistent with the hypothesis of intertemporal incentives arising from contract renewal probabilities. Yet, our results are not necessarily supportive to implications of the interlinked contract of labor and credit transactions. Also, we reject the optimality of FW contract due to large effort measurement errors.