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To friends everything, to strangers the law? An experiment on contract enforcement and group identity

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by

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To friends everything, to strangers the law?

An experiment on contract enforcement and group identity*

Marian Panganiban[†]

October 5, 2015

Although the role of formal and informal institutions in promoting economic growth and sustaining exchange relations is now well established, explaining and differentiating how informal and formal rules affect individual behavior remain a challenge. This study aims to distill the essential characteristics of formal and informal institutions and disentangle their effects on trust and performance in exchange relations through a laboratory experiment. Formal institutions are modeled as third-party contract enforcement while informal institutions are represented as shared group identity. Results show that trust choices increase as contract enforcement increases but are not affected by shared group identity. However, performance is more likely to occur in interactions with in-group members than out-group members.

Keywords: institutions, exchange relations, contract enforcement, group identity, laboratory experiments

JEL-codes: C72, C91, D03, D81

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1 Introduction

Economists have long recognized the importance of institutions in promoting and sustaining economic growth. The path-breaking work by North and Thomas (1973) lays the theoretical and empirical foundation for establishing the causal link between economic growth and institutions. North (1991, p.3) defines institutions as the “humanly devised constraints that structure political, economic, and social interactions.”¹ Institutions can be formal rules or informal constraints. Acemoglu et al. (2005), Dollar and Kraay (2003), and Rodrik et al. (2004) emphasize the primary role of institutional quality,² particularly of formal institutions like property rights protection and rule of law, in explaining differences in economic growth between countries.

Underlying the broad function of institutions in sustaining economic growth is its specific role in supporting exchange relations. The importance of informal constraints is emphasized in this strand of literature. Greif (1993, p.525) writes that “without the ability to exchange, the potential for growth is rather limited,” yet inherent in most exchange relations is a commitment problem. An agent can promise to deliver some goods upon receiving money from another agent. The first agent can act opportunistically by embezzling the money and not delivering the goods he promised. In his paper examining 11th century Maghiribi trade, Greif (1993) examines how the Maghiribis overcame the commitment problem amidst a weak legal system by forming a trading coalition based on shared ethnicity. Landa (1981) makes a similar case for ethnically homogenous middlemen groups functioning as an alternative to contractual law in early trade among the Chinese in Southeast Asia. More recent work by Rauch and Trindade (2002) show that ethnic Chinese networks, proxied by the product of ethnic Chinese population shares, increase bilateral trade for products whose quality is difficult to ascertain, in addition to enforcing community sanctions and deterring opportunistic behavior. Gould (1994) finds similar results suggesting that U.S. immigrants have historically been important in increasing bilateral trade flows with immigrants’ home countries. In these examples, when legal systems were weak, individuals turned to more informal institutions like ethnic networks to support trade relationships.

While significant advances have been made in causally linking institutions with economic growth and with the evolution of exchange relations, explaining and differentiating how informal and formal rules affect individual behavior remain a challenge. Part of the difficulty lies in the fact that most behavior is embedded in an environment of both formal and informal rules which can be difficult to disentangle in empirical work. For example, there is the risk of overestimating the role of formal institutions, which are also shaped by informal constraints.³ In some instances, formal

¹Hodgson (2006) criticizes this definition as not sufficiently clear. This is something that I tackle in section 2.

²This is measured by an index by Kaufmann et al. (2002) which takes available subjective measures of rule of law and protection of property rights, and combine them into a composite indicator.

³See the discussion on social capital by Knack and Keefer (1997)

and informal rules appear to function similarly although they can lead to divergent outcomes.⁴ Understanding where such differences lie can help how we design and sequence institutional reform.⁵

This study attempts to disentangle the effect of formal and informal institutions on behavior in exchange relations through a laboratory experiment. My approach follows the framework of Helmke and Levitsky (2004) to distill the essential characteristics of formal and informal institutions and to distinguish their relative impact on behavior in a one-shot interaction. The exchange relation depicted in the experiment involves two players who move sequentially. The first player can either enter or not enter into an agreement with the second player. For example, the first player offers money to the second player for goods to be delivered in a future date. If the first player does not offer an agreement, then no exchange takes place. If the second player performs his end of the deal, joint surplus is produced; if the second player breaches and acts opportunistically (e.g. by embezzling the money), with a given probability of contract enforcement, he can be found liable. I manipulate the quality of formal institutions through exogenous changes in the probability of contract enforcement. Meanwhile, informal institutions are created via shared expectations induced through shared group identity.

Overall, the results of the experiment show that formal institutions in the form of third party enforcement encourage cooperative behavior of both parties in an exchange relation. Shared group identity however only affects the performance of the second mover in an exchange relation.

This study is part of a growing theoretical and experimental literature analyzing institutions in exchange relations. In this respect, this work is closely related to Gueth and Ockenfels (2003) and to Gueth and Ockenfels (2000) that present a theoretical model that analyzes the evolution of trust in the presence of both formal (e.g. legal insurance, courts) and informal institutions (e.g. communities). However, this paper implements an experiment to analyze formal and informal institutions in a one-shot game instead of repeated interactions. It also follows the work of Bohnet et al. (2010) who find in their cross-country laboratory experiments differences in trust and trustworthiness according to the predominance of rules-based interactions in the West and relation-based interactions in Gulf countries. I also explore these differences but in a minimal setting where groups are induced in the laboratory instead of determined by geography and ethnicity. Like Buchan et al. (2002), I analyze in the laboratory the role of social identity in one-shot anonymous interactions. In addition to their work, I consider the role of contract enforcement. In terms of analyzing exchange relations in the laboratory, my work builds upon the experiment of Kollock (1994) but

⁴Helmke and Levitsky (2004) introduce a typology of formal and informal institutions: first on the basis of the degree to which formal and informal institutional outcomes converge, and second on the basis of the extent to which rules and procedures that exist are enforced and complied with in practice.

⁵The importance of sequence matters for instance, when reforms crowd-out desired behavior already existing and shaped under old rules. As Stiglitz (2000, p.66) writes, "how we sequence reforms can matter, and matter a great deal."

instead of looking at information asymmetries as a source of differences in trust and trustworthiness, I focus on formal and informal rules.

In the next section, I outline the framework and model that I use in designing the experiment and describe how the experiment was conducted. In section 3, I discuss the hypotheses that I test while I explain results in section 4. I conclude and discuss avenues for future research in section 5.

2 Method

In this section, I begin by presenting a framework whereby I can investigate formal and informal institutions in the laboratory. I then present the details of the game I used to model exchange relations and the experimental treatments I implemented. The final section describes procedural details of the experiment.

2.1 Framework

Helmke and Levitsky (2004) point out that most empirical and theoretical work on institutions have not been clear and consistent in distinguishing between what formal and informal institutions are.⁶ To provide conceptual clarity, they define “informal institutions as socially shared rules, usually unwritten, that are created, communicated, and enforced outside of officially sanctioned channels” while formal institutions are “rules and procedures that are created, communicated, and enforced through channels widely accepted as official” Helmke and Levitsky (2004, p.727). They also note four important distinctions when discussing informal institutions to avoid casting it as a residual category of formal institutions: 1) informal institutions must be distinguished from weak institutions; 2) they are different from informal behavioral regularities;⁷ 3) they must not be confused with informal actors and organizations; 4) and they must be more narrowly defined than culture—informal institutions should be defined in terms of shared expectations rather than shared values.

Within this framework, analyzing the the effect of informal and formal institutions on behavior through laboratory experiments becomes more meaningful. The laboratory, apart from being an ideal venue to investigate individual behavior under specific conditions, allows the simulation of an environment where I can clearly and feasibly draw the distinctions just enumerated. To create a type of informal institutions in the laboratory, I systematically induce social identity in the laboratory following the minimal groups paradigm by Tajfel et al. (1971). In a typical minimal group experiment,

⁶Helmke and Levitsky (2004) also summarize previous work on formal and informal institutions as being distinguished along the lines of cultural traditions, state or civil society, or third-party or self-enforcement. They argue though that these distinctions are either too ambiguous or fail to capture crucial features.

⁷They cite here the example of removing one’s hat in church as an informal institution while removing one’s coat in a restaurant is simply a behavioral regularity. Leaving one’s hat in the church can trigger social disapproval or sanctions while leaving one’s coat does not.

participants are randomly and anonymously divided into two groups on the basis of trivial criteria e.g. preference for painting.⁸

How are nominally shared group identities like informal institutions? Yamagishi et al. (1998) suggest that differences in behavior toward an in-group member versus an out-group member in a minimal groups paradigm arise not because of shared social categories *per se* but because of shared expectations between same group members. Such shared expectations can be induced through common knowledge of shared group membership as seen in the experimental results of Jin and Yamagishi (1997). In the words of Yamagishi and Kiyonari (2000), the group becomes “a container of generalized reciprocity.” As already mentioned in the work of Greif (1993), Landa (1995) and in experiments summarized in Andreoni (2005), the expectation to reciprocate functions like an informal constraint and can be a substitute for law when compliance with contracts is imperfectly enforced.

To translate in the laboratory the essential feature of shared expectations in informal institutions, I create minimal social groups and also implement common knowledge of shared group membership in treatments wherein group membership is revealed. As Platow et al. (2012) explain, common knowledge emerges when one person (Player 1) knows the group membership of the other person (Player 2), and knows that this Player 2 also knows the group membership of Player 1. I further underline the contrast between formal and informal rules of the game by how they are communicated to participants; the probability of contract enforcement and its possible impact on pay-offs are explicitly and directly relayed to participants to mimic an official communication. While group membership of the partner is also directly communicated to participants, whether it should have consequences on pay-offs is entirely up to the participants' actions.

Using the minimal groups paradigm helps me distinguish informal institutions (i.e. group identity) from weak institutions (i.e. weak contract enforcement). Furthermore, because groups are artificially induced in the laboratory and participants play only one round, I am able to separate informal institutions created through shared expectations from behavioral regularities and common values that usually emerge from shared history. Moreover, there is no inherent organizational feature within a minimal group that determines who decides and enforces what the rules are. Thus, I am able to separate the effect of informal rules from the actors that enforce them.⁹

Participants then play the contract game by Bohnet et al. (2001) for one round. The contract game proceeds as follows. The first mover decides whether she wants to enter a contract without knowing whether the second mover will perform. Not entering the contract leaves both players with nothing while a contract offer by the first player and a corresponding performance by the second player generates joint surplus. If the second player does not perform, a chance move determines whether or not he is

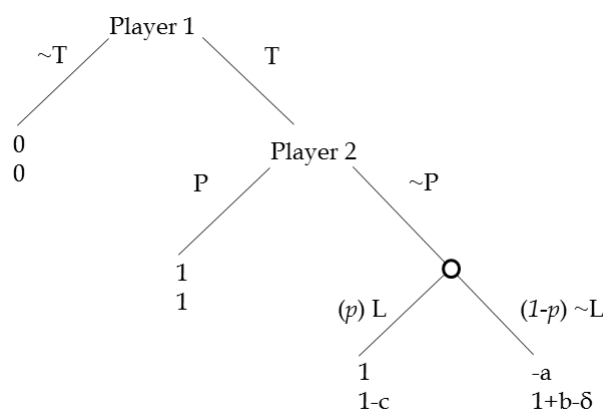
⁸See Guala et al. (2012) for a summary of the common methods of inducing minimal social groups.

⁹On a related note, I also accomplish something similar by devising contract enforcement as an exogenous move and not as a strategic choice by another player. This allows me to remove the impact of formal actors who enforce the rules (e.g. police officers or judges) and retain the effect of the rules of the game (e.g. when someone is found liable) per North (1991).

punished for breaching the contract. As in Bohnet et al. (2001), this chance move represents a formal institution that determines the probability of contract enforcement. In the experiment, I vary the probabilities of contract enforcement in which players make a decision and implement three group conditions: in one condition, players have no knowledge of group identity of the other party; in another condition, players have common knowledge that their partner is an in-group member; and in the last condition, players have common knowledge that their partner is an out-group member.

2.2 The Contract Game

The contract game¹⁰ by Bohnet et al. (2001), henceforth BFH, models an asymmetrical relationship between two parties who can enter a contract to produce a surplus. The relationship is asymmetrical in the sense that Player 1 first enters the contract without knowing whether Player 2 will perform. As BFH note, Player 1's decision to enter a contract is a matter of trust.¹¹ I summarize here the essential features of the game while I presents the game in extensive form in Figure 1.



Note: Player 1 can either offer a contract or not offer a contract to player 2. If she does not trust, she and player 2 get nothing. If she trusts, player 2 decides whether to perform or not perform the contract. If he performs, both he and player 1 get 1. If he does not perform, a chance move determines whether he is found liable. If he is found liable, player 1 gets 1 and player 2 suffers a cost from breaching and gets $1 - c$. If he is not found liable, player 1 suffers the costs of breach and gets $-a$ and player 2 gets $1 + b - \delta$.

Figure 1: The Contract Game (Bohnet et al., 2001)

The contract game is a sequential, two-person game. The first player (Player 1) has two options, to either trust (T) or not trust ($\sim T$). If she does not trust, both she and

¹⁰I follow the terms here used by BFH for consistency with their work. For simplicity, contract here can be thought of as a legally enforceable agreement that an exchange will take place.

¹¹Given that the game is formulated such that an exogenous probability influences the decision of Player 2 and consequently, the decision of Player 1, it may be more precise to describe this as calculative trust following the typology of Williamson (1993) and label the actions available to Player 1 as 'offer' or 'not to offer' a contract.

Player 2 get 0. If she chooses to trust, Player 2 then gets to decide between performing (P) or not performing ($\sim P$). If he performs, both he and Player 1 get 1.¹² If Player 2 breaches the contract and does not perform, then a chance move that captures a litigation process comes into effect.¹³ With a probability p , Player 2 can be found liable (L) and he bears the costs of the trial c ; Player 1 gets 1 and Player 2 gets $1 - c$.¹⁴ If he is not found liable, Player 1 gets $-a$ and Player 2 profits from the breach and receives $1 + b - \delta$, where $b > 0$. However, the gains from breaching are not large enough to compensate the first mover, that is $b < 1 + a$. The parameter δ represents the psychological costs for breaching a contract.¹⁵

A higher p indicates a stronger institutional or in this case, contract enforcement, environment. That is, it is more likely for the chance move to find Player 2 liable if he did not perform the contract; a lower p signifies that it is less likely that Player 2 is found liable if he breaches.

2.3 Treatments

I manipulate two variables in the experiment: group identity to represent informal institutions and level of contract enforcement to capture formal rules. Within subjects, I manipulate the probability of contract enforcement p like in the experiment of BFH. Between subjects, there are 3 group identity conditions: no-knowledge, in-group, and out-group. In the no-knowledge condition, players are not informed of the identity of the other player in the contract game; in the in-group condition, both players are informed that the other player in the contract game comes from the same group; and in the out-group condition, both players are informed that the other player in the contract games comes from a different group. Moreover, in the in-group and out-group condition, both players know that their partners know their respective identity and their partner's identities. Table 1 shows how many participants were assigned the role of Player 1 and 2, and the group conditions they were assigned.

¹²I use female pronouns for Player 1 and male pronouns for Player 2 for purposes of distinction only.

¹³This is similar to Abbink et al. (2002) modeling discovery of committing bribery as an exogenous lottery in their experimental bribery game and to the seminal work of Becker (1968) which takes into account the probability of punishment in the commitment of crimes. I adopt this simplification in line with the study's research question. One can of course explicitly model authorities as strategic players as in Basu et al. (1992) or as rational belief forming institutions like in Gueth and Ockenfels (2000) and Brennan et al. (2003).

¹⁴The configuration of payoffs assumes perfect expectation damages which put Player 1 in a position as if Player 2 had performed the contract and that Player 2 shoulders all costs of the trial.

¹⁵This is similar to m or the moral costs of breaching as in Gueth and Ockenfels (2003).

Table 1: Number of participants and player types in each treatment

| | No group | In-group | Out-group | Total |
|----------|----------|----------|-----------|-------|
| Player 1 | 30 | 30 | 30 | 90 |
| Player 2 | 30 | 30 | 30 | 90 |
| Total | 60 | 60 | 60 | 180 |

In implementing the group conditions, I consider the proposition of Akerlof and Kranton (2000) that there are identity-based pay-offs and the psychological costs of breaching for in-group interactions are higher than out-group interactions.¹⁶ More formally, this implies that $\delta_I > \delta_O$ where I represents an interaction with an in-group member and O represents an interaction with an out-group member.

2.4 Procedures and Payoffs

Participants in all treatments and upon entering the laboratory are arbitrarily assigned to a group—red or yellow—and a role—Player 1 or Player 2. Similar to how Guala et al. (2012) induced groups in one of their treatments, participants in this experiment drew from a covered box at the entrance of the laboratory either a yellow or red arm band which indicated their group identity and their computer number that also determined whether they are Player 1 or Player 2.¹⁷ Each participant is assigned a visually isolated computer terminal that corresponded to the number indicated on their arm band. The group identity and role of each participant remained the same throughout the experiment and there was an equal probability of drawing a red arm band and a yellow arm band and of being assigned the role of Player 1 and Player 2.

All participants received at the beginning of the experiment a copy of the instructions. The instructions contained some passages from the instructions of Chen and Chen (2011) to relay group information and some passages from BFH to explain the mechanics of the contract game. The instructions which are presented in the Appendix were neutrally framed to minimize presentation or context effects that are not related to group identity or contract enforcement probabilities; in particular, choices were labeled with letters instead of trust or not trust and perform or not perform. Each participant received a copy of the instructions for both Players 1 and 2 and an experimenter also read aloud the instructions. This is to ensure that all participants have common knowledge of how the experiment proceeds regardless of player type. Before participants made decisions, participants answered questions to test their understanding of the instructions and they could only proceed with the experiment upon answering all control questions correctly.

Participants made decisions via strategy method, i.e. they made contingent deci-

¹⁶Balliet et al. (2015) conducts a meta-analysis of the experimental evidence on this phenomenon.

¹⁷The program allocated half of the computers in the laboratory for Player 1 and the other half for Player 2.

sions for all the probabilities at which they may have to play.¹⁸ Player 1 decided to either trust or not trust Player 2 under changing probabilities of contract enforcement. The probabilities of contract enforcement changed by increments of 0.10, beginning from $p = 0.1$ until $p = 0.9$. 2 chose to perform or not perform under different probability conditions based on the hypothetical situation that Player 1 trusted them. All decisions were payoff relevant: at the end of the experiment, a probability condition was randomly chosen and a participant was paid according to his or her decision under this probability condition. I calibrated the parameters of the model and translated them to material payoffs measured in experimental currency units (ECUs) following BFH.¹⁹ Thus, $a = 20$, $b = 100$, and $c = 30$. This was shown to participants in the decision tree as seen in Figures 3 and 4 in Appendix 6.

After playing the contract game, participants answered a post-experimental survey with items to measure their general trust from Yamagishi and Yamagishi (1994) and from the World Values Survey (2014). The items required participants to rate statements by choosing one of the following options: strongly agree, agree, neither agree or disagree, disagree, strongly disagree).

I ran the experiment with z-Tree (Fischbacher, 2007) and recruited participants through ORSEE (Greiner, 2004). The experiment's participants were students from the Friedrich Schiller University and University of Applied Sciences in Jena and were paid 2.50 Euros for showing-up on time. The average payment was 7.57 Euros. The sessions took place at the Goethe Galerie Laboratory in Jena on December 2013 and March 2014. The mean age of participants was 23.58 years, 62.22 percent were females, and 94 percent wrote Germans as their nationality.

3 Hypotheses

The hypotheses I test follow from the predictions on equilibrium play in the previous section. The first hypothesis takes into account the contract enforcement probability while the next hypotheses deal with group treatment comparisons.

Hypothesis 1. The frequency of trust and performance increases with a higher probability of contract enforcement.

A corollary to this is that the likelihood of trust and performance decreases with a lower probability of contract enforcement. I expect more players 2 choosing perform with higher values of p as their expected payoffs from breaching the contract become lower. After foreseeing this, more players 1 therefore choose to trust with higher val-

¹⁸Such a method of eliciting participants' decision may be too psychologically cold as to capture real world behavior as Brandts and Charness (2011) point out in their survey of laboratory experiments comparing direct response and strategy method. However, this provides a larger number of observations while still retaining the one-shot characteristic of the game and with a smaller number of participants to be paid. The survey study also finds in no case that a treatment effect found with the strategy method that is not observed with the direct response method.

¹⁹In the experiment 1 ECU = 0.05 Euros.

ues of p .

Hypothesis 2. The frequency of performance is higher with an in-group partner than with an out-group partner or with a partner whose group identity is unknown.

More players 2 will choose perform when paired with an in-group partner than when they are paired with an out-group partner or with a partner whose group identity is unknown. As shown in numerous experiments, the psychological costs of breaching an agreement is higher within a group than without a group. I posit further that the minimum probability at which players 2 perform is lower for interactions with an in-group partner than with an out-group partner or with a partner whose group identity is unknown.

Hypothesis 3. The frequency of trust with an in-group partner is at least as high as the likelihood with an out-group partner and with a partner whose group identity is unknown.

Unlike with the choice to perform by player 2, the choice to trust by player 1 is additionally affected by the parameter a or the costs she suffers if player 2 breaches and is not found liable. Note that in the game, a is at least as great as the costs c player 2 suffers if he is found liable and greater than the gains b which player 2 experiences from breaching and not being caught. If the psychological costs from breaching δ_I , then trust choices can be more likely with an in-group than with an out-group. Otherwise, the costs suffered from unpunished breach, a , drives player's 1 choice to trust and also the choice at which minimum level of contract enforcement probability she begins to trust. In this case there will be no difference in the likelihood of trust between group treatments.

Hypothesis 4. There is no difference in the frequency of trust and performance with an out-group partner and with a partner whose group identity is unknown.

The comparisons made thus far have been between the in-group treatment versus the two other group treatments. I predict that there will be no difference in the choices to trust and perform in interactions with an out-group partner and in interactions wherein the group identity of the partner is unknown in terms of frequency of trust and perform choices and also in terms of the minimum probability required to switch to trust and performance.

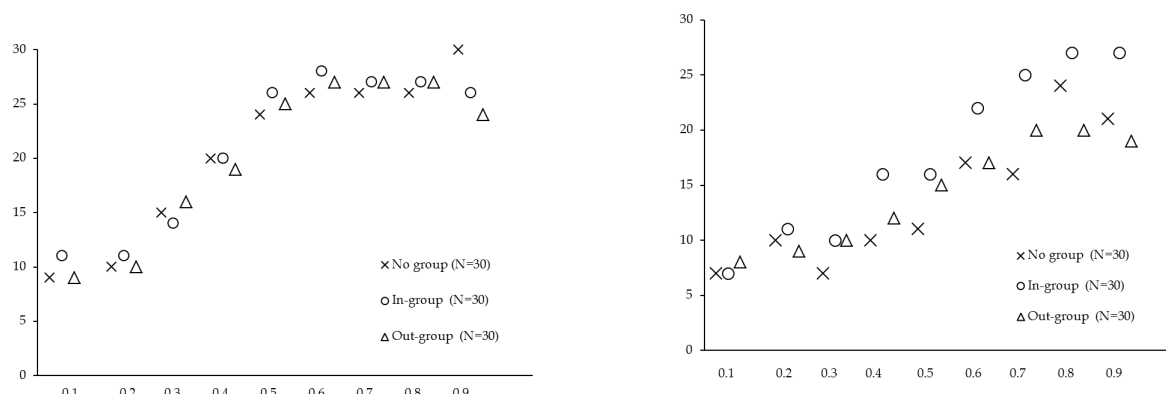
In the model, I assume that the psychological costs from breaching an agreement with an out-group partner is at least equal to the psychological costs of breaching with an unknown-group partner which leads to this hypothesis. Although one can also consider the possibility of out-group derogation in which case the psychological costs from breaching an agreement with an out-group member is lower than with a stranger, I assume that psychological costs are equal. I make this assumption on the basis of experimental literature²⁰ consistently showing that variations in bias in intergroup relations arise due to variations in in-group favoritism more than because of variations in out-group derogation.

²⁰See Balliet et al. (2015) and the literature cited therein.

4 Results

The results support Hypothesis 1 showing that trust and performance increases with higher contract enforcement probability. The other hypotheses on the effect of the group treatment are also supported by the data.

Figure 2 shows the frequency of trust and perform choices for each probability condition and group treatment. An initial look suggests that as predicted in hypothesis 1, trust and perform choices increases with probability condition. The differences in trust and perform choices between group conditions are not as easy to distinguish.



The figure above shows the frequency of trust choices of 30 participants assigned as player 1 in each group condition. Two participants in the no-group condition and one participant in the in-group condition consistently chose "not trust" in all probability conditions. One participant in the in-group condition switched their choice more than once.

The figure above shows the frequency of perform choices of the participants assigned as player 2 in each group condition. Four participants in the no-group condition, 4 participants in the in-group condition, and 2 participants in the out-group condition consistently chose "perform" in all probability conditions. Six participants in the no-group condition and 1 participant in the in-group condition switched their choice to perform more than once.

Figure 2: Frequency of Trust and Perform Choices, by Group and Probability Condition

4.1 Group identity

In this section, I focus on the effect of group identity on conduct chi-squared goodness-of-fit tests on aggregate trust or perform choices to see whether the hypotheses on the effect of shared group identity are supported by the data. Table 2 shows the result of the tests. There are more perform choices observed in the in-group condition than in the no group and out-group conditions and I find no statistically significant difference when comparing perform choices under the no group and out-group condition. I find no statistically significant differences when comparing trust choices between group conditions. The results of the Chi-squared tests support Hypotheses 2 that performance is more likely to occur with an in-group partner than with other types of partners.

Table 2: Chi-squared Goodness-of-Fit Tests on Trust and Perform Choices, by Group Condition

| Group condition | <i>Trust</i> | | <i>Perform</i> | |
|-----------------|--------------------|-----------------|--------------------|-----------------|
| | Pearson's χ^2 | <i>p</i> -value | Pearson's χ^2 | <i>p</i> -value |
| NG-IG | 0.6976 | 0.404 | 10.7251 | 0.001 |
| NG-OG | 0.0761 | 0.783 | 0.3644 | 0.546 |
| IG-OG | 0.3131 | 0.576 | 7.1618 | 0.007 |

Note: I test the null hypothesis that there are no differences in trust or perform choices between group conditions. There are 30 participants in each group condition and each participant made 9 choices (N for each group is 180). I report the chi-squared statistic with 1 degree of freedom. Given the results, I reject the null hypothesis for perform choices when comparing choices under no-group and in-group condition and no-group and in-group conditions. However, I cannot reject the null hypothesis for trust choices. The same results hold if we conduct one-sample binomial tests.

4.2 Group identity and contract enforcement

I further investigate how trust and perform choices differ across group conditions, even when controlling for third party contract enforcement quality. I estimate a panel binary choice model to test the relationship between trust, performance and institutions in the experiment. In the model, p_i is the probability of trust for first-mover participant i and performance for second-mover participant i . The dependent variables are P , the vector of contract enforcement dummy variables and G , the vector of group treatment variables. The regression also includes X , a vector of control variables that includes the participants' gender (Female=1, 0 otherwise), age, and nationality (German=1, 0 otherwise). The β s are log of the odds for a unit change in the explanatory variables while u_i is the error term.

$$\ln \left(\frac{p_i}{1 - p_i} \right) = \beta_0 + \beta_1 P + \beta_2 G + \beta_3 X + u_i$$

The results of the regression are presented in Table 3. I performed 200 bootstrap replications to obtain normal-based 95% confidence intervals for the estimates which according to (Mooney and Duval, 1993) is adequate for normal-approximation intervals.

Table 3: Logistic Regression Estimates of Trust and Perform

| | Trust | | Performance | |
|---|-----------|---------|-------------|---------|
| | β | z | β | z |
| <i>Contract enforcement probability (baseline is p=0.1)</i> | | | | |
| 0.2 | 0.1880 | (1.05) | 0.6422** | (2.50) |
| 0.3 | 1.3681*** | (3.73) | 0.4140 | (1.54) |
| 0.4 | 2.4727*** | (4.93) | 1.2051*** | (3.33) |
| 0.5 | 4.011*** | (4.94) | 1.4718*** | (2.87) |
| 0.6 | 4.9131*** | (4.88) | 2.4004*** | (3.98) |
| 0.7 | 4.7331*** | (4.48) | 2.7548*** | (3.91) |
| 0.8 | 4.7330*** | (4.07) | 3.5746*** | (4.38) |
| 0.9 | 4.0107*** | (3.97) | 3.2217*** | (4.04) |
| <i>Group identity (baseline is no group)</i> | | | | |
| In-group | 0.3426 | (0.49) | 1.0059** | (1.86) |
| Out-group | 0.0659 | (0.09) | 0.1719 | (0.30) |
| <i>Participant variables</i> | | | | |
| Female | -1.316** | (-1.98) | 0.6794 | (1.37) |
| German | -0.6681 | (-0.40) | 0.1419 | (0.34) |
| Constant | -0.0556 | (-0.03) | -2.6572 | (-3.36) |
| Log-Likelihood | 139.40*** | | 116.40*** | |
| Wald χ^2 (12) | 35.04*** | | 24.78*** | |
| N of observations | 810 | | 810 | |
| N of groups | 90 | | 90 | |

Note: *** (<1%), ** (<5%), and * (<10%), mark which variables were statistically significant in each model and indicate their associated levels of significance. The dependent variable takes a value of 1 if participant chose to trust or perform, 0 if not. The reported z statistics in parentheses are based on bootstrapped standard errors (200 replications)

The regression results show that as predicted in first hypothesis, a higher probability of third party contract enforcement encourages both trust and performance. Shared group identity affects performance but not trust. The likelihood of performance is higher with an in-group partner than with an out-group partner or with a partner whose group identity is unknown but there are no statistically significant differences in trust choices based on knowledge of partner's group identity. Females are also less likely to choose trust than males, but this effect is not observed with choices to perform. I also find no statistically significant difference in the choices between German and non-German participants. These findings are robust with the inclusion of answers to the post-experimental questionnaire which can be found in Table 4 in the Appendix 6.

4.3 Discussion

In the exchange relations I mimicked in the laboratory via a contract game, two players can enter and fulfill a contract to produce joint surplus. To model varying quality in formal institutions, the probability that the contract will be enforced should the second player breach changes in each decision. As predicted, more contracts are

offered and performed when the probability of contract enforcement is higher. To depict a type of informal institutions, I induce and manipulate group identity. In one treatment, players interact with an in-group member, in another they interact with an out-group member, and in another, they interact without knowing the group identity of their partner. In this variation, shared group identity increases contract performance but does not affect contract offers.

It is well-known that one way of reducing undesired behavior is to increase the probability that it will be sanctioned. However, under low probabilities of enforcement, people tend to rely on other means to enforce agreements and common group membership can be used to evaluate the probable trustworthiness of the other party. The results of the experiment show that shared group membership increases performance but not trust decisions. Unlike Buchan et al. (2002) who found differences in trusting behavior between in-group and out-group members in a trust game, I do not observe a significant difference in trusting behavior as the context of the exchange moves from the in-group to the out-group. One crucial distinction though of this experiment from Buchan et al. (2002) is that participants played a standard trust game which involved no exogenous chance move after the second player made a decision.

That group membership only mattered for second movers corresponds to what Yamagishi et al. (1999) postulate: group membership may be relatively less important in first move cooperation in sequential cooperative decision-making tasks.²¹ Because the contract game is sequential, the second player decides as if the first player already offered a contract and thus perhaps highlights the norm to reciprocate. This can help further explain why we observe more cooperative behavior from second movers than first movers. Bicchieri et al. (2011) also finds a similar distinction related to behavior of first and second movers in their study using an incentivized survey. They asked participants whether they would punish untrusting investors (first movers) and untrustworthy performers (second movers) and find that most people would not punish untrusting investors, regardless of whether the potential trustee was a stranger or a friend. In contrast, most participants would punish someone who failed to reciprocate a stranger's or a friend's trust.

5 Conclusion

Formal and informal institutions shape and constrain behavior. Although much has been said about its role in shaping economic growth and exchange relations, it has only been recently that we have begun to understand how exactly they shape individual behavior. I conducted a laboratory experiment to distill the essential characteristics of formal and informal rules and disentangle the effects of varying qualities of institutions on behavior in an exchange relation. Using the contract game by Bohnet et al. (2001), I manipulated the quality of formal institutions by varying the probability of contract enforcement. I introduced informal institutions in the labo-

²¹See also Balliet et al. (2015) and Brewer (2008) for supporting experimental evidence.

ratory by induced shared expectations on behavior through common knowledge of shared group identity. Results show that the quality of formal institutions matter for contracts to be offered and fulfilled while informal institutions only matter for contracts to be fulfilled in one-shot exchange relations.

One of the crucial functions of institutions in an exchange relation is that they make the act of trusting or offering a contract less risky by aligning the incentives of both parties. In a one-shot anonymous interaction, the shadow of the courts (formal rules) matter given that the shadow of the future (repeated interaction) casts little or no shade.²²

While the reliance on informal institutions in early exchange relations documented in Greif (1993) and Landa (1995) relied on its reputation-building function for future interactions, the results on group identity manipulation suggest that shared group membership helps in performance but not trust in one-shot anonymous interactions. People tend to perform more contracts with in-group members than with out-group members. However, the material costs of cooperation itself, an aspect that I control in the experiment, can also be affected by institutional quality and this may worthwhile to investigate in the future. Bolton et al. (2005) find that in transactions where the costs of cooperation are high, providing information about a partner's immediate past action increases cooperation. This may be something that is easier to accomplish for in-group members than out-group members, even when the quality of formal institutions is high.

It would also be interesting to see in future work how the relative importance of formal rules over informal constraints on behavior changes with repeated play. As Boettke et al. (2008), Bohnet et al. (2001) and Stiglitz (2000) have argued, history matters for institutions. Bohnet et al. (2001) note that institutions shape behavior but by affecting behavior, they also affect preferences. In a similar vein, another question this study raises is how the quality of formal institutions at the beginning change preferences for exchanges within one's group in the long-run. The experiment design presented here can lend itself as a starting point to answer questions like this. One can see this work as part of ongoing efforts to better understand how and why institutions matter.

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²²The shadow of the courts is phrase I borrow from Brennan et al. (2003) while shadow of the future was coined by Axelrod (1984). Formal rules need not be a function of the courts or of governments only. In Güth et al. (2007), feedback mechanisms for (some one-shot anonymous) exchanges in online platforms such as e-bay perform a type of third party enforcement.

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6 Appendix

6.1 Instructions

*The instructions were originally written in English and were translated in German for the experiments. They were then back-translated to English to verify accuracy.*²³

Welcome! You are about to participate in an experiment funded by the Max Planck Institute of Economics. Please switch off your mobile and remain quiet. It is strictly forbidden to talk to the other participants. Whenever you have a question, please raise your hand and one of the experimenters will come to your aid.

You will receive 2.50 Euros for showing up on time. Besides this, you can receive more. The show-up fee and any additional amounts of money you may receive will be paid to you in cash at the end of the experiment. Payments are carried out privately, i.e., the others will not see your earnings.

During the experiment we shall speak of ECUs (Experimental Currency Unit) rather than Euros. The conversion rate between them is 1 ECU = 0,05 Euros. This means that for each ECU you get you will be paid 0,05 Euros.

Before the experiment started everyone drew a bracelet that is either Yellow or Red. There are an equal number of Yellow or Red bracelets in the bag. You have been assigned to the Yellow group if you received a Yellow bracelet and the Red group if you received a Red bracelet. Please wear your bracelet throughout the experiment.

What is the decision you have to make?

At the beginning of the experiment, you will be assigned the role of Person 1 or Person 2. The number of participants assigned to the role of Person 1 will be equal to the number of participants assigned to the role of Person 2. Each person's task is to choose between two options. All decisions made will not be known by the other participants.

Person 1

Below are the possible contents of the screen that you will encounter if you are Person 1. It tells you how many ECUs you earn depending on what you choose and what the other person chooses.

²³I thank Johanna Schnier and Claudia Zellmann for translation help.

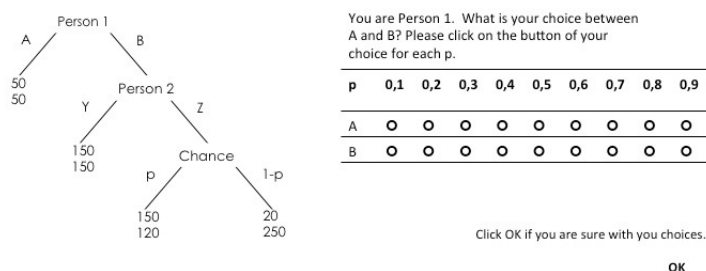


Figure 3: Decision Screen for Player 1

The diagram on the left reads as follows. If you are Person 1, you have to choose between A and B. If Person 1 chooses A, Person 1 and Person 2 receive 50 ECUs each. If Person 1 chooses B, Person 2 gets to choose between Y and Z. If Person 2 chooses Y, Person 1 and Person 2 receive 150 ECUs each. If Person 2 chooses Z, chance decides about your earnings. Person 1 can earn 150 ECUs and 20 ECUs with a given probability (p) that change in increments of 0,10. For example:

A p of 0,1 means you have a 1 out of 10 chance of receiving 150 ECUs and a 9 out of 10 chance of receiving 20 ECUs if you choose B AND Person 2 chooses Z.

A p of 0,2 means you have a 2 out of 10 chance of receiving 150 ECUs and an 8 out of 10 chance of receiving 20 ECUs if you choose B AND Person 2 chooses Z...

... and so on.

The task is to choose between A and B for each given probability p . That means you must make at least nine decisions. You make this decision by clicking on the buttons corresponding to your choice on the tables you see at the right side of the screen.

Person 2

If you are person 2, below is a sample of the contents of the screen you will encounter. It has the same contents as the screen for participants assigned the role of Person 1 but the choice to be made now is between Y and Z. It tells you how many ECUs you earn depending on what you choose and what the other person chooses.

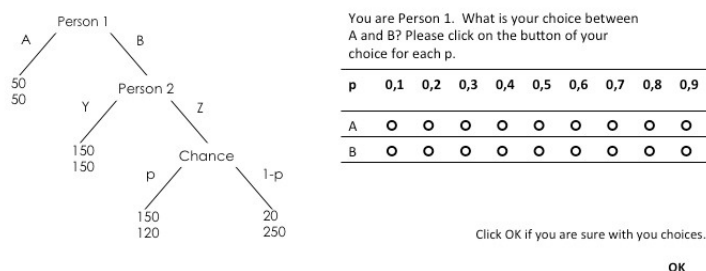


Figure 4: Decision Screen for Player 2

The task is to choose between Y and Z. If Person 2 chooses Y, Person 2 and Person 1 receive 150 ECUs each. If Person 2 chooses Z, chance decides about your earnings. Person 2 can earn 120 ECUs and 250 ECUs with a given probability (p) that change in increments of 0,10. For example:

A p of 0,1 means you have a 1 out of 10 chance of receiving 120 ECUs and a 9 out of 10 chance of receiving 250 ECUs if Person 1 chooses A AND Person 2 chooses Z.

A p of 0,2 means you have a 2 out of 10 chance of receiving 120 ECUs and an 8 out of 10 chance of receiving 250 ECUs if Person 1 chooses A AND Person 2 chooses Z.

... and so on.

The task is to choose between Y and Z for each given probability p . That means you must make at least nine decisions. You make this decision by clicking on the buttons corresponding to your choice on the tables you see at the right side of the screen.

How will you be paid?

At the end of the experiment, you will be randomly paired with a Person 2 if you are Person 1 and a Person 1 if you are Person 2. Then one of the probability conditions will be randomly chosen and your decision there will be used to determine your final payment.

Kindly think carefully of each of your choices because each has an equal chance of being selected for your final payment.

At the end of the experiment, you will be asked to answer some questions. All your answers will be kept private and will not be used to identify you.

Please click OK on the screen if you are finished reading the instructions.

Post-experimental questions

This part is displayed on screen. Participants rated the following items according to the following options: strongly agree, agree, neither agree or disagree, disagree, or strongly disagree with them.

1. Most people tell a lie when they can benefit by doing so.

2. Those devoted to unselfish causes are often exploited by others.
3. Some people do not cooperate because they pursue only their own short-term self-interest. Thus, things that can be done well if people cooperate often fail because of these people.
4. Most people are basically honest.
5. There will be more people who will not work if the social security system is developed further.
6. Generally speaking, people can be trusted and you need not be too careful when dealing with others

6.2 Regression with responses to post-experimental questions

The answers to the questions were coded such that “strongly agree” takes the value of 1, “agree” is 2, “neither agree or disagree” is 3, “disagree” is 4, and “strongly disagree” takes the value of 5. None of the answers to these items are correlated with trust choices. The stronger a participant disagrees with the statement that some people do not cooperate to pursue their own short-term self interest, the more likely he is to choose perform; similarly, the stronger a participant agrees with the statement that there will be more people who will not work if the social security system is developed further, the more likely he is to choose perform.

Table 4: Logistic Regression Estimates of Trust and Perform

| | Trust | | Performance | |
|---|-----------|---------|-------------|---------|
| | β | z | β | z |
| <i>Contract enforcement probability (baseline is $p=0.1$)</i> | | | | |
| 0.2 | 0.1890 | (0.90) | 0.6478** | (2.51) |
| 0.3 | 1.3700*** | (3.66) | 0.4177 | (1.52) |
| 0.4 | 2.4717*** | (4.95) | 1.2144*** | (3.05) |
| 0.5 | 4.0080*** | (5.11) | 1.4822*** | (2.89) |
| 0.6 | 4.9135*** | (5.27) | 2.4098*** | (3.92) |
| 0.7 | 4.7325*** | (5.08) | 2.7651*** | (4.23) |
| 0.8 | 4.7325*** | (2.42) | 3.2225*** | (4.79) |
| 0.9 | 4.0080*** | (4.38) | 3.2217*** | (4.49) |
| <i>Group identity (baseline is no group)</i> | | | | |
| In-group | 0.2980 | (0.36) | 1.0687** | (1.91) |
| Out-group | 0.1413 | (0.18) | 0.0772 | (0.13) |
| <i>Participant variables</i> | | | | |
| Female | -1.3896** | (-1.89) | 0.7073 | (1.48) |
| German | -0.9796 | (-0.47) | -0.2975 | (-0.41) |
| Age | 0.0423 | (0.90) | 0.0337 | (0.54) |
| <i>Questionnaire</i> | | | | |
| People tell a lie when they can benefit | 0.3397 | (0.90) | -0.1188 | (0.41) |
| Those devoted to unselfish causes are often exploited by others. | -0.0485 | (-0.16) | 0.0099 | (0.04) |
| Some people do not cooperate because they pursue only their own short-term self- interest... | 0.0957 | (0.21) | 0.3702* | (1.83) |
| Most people are basically honest | 0.1089 | (0.24) | 0.1940 | (0.63) |
| There will be more people who will not work if the social security system is developed further. | -0.2592 | (-0.94) | -0.5281 | (-2.79) |
| People can be trusted... | -0.5003 | (-1.15) | -0.1117 | (-0.44) |
| Constant | -0.1779 | (-0.04) | -2.8310 | (-0.96) |
| Log-Likelihood | 130.08*** | | 83.61*** | |
| Wald χ^2 (19) | 45.05*** | | 39.75*** | |
| N of observations | 810 | | 810 | |
| N of groups | 90 | | 90 | |

Note: *** (<1%), ** (<5%), and *, (<10%), mark which variables were statistically significant in each model and indicate their associated levels of significance. The dependent variable takes a value of 1 if participant chose to trust or perform, 0 if not. The reported z statistics in parentheses are based on bootstrapped standard errors (200 replications)