Pre-analysis Plan:
An Experiment on Property Rights and Coordination

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1 Introduction

A key feature of legal systems is to help people to coordinate toward specific behaviors, the so called "expressive function of the law" (Sunstein, 1996). In this project, we verify whether private property affects coordination in a situation characterized by multiple equilibria. We study a reform of property rights that formalized and registered use rights over land. With the reform, registered land plots can be defended in court against contenders, sold, or used as collateral by land owners. Therefore, the reform introduces a shift from collective and informal land rights to a system akin to private ownership. We test subjects' ability to coordinate using a two-player coordination game characterized by multiple Nash equilibria in pure strategy similar to Jackson and Xing (2014): two asymmetric equilibria characterized by highly inequitable payoffs and one symmetric equilibrium that results in a lower total payoff. We make use of the peculiar implementation of the land rights reform to compare the choices of subjects who experienced land ownership against those who maintained a system of collective and informal land rights.

2 Research Strategy

We implement a design similar to Jackson and Xing (2014), and we combine it to the unique process of implementation of the land rights reform we study. We run a modified battle-of-the-sexes game with an additional symmetric option. The beginning of the data collection for the

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research project is scheduled for the end of January 2020. The pre-analsysis plan was submitted before the data collection started.

The recruitment of participants will proceed as follows. With the support of local research assistants, we will carry on a fieldwork activity collecting lab-in-the-field experimental and survey data on 32 villages (16 treated and 16 control) randomly selected among those included in the lottery pool. Data will be collected from 18 subjects (9 male and 9 female) in each village who will volunteer for participating in the incentivized experiment, for a total of 576 expected participants.

3   Design

3.1   Experimental tasks

			Column Participant		
			Purple	*Orange*	*Green*
Row Participants		**Purple**	**100** ; 700	**0** ; 0	**0** ; 0
		Orange	**0** ; 0	**700** ; 100	**0** ; 0
		Green	**0** ; 0	**0** ; 0	**200** ; 200

Figure 1: Table of payoffs

We run a modified battle-of-the-sexes game with an additional symmetric option. The experimental parameters, possible strategies, and combinations of payoffs are summarized in table 1. Players have the possibility to choose among three strategies/colors. If the two players choose the same color, they earn positive payoffs. If they choose different colors, they earn zero.

The game has three Nash equilibria (NE) in pure strategy and four in mixed strategy. Focusing on the NE in pure strategy, the two asymmetric equilibria are highly inequitable. The symmetric equilibrium generates total payoff equal to half of the asymmetric NE.

Each player will make one choice in each of two different conditions (the order in which conditions are presented will be randomized).

In the "base" condition, participants make their choice without receiving any prompt that can induce coordination.

In the "prompt equilibrium" conditions, participants receive a prompt, consisting in an observation of a color that corresponds to one of the labels of the three possible actions. In particular, during the explanation of the game instructions, the experimenter will reproduce the payoffs summarized in table 1 using physical coins and pieces of colored textile. The wood side-table used to place the textiles and coins will be covered by a cloth of a given color. (In the "base" condition, the same instructions will be provided, but the wood side-table will not be covered by a cloth). Following Jackson and Xing (2014), we will not call attention to the color as

a correlating device in any way: We will just offer the visual information before asking the study participants how they would play the game. We intentionally chose to present the prompts in the above form instead of as an explicit recommendation, so that the study participants have a common signal that can be used as a cue, mimicking something which may be focal in the real world, but without feeling pressured by the experimenter to act in a specific way.

The color of the cloth will be either purple or orange. Therefore, one of the players is advantaged by the prompt, in that it could suggest that one of the players earns his or her highest payoff if the players play the equilibrium corresponding to the cloth's color, while the other player is disadvantaged. As explained below, the analysis will focus on how advantaged and disadvantaged subjects reacted to the prompt.

Below in this section we report the instructions that will be used in the game.

Instructions 1: introduction and understanding tests

This part starts with an introduction, and then a three-question test that checks the study participants' understanding about the payoffs. Study participants who correctly answer all the three questions pass the test; otherwise they have to answer another three-question test. If they miss a question on the second test they fail and are ruled out from the remainder of the experiment. Study participants who pass at the first or second test proceed to the remainder of the experiment, and are informed that all remaining study participants have passed similar comprehension tests. Each study participant is randomly assigned his/her role, either Row Person or Column Person, which remains unchanged throughout the experiment.

Instructions 2: the game

Each study participant makes two decisions. Before each decision, he/she receives information about the game, the study participants role, and in one of the two decisions also about a prompt.[1] The prompt consists in placing a table cloth of a color identical to one of the two colors that can be chosen by players and that provides an advantage to one of them.

Each study participant is informed that his/her decision will be matched with a randomly selected study participant to that day session who has the opposite role (the other person), and that their payoffs are determined by their actions according to the payoff rules.

3.2 Survey questions

In addition to the distribution choices, participants will answer a set of non-incentivized survey questions regarding: age, gender, religion, marital status, number of family members, participation to household finance management, education, literacy, village of birth, years of residence in the village, income.

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[1]The decision with a prompt is presented half of the time first and half of the time after the other decision

4 Empirical Strategy

4.1 Hypothesis

The experiment is designed to verify whether the property rights reform affected subjects' ability to coordinate. In particular, we are testing whether experiencing formalized land rights changes participants' ability to achieve non-zero payoffs by coordinating on a pure strategy NE.

Hypothesis 1 *The likelihood to coordinate on any of the NE in pure strategy is the same in treated and control villages.*

We also test whether, when coordination is achieved, private property affects the likelihood to coordinate on a pure strategy NE characterized by asymmetric and highly inequitable payoffs that generate the highest total gain versus the symmetric equilibrium that generates half of the total gain. We then test how total earnings are affected.

Hypothesis 2 *The likelihood to coordinate on a NE in pure strategy that generates an inequitable but higher total payoff is the same in treated and control villages. Similarly, the likelihood to coordinate on the NE in pure strategy that generates an equal division of payoff is the same in treated and control villages*

Hypothesis 3 *Total earnings are the same in treated and control villages.*

Finally, we look at how the land rights reform affected players' response to a coordination prompt.

Hypothesis 4 *The likelihood to coordinate on a NE in pure strategy that generates an inequitable but higher total payoff or on the NE in pure strategy that generates an equal division of payoff, and the total earnings collected, are the same in treated and control villages when subjects face a coordination prompt.*

Heterogeneity

We will study heterogeneity in coordination in the treated and control villages using data on the level of market integration. As a proxy for market integration, we will use a village distance from the closest paved road (below and above the median in the sample).

We will additionally test whether background data collected in the survey – gender and income – generate differences.

4.2 Specification and analysis

Hypothesis 1 will be tested by estimating the following regression equation:

$$c_i = \alpha + \delta_T T_i +_i + \epsilon_i \tag{1}$$

where c_i is a dummy equal to one when coordination on a non-zero NE in pure strategy is achieved, T_i is a dummy equal to 1 for subjects in treated villages, and $_i$ is a vector of the individual characteristics specified in the post-experimental survey.

Hypothesis 2 will be tested by estimating the following regression equation:

$$c_i = \alpha + \delta_T T_i + \beta_A A_i + \beta_A A_i T_i +_i + \epsilon_i \tag{2}$$

A_i is a dummy equal to 1 when subjects coordinate on a NE in pure strategy yielding asymmetric payoffs.

Hypothesis 3 will be tested by estimating the following regression equation:

$$e_i = \alpha + \delta_T T_i +_i + \epsilon_i \tag{3}$$

where e_i calculate earnings.

Hypothesis 4 will be tested by adding to the previous specification the dummy P_i equal to one for the decision taken when the prompt is introduced, the dummy F_i equal to one when a prompt is introduced and a subject is favorite by the prompt, and their interaction terms with the treatment dummy.

The heterogeneity analysis will add to this specification interaction terms with the following variables:

- a dummy variable equal to 1 when the distance of the village from the closest paved road is above the median in the sample of villages

- a dummy equal to 1 for male subjects

- a dummy equal to 1 for subjects whose income is above the median in the sample

References

Jackson, M. O. and Xing, Y. (2014). Culture-dependent strategies in coordination games. *Proceedings of the National Academy of Sciences*, 111(Supplement 3):10889–10896.

Sunstein, C. R. (1996). On the expressive function of law. *University of Pennsylvania law review*, 144(5):2021–2053.