

Vollan, Björn; Zhou, Yexin; Landmann, Andreas; Hu, Biliang; Herrmann-Pillath, Carsten

Working Paper

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Working Papers in Economics and Statistics, No. 2013-14

Provided in Cooperation with:

Institute of Public Finance, University of Innsbruck

Suggested Citation: Vollan, Björn; Zhou, Yexin; Landmann, Andreas; Hu, Biliang; Herrmann-Pillath, Carsten (2013) : Cooperation under democracy and authoritarian norms, Working Papers in Economics and Statistics, No. 2013-14, University of Innsbruck, Research Platform Empirical and Experimental Economics (eeecon), Innsbruck

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**Björn Vollan, Yexin Zhou, Andreas Landmann,
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Working Papers in Economics and Statistics

2013-14

University of Innsbruck
Working Papers in Economics and Statistics

The series is jointly edited and published by

- Department of Economics
- Department of Public Finance
- Department of Statistics

Contact Address:
University of Innsbruck
Department of Public Finance
Universitaetsstrasse 15
A-6020 Innsbruck
Austria
Tel: + 43 512 507 7171
Fax: + 43 512 507 2970
E-mail: eeecon@uibk.ac.at

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COOPERATION UNDER DEMOCRACY AND AUTHORITARIAN NORMS*

BJÖRN VOLLAN

YEXIN ZHOU

ANDREAS LANDMANN

BILIANG HU

CARSTEN HERRMANN-PILLATH

Correspondence to: Björn Vollan, University Innsbruck, Department of Public Finance, Universitätsstraße 15, A - 6020 Innsbruck, Austria. bjorn.vollan@uibk.ac.at

Total word count: 13,371

JEL: A13 - Relation of Economics to Social Values, C92 - Laboratory, Group Behavior, D02 - Institutions: Design, Formation, and Operations, D72 - Political Processes: Rent-Seeking, Lobbying, Elections, Legislatures, and Voting Behavior, H41 - Public Goods

Keywords: Deterrent effect of legal sanctions; expressive law; authoritarian norms; public goods; democratic voting, China

Abstract: There is ample evidence for a “democracy premium”. Laws that have been implemented via election lead to a more cooperative behavior compared to a top-down approach. This has been observed using field data and laboratory experiments. We present evidence from Chinese students and workers who participated in public goods experiments and a value survey. We find a premium for top-down rule implementation stemming from people with stronger individual values for obeying authorities. When participants have values for obeying authorities, they even conform to non-preferred rule. Our findings provide strong evidence that the efficiency of political institutions depends on societal norms.

* **Acknowledgements:** We are thankful to Qingchao Wang, Wei Yuan, Xiangdong Sun, Fei Xiong, Wei Tang, Fei Yang and Qian Wan for their enthusiastic research assistance. Funding for this project comes from “985 Project” of Beijing Normal University. We are grateful for constructive comments from Esther Blanco, Bernd Hayo, Michael Kosfeld, Antonio Nicolò, Rupert Sausgruber, Sebastian Prediger and participants of EEECON workshop in Innsbruck (4.Oct. 2012) and SEEDEC workshop in Berkeley (29-30. Nov. 2012) and GIGA seminar in Hamburg (29. May 2013) as well as to Lars Feld for providing the instructions to their experiment. All remaining errors are of course ours.

1. Introduction

Democracy is considered a “good” institution on ethical and philosophical grounds. There is strong evidence that offering the opportunity to vote for the implementation of laws and institutions by the citizens who will be affected by the law increases legitimacy of the law leading to higher law conformance. This evidence is matched by beliefs of decision makers around the world and might be one of the driving forces for initializing numerous decentralized and participatory processes at various political levels as well as of nations that have adopted electoral democracies in the past two decades since the fall of the former Soviet Union. According to Freedom House 69 countries in 1989 were electoral democracies compared to 117 in 2011. Economic experimental research provides evidence that supports higher law conformance in the laboratory after allowing subjects to vote for the law (Ostrom, Walker, and Gardner 1992, Tyran and Feld 2006, Dal Bó, Foster, and Putterman 2010, Sutter, Haigner, and Kocher 2010, Decker, Stiehler, and Strobel 2003, Ertan, Page, and Putterman 2009, Walker et al. 2001).¹ In the same direction, empirical evidence from studies on participation at the workplace (Ichniowski and Shaw 2003, Zwick 2004), public participation to foster development (Casey, Glennerster, and Miguel 2012), the provision of public goods (Pommerehne and Weck-Hannemann 1996) or the management of common pool resources (Bardhan 2000, Sekher 2000, Yoder 1994, Lam 1998) highlights higher cooperation with the use of democratic principles as well as higher satisfaction among community members in participatory processes (Olken 2010). Sztompka (1998) contends that democratic institutions create conditions that are conducive to trust, such as impartiality, transparency, stability, normative certainty and accountability.

¹ Also social psychologists have investigated the effects of democratic versus autocratic leadership on satisfaction and/or productivity. The meta-analysis of Foels et al. (2000) reports a positive significant effect for democratic leadership. Most closely related to our experimental study is the study of Van Vugt et al. (2004) who use autocratic and democratic messages in a public good experiment to show that participants are more likely to exit the group independent of their personal monetary outcome when the leader is autocratic.

Contrary to this apparently overwhelming evidence, Bjørnskov (2007) could not find empirical support that democracy leads to more generalized trust in cross-country analysis. For example evidence from post-conflict countries like Iraq, Afghanistan or the Democratic Republic of Congo as well as in post-revolution countries like Egypt, Tunisia and Ukraine suggest that many countries struggle to achieve high trust levels, cooperation and rule compliance after having implemented democratic principles. So, why does democracy work in some countries but apparently not in others? Seemingly, a complex range of formal and informal institutions is needed to underpin a functioning democracy (Coyne 2008). Furthermore there is growing evidence for a strong persistence of many societal norms or institutions besides language, ethnicity and religion. Most importantly, Giuliano and Nunn (2013) show a strong association between nations that are democratic today or have positive attitudes towards democracy today and past-experience with local-level democracy.

Our experiments contribute to the debate about the interaction of non-deterrent formal laws and behavioral norms in general and for the success of democracy in particular. We present evidence from results of participants living in an authoritarian society where “eastern” values of collectivism and loyalty towards authorities such as parents, teachers, public officials or political leaders have often been claimed to be deeply engrained cultural values (Pye 1968, Ho 1996) that may work against intrinsic value of having a say in the decision-making process. We show that democratic procedural justice through voting for laws generally does not increase rule conformance and cooperation in China. Importantly we show that this result is especially pronounced for subjects who have strong values of obeying to authorities themselves. Our findings are consistent with Giuliano and Nunn (2013) as large parts of China in their paper are classified as having no tradition of local democracy. Without this experience norms of obeying authorities persist and restrain the benefits from democratic voting.

Cooperation is considered as a key criterion for e.g. subjective well-being (Bechetti, Pelloni, and Rossetti 2008), performance of political institutions (Putnam 1993), economic growth (Knack and Keefer 1997) and successful entrepreneurship (Bauernschuster, Falck, and Heblich 2010). We measure the level of cooperation between social actors in the context of public goods experiments. Our experiments closely follow the experimental protocol of Tyran and Feld (2006) who investigated whether non-deterrent law induces compliance through norm-activation. In their standard public good experiment individuals are faced with a law to contribute all of their endowment to the group account. Their study comprises 102 business, law and economics students from a Swiss university. Tyran and Feld (2006) find cooperation rates to be twice as high when the law is enacted democratically in referenda as when the same law is exogenously imposed. The overall benefit of democratic decision making was more recently confirmed with students from the United States (Dal Bó, Foster, and Putterman 2010) and Austria (Sutter, Haigner, and Kocher 2010). Additionally, it was shown that higher levels of cooperation found under democratically chosen rules were not driven by self-selection (i.e. more cooperative subjects vote for institutions that support cooperative behavior), or an information effect (i.e. participants learn the number of group members in favor of the rule), but mainly by democracy per se.² Sutter, Haigner and Kocher (2010) concluded that “*the option of participating democratically in the choice of institutions makes the difference*” (Sutter, Haigner and Kocher (2010): p.1563). This is in line with models of pure procedural fairness put forward by Rawls (1971) where the legitimacy of the procedure itself might give rise to an equitable and efficient distribution of goods. Confronting individuals with an illegitimate procedure may lead to disobeying and willingly accepting the legally prescribed sanction. Many people in western countries might feel it harder to rationalize to them to take a higher personal profit at the expense

² According to Dal Bó, Foster and Putterman (2010), only 8% of the total effect from voting on cooperation was caused by self-selection and only 20% of the democracy effect was due to the information provided to subjects.

of the others following a fair, participative procedure. One possible psychological explanation is that democratic participation increases “self-determination” and thus actors’ intrinsic motivation to cooperate with each other (Frey and Oberholzer-Gee 1997). Moreover, there is evidence that non-democratic, externally imposed policies can crowd-out this intrinsic motivation (Bowles 2008). However, ideas about legitimacy may themselves have a foundation in values that have grown under the respective institutions over a long historical process. Hence, we might not necessarily expect that these correlations also hold in the case of China. On the contrary we might even expect higher cooperation in China under top-down policymaking as this might be perceived more legitimate when people value authorities.

We think that in testing for the relationship between values and behavior it is important to investigate the role of non-deterrent laws, because deterrent laws set strong incentives anyway. Indeed, we chose to focus on cooperation under *non-deterrent* laws for two reasons. First, many interactions in real life related to honesty or cooperation are subject to non-deterrent sanctions. In many instances the benefits of disobeying to declare the right amount of taxes, overstate the claims to insurance, shirking co-workers, download illegal music and films from the internet outweigh the probability of getting caught and the corresponding costs (Mazar and Ariely 2006). Also China has a long tradition of governance with de facto non-deterrent laws. Until most recent times, the sheer size of the country put severe constraints on the enforcement of formal institutions, leading towards a pattern that has been coined as ‘centralized minimalism’ (Huang 2008). Secondly, (non-deterrent) laws are important not only for their material incentives but also in prescribing what people ought to do (Sunstein 1996, Posner 1998). This expressive function of the law helps in shaping the values of society. Thus, non-deterrent laws might signal what is the appropriate behavior for energy consumption, air and noise pollution, discrimination, voting turnout, and more generally any contribution to public goods. Indeed, throughout Chinese history

the expressive function of law has always had a strong component of establishing moral examples and reference points for decisions in local contexts. For example, in spite of the fact that irrigation systems were regarded by the Imperial administration as a cornerstone for national economic security, and destructive private action as violating formal regulations in safeguarding their operations, these political priorities were mainly enforced via the expression and the propagation of moral leadership on part of local officials, and less by direct incentivization and enforcement (Schoppa 1989).³

Our paper proceeds as follows: we start by explaining the experimental setting (2.1), the implementation (2.2), background and sample characteristics (2.3) and our identification strategy (2.4). Section 3 contains our empirical results starting with the overall democracy effect (3.1), the relation between values and the democracy effect (3.2) and robustness check for two separate subsamples (3.3) and possible ordering effects (3.4). Section 4 discusses and concludes.

2. Methods

Our experimental strategy relates to seminal approaches in cross-cultural experimental economics such as Henrich et al. (2005), Herrmann, Thöni and Gächter (2008) or Cameron et al.(2009) that document different patterns of economic behavior in the laboratory across countries with different cultural norms. Our paper uses existing findings from western democratic countries as a benchmark, and contrasts them with a country that is obviously different culturally, especially with respect to collectivism and authoritarian norms: China. China is, according to popular indexes, ranked as authoritarian regime and “not free” (“Democracy Index 2011” or “Freedom in the World 2012). At the same time China is a highly interesting case given its

³ Another form of non-deterrent symbolic sanctions is to have high sanctions with practically zero enforcement. Draconic punishments of unfilial behavior in violation of Confucian norms were not implemented universally, but served as a message about morally proper behavior, leaving much space for local variety in customs and peculiarly Chinese interactions between ‘orthopraxy’ and ‘heterodoxy’ (Sutton 2007). This tradition of moral leadership via the expressive function of central government regulations was still a major feature under Maoist rule and continues to persist in China’s legal tradition until recent times.

population size, gross domestic product and political influence. We exploit individual (instead of societal) variations in a broad set of cultural values to explain diverging behavior in our experiment.

2.1 The public good experiment with (non)democratic law

To test whether the cooperation enhancing effect of elections can also be found in China and whether it is contingent on specific characteristics of the population, we measure cooperation by using a linear public goods game as a stylized model of the cooperation dilemma. In our public good experiment, n players are randomly paired in a one-shot and anonymous interaction. Each of the players receives an endowment y_i and has to decide anonymously and simultaneously on his contribution to a public good g_i or private good ($c_i=y_i - g_i$). Each subject's income from the public good is the sum of contribution by all $j=1, \dots, n$ group members to the public good $\sum_{j=1}^n g_j$

. Total payoff is given by $\pi_i = y_i - g_i + a \sum_{j=1}^n g_j$. The marginal return from the public good is $a=0.5$, group size $n=3$ and initial endowment $y_i=10$. The game constitutes a cooperation dilemma because players together are best off if all three contribute their entire endowment to the public good ($g_i= y_i$); however, because the individual cost of contributing one point to the public good is one but the return is only 0.5, the dominant strategy of a selfish player is contributing zero to the public good, independent of the other player's contribution.

The law is a material incentive introduced either by majority vote or by the experimenter and prescribes full contribution to the public good.⁴ Contributions of less than ten points lead automatically to a sanction of two points. The law however does not change the equilibrium prediction of contributing nothing to the public good. In case of a mild sanction the payoff is

$\pi_i = y_i - g_i + a \sum_{j=1}^n g_j - s_i$ where $s_i=0$ if $y_i = g_i$ and $s_i=2$ if $g_i < y_i$. Full contribution is rational when $\pi_i(\text{full}) > \pi_i(\text{zero})$ i.e. if $s_i > y_i (1-a)$. The equilibrium strategy of zero contribution yields a payoff of 10 token in *ExoNoLaw* and 8 token in *Law*. The game theoretic predictions for voting are obtained through backward induction. In the first stage people vote on the sanction and in the second stage they make their contribution decision. Thus, knowing that the mild law does not deter other people from defecting it is irrational to vote for the sanction since the payoff in the equilibrium prediction $\pi_i(\text{NoLaw}) > \pi_i(\text{Law}) = 10 > 8$.

In distinguishing between different institutions when designing the game settings, we are in line with recent research on classifying political systems, which shows that simple classifications mainly based on the nature of the electoral system end up with a bipolar taxonomy that just distinguishes democratic from autocratic regimes (Cheibub, Gandhi, and Vreeland 2010). Correspondingly, in our experiments we distinguish two scenarios; one in which participants can vote democratically over the establishment and enforcement of a rule, and another one where the rule is imposed by an external authority. Following Tyran and Feld (2006), our experimental treatments vary in two dimensions: First, whether there is a (non-deterrent) sanction or not and second how the sanction is enacted. The law can either be exogenously

⁴ We slightly modified the experimental conditions for the non-deterrent law used by Tyran and Feld (2006). We reduced the endowment from 20 to 10 points to make the conditional choice easier to implement and consequently also the sanction from 4 to 2 points.

imposed or endogenously chosen through majority voting (if two out of three subjects vote for the law). The following treatments were randomly implemented as within subject design:

- *ExoNoLaw*: The deduction rule is not implemented and participants play a normal version of the public good game.
- *ExoLaw*: The deduction rule of two points for not contributing all endowment to the public good is imposed on participants.
- *Endo*: Players vote whether or not to have the deduction rule that deducts two points for not contributing all endowment to the public good (*strategy method*).

Contrary to Tyran and Feld (2006), we use a within-subject design instead of a between-subject design. A within-subject design holds constant individual-specific factors and isolates the treatment effect in a more powerful way than could be carried out in a between-subject test. It also enables us to calculate the democracy effect for every person and hence to calculate heterogeneous effects for voter types (i.e. allowing for different democracy effects of proponents and opponents to the law). The orders of these rounds were changed between sessions to control for possible ordering or “carryover effects” (Section 3.4 provides a test on the possibility of ordering effects). After each round each subject was randomly matched with another subject. Information about others’ contribution level was never revealed and earnings were given to participants after the final rounds to keep the treatments independent from each other. In the *Endo* treatment the subjects do not learn the distribution of votes in their group but have to make their contribution decision contingent on (i) whether no other person voted for the rule (*Endo0*; the rule is not implemented), (ii) one other person voted for the rule (*Endo1*; own previous voting decision determines whether rule is in place), or (iii) two other person voted for the rule (*Endo2*; the rule is implemented). Based on the voting outcome within each group we can identify which of the three decisions (*Endo0*, *Endo1*, *Endo2*) was finally payoff relevant to estimate the total

treatment effect of endogenous law. By using this strategy method in the *Endo* treatment we can further distinguish contributions conditional on the number of law supporters and opponents, which enables us to identify how participants react to the voter distribution (information effect). The strategy method also avoids selection effects between groups implementing and not implementing the law. Additionally, we tested for one other arrangement that we only applied on the student sample. This is labelled “EndoPay”. In this case, if there are less than two players willing to pay for the voting out of their show-up fee, we determined randomly whether rule or no-rule was played (analysis available in the online appendix).⁵

(insert Table I here)

2.2. Implementation of the experiment

A total of 300 subjects participated in the experiment. One of the workers had to leave during the experiment leaving us with 299 observations: 150 students and 149 workers. All participants passed the control questions on understanding the experiment. One experimental session comprised of 30 subjects. The first five sessions were carried out with students at Beijing Normal University (BNU) and the final five sessions with workers from Fuxing village in Hubei province. Participants were all seated in one room and each participant was seated a separate table to minimize observation of other people. Recruitment of students was done with flyers at the BNU campus, workers recruited with help of managers of Fuxing Tech Co., Ltd.. The participants were not aware of the fact that one of the experimenter was a foreigner. In both settings, the experiments were conducted by a team of seven Chinese research students from Beijing Normal University who received extensive training and were under our supervision. The

⁵ Participants had to vote and contribute in a strategy method (Endo0, Endo1, Endo2, ExoLaw, ExoNoLaw). In total 31% of students were willing to pay in order to vote. Effects found in the main analysis can be confirmed in the additional treatment. We do not find stronger overall democracy effects if people have to pay for voting. We further find that especially people who are willing to take risks pay for the right to vote.

same research assistant was reading and explaining the experiment during all ten sessions. Six other assistants responded privately to questions from individual participants, and collected and distributed the paper forms. There was no suggestion that the experiment was regarded to be an extension of the regular workplace activity in the Fuxing Company. Students were randomly allocated to the different sessions while workers remained within their usual working team; this was necessary because workers had to participate during the same time slots after work. However, we intentionally exploit this difference in our analysis, because the worker sample, for that very reason, represents a high-trust reference case that allows checking for the external validity of the student sample. The experiments were pre-tested and back translated between English and Chinese. We used different posters to visualize the experimental set-up and asked several test questions before each round. Each session consisted of four independent rounds (5 rounds for students).

The first round elicited “player types” (i.e. selfish, conditional cooperators, unconditional co-operators) using the strategy method proposed by Fischbacher, Gächter and Fehr (2001). Controlling for player types could be important because especially conditional cooperators should be prone to the information effect of democracy. In other words, they should react more to the information on the co-players’ voter types delivered through the election process. Also, we will assess whether the distribution of player types is comparable to Western countries. Each treatment was implemented in one of the following rounds. The orders of the rounds are presented in Appendix 1-3. In section 3.4 we show that the treatment order does not affect our results. No information about others’ contribution level or own payoff were given to participants before the end of the session. After all rounds were completed, we randomly paid out 3 rounds. All participants received a show-up fee of ten Yuan. The exchange rate is 1 token for one Yuan. In total subjects earned an average of 82.16 Yuan (equivalent to 9.88 Euro) including show-up

fee. This average payment is about equal to three hours' wage for a university student or 4 hours' wage for a worker. Experiments lasted between two to three hours including the final questionnaire on socio-demographics and values.

2.3. Background and sample characteristics: Socio-demographics and values of students and workers

It is often claimed that education supports the transition to democracy (Lipset 1959, Barro 1999). Thus, we decided to have one sample of students from Beijing and one sample of rural workers. Our hypothesis is that these samples represent evolving value systems in Chinese society. The rural workers may hold more traditional values because of both acculturation and the typical workplace setting of Chinese companies, which manifest high degrees of paternalistic authoritarianism; this is a pattern that prevailed also in non-communist Chinese societies (Redding 1993, 1996) and is bolstered in the context of the People's Republic (Chan and Unger 2009). In contrast, the current student generation represents the single-child generation who also receives strong international impacts in contemporary metropolitan society. The "two societies" (Whyte 2010) of China's countryside and megacities also feature many institutional differences, such as in social security system: Whereas the urban population is at least partly covered by public social support systems, the rural population until most recently had to rely on traditional forms of social support in the family and community. Thus, the difference between our samples is not a special corporate culture of Fuxing Company but a societal and cultural manifested difference.

Descriptive results of our two subpopulations are found in Table II. Students represent a relatively affluent generation of "single children." At the mean age of almost 22 years, they have already spent a larger part of their undergraduate studies at the university and therefore have the

experience of living independently from their parents. The student life style is strongly embedded into communitarian arrangements of everyday life (student dormitories, canteens etc.), yet allows for much larger degrees of individual freedom than especially during the last years of high school education which is overshadowed by the challenge to gain university admittance (“gao kao”). The worker sample is very different from this background. Fuxing village is a modernized village that experienced explosive economic growth during the past two decades, driven by entrepreneurial leaders and foreign direct investment. Most of the workers in the flourishing rural industries are migrant workers from all over China’s mainland. Since the factory belongs to a company in a male dominated manufacturing industry, the majority of workers are male (80%), many of them married (44%) in the average age of 33, and already working for the company for about 10 years (mean=9.28, s.d.=7.62, min=1, max=25) having similar income (mean=2214.17, s.d.= 847.52) and hierarchical position within the company (only 3% have a monthly income above 4000 yuan).

After the experiment participants filled in a questionnaire about socio-demographics as well as their attitudes towards obeying authorities (Feldman 2003), collectivism (Torelli and Shavitt 2010, Shavitt et al. 2006) and locus of control (Naditch 1974) and competitiveness/vertical individualism that emphasizes hierarchy (Triandis and Gelfand 1998). In order to control for possible different demand of people for punishment (Altemeyer 1988, Duckitt and Sibley 2010) we also included items to measure the demand for punishment. This approach follows standard practices and sets of questions in established value surveys. Altogether we asked 21 socio-psychological questions that we reduced to five factors (*obey authority, collectivism, competitiveness, locus of control and demand for punishment*) using principal-component factor analysis as described in Appendix 4 and Online Appendix Table I. It is straightforward to recognize that the two samples tend to diverge in many respects. For our discussion, one

remarkable observation about differences is that students clearly manifest less support for attitudes that are supportive of obedience, which may partly reflect their stage in the life cycle, but also the more liberal environment at universities. However, surprisingly, and similar to findings from the World Value Survey our absolute values for obeying authorities are not much higher in China compared to other Western countries (Dalton and Ong 2005). This raises some concern for cross-country comparisons. Methodological assessments of international value studies have made the point that the resulting values do not represent absolute values, but marginal valuations, so that they cannot be directly compared. Marginal valuations are strongly contextualized, especially relative to reference points. For example, in a country with high absolute realizations of values marginal valuation might be even relatively low (Beugelsdijk and Maseland 2010).⁶ Since ‘obeying authorities’ is engrained in Chinese culture people give lower ratings according to that reference point. This would mean that ‘obey authority’ is only a good measure within the same culture. The other difference between the two samples is that students reported to be less competitive. The latter result is not surprising given the study by Cameron et al. (2013) who found that people born after the introduction of the one-child policy (no older than 32years) are less competitive which holds true for all the students but only for 45% of the workers. Students and workers have similar values for the remaining factors locus of control and demand for punishment.

These personal preferences (“values”) of our participants are in line with prior findings such as from Hofstede, Hofstede and Minkov (2010).⁷ Comparing China to Switzerland, Austria

⁶ Furthermore, other potential biases inherent in surveys were found to be more pronounced in China. First, social desirability and tendency for middle responses might be more a problem in a collectivist country (Bennett 1977). Secondly, studies analysing hypothetical bias in contingent valuation have found that this bias might be particularly large in China (Ehmke, Lusk, and List 2008, Carlsson et al. 2013). Third, trust towards the interviewer in an authoritarian country might also be different.

⁷ From Hofstede, Hofstede and Minkov (2010): Power distance is defined as the extent to which the less powerful members of institutions and organisations within a country expect and accept that power is distributed unequally. Individualism addresses the degree of interdependence a society maintains among its members.

and the United States where the experiment of Tyran and Feld (2006), Sutter et al. (2010) and Dal Bo et al. (2010) were run suggests that especially power distance and individualism differ substantially for all three countries. Based on Hofstede, Hofstede and Minkov (2010) individuals in China are relatively stronger influenced by formal authority and they are optimistic towards people's capacity for leadership. China is also a collectivist country where people act in the interests of the group and not necessarily of themselves. In the first round of the experiment we also identified each participants' type as proposed by Fischbacher, Gächter and Fehr (2001) as this is a robust and externally valid measure (Rustagi, Engel, and Kosfeld 2010). According to the classification used by Fischbacher, Gächter and Fehr (2001) we have 49 percent conditional co-operators in the pooled sample (47 percent only for students), 9 percent free-rider (14 percent for students), 4 percent altruists (1 percent for students), 4 percent triangle contributor (6 percent for students) and 33 percent that cannot be classified (32 percent for students). Both samples show a similar share of conditional co-operators and these figures are overall very consistent with those obtained from Kocher, et al. (2008) on three continents underlining a culturally independent pattern of player types. As the share of conditional co-operators and free-riders is similar to Western countries any differences in treatment effects should not be related to systematic differences in norms to cooperate, but rather to norms about democracy. Differences between our samples are mainly reflected by the differences in the extreme behaviors, i.e. free-riding and altruism. This is plausible as the worker sample is taken from the same company where workers have the current experience to cooperate, and certainly look back on a number of shared experiences with punishing free-riders and applauding altruistic contributions.

(insert Table II here)

2.4. Identification strategy

Subsequently, we analyze the pooled sample, using the internal differentiation into the two groups as a robustness check. We distinguish between different variants of the game, depending on whether and how the ‘Law’, i.e. the rule of punishment is implemented. Due to the randomized design, identifying differences between *ExoNoLaw*, *ExoLaw* and *Endo* is simply a matter of mean comparisons. However, since in the *Endo* treatment some groups have implemented the law while others have not, the democracy premium is not simply obtained by comparing *Endo* to *ExoLaw*. Following earlier related contributions (Dal Bó, Foster, and Putterman 2010), we also need to consider the information effect that may influence the behavior of the subjects. We thus need to distinguish the rule effect and information effect from the democracy premium.

Our benchmark is the exogenous non-implementation of the rule (*ExoNoLaw*) with contribution $Contr_{i,NoLaw}$. If the rule is implemented exogenously (*ExoLaw*), there might be an additional exogenous rule effect $\alpha_{i,ExoLaw}$. Under democratic decision making (*Endo*), rule effects could be more diverse. Besides the actual democratic rule implementation effect, there is always additional information revealed in an election, i.e. the election result. This type of information effect has to be taken into account. For example, an unanimous agreement to implement the rule might motivate group members even more to abide by it. Hence, relative to *ExoNoLaw* there could be the effect of endogenous non-implementation $\alpha_{i,Demo(NoLaw)}$, of endogenous implementation $\alpha_{i,Demo(Law)}$ and an information effect $\alpha_{i,Info\#}$ depending on the number of other yes-voters $\#$. Formally, individual contributions ($Contr_i$) depend on rule implementation (*Law*) and democratic decision making (*Endo*) as follows:

$Contr_i =$

$$Contr_{i,ExoNoLaw} + \alpha_{i,ExoLaw} Law + \alpha_{i,Demo(Law)} Law \square Endo + \alpha_{i,Demo(NoLaw)} (1 - Law) \square Endo + \alpha_{i,Info\#}$$

This formalization is not very restrictive, as all effects may vary across individual types. Identifying different partial effects is only possible due to the within-subject variation in institutions and because subjects reveal their reaction to different choices of group members in the strategy method. In particular, we have contributions under democratic implementation and non-implementation for each individual.

The exogenous rule effect $\alpha_{i,ExoLaw}$ is simply the individual difference between contributions under *ExoNoLaw* and *ExoLaw*. The effect of endogenous non-implementation $\alpha_{i,Demo(NoLaw)}$ (Democracy Effect No Law) is the individual difference between *ExoNoLaw* and contributions with democratic non-implementation (*Endo0/Endo1*), minus the information effect. The effect of endogenous implementation $\alpha_{i,Demo(Law)}$ (Democracy Effect Law) is similarly given by the difference between *ExoLaw* and contributions with democratic implementation (*Endo1/Endo2*), minus the information effect.

We propose the following strategy to test for the information effect: If an individual votes for rule implementation, then the law is enacted when there is *at least* one other supporter in the group of three (*Endo1/Endo2*). Conversely, opponents of the rule can avoid the law if there is *at most* one supporter of the rule in the group (*Endo0/Endo1*). This setting provides variation in information (number of group members in favor of the rule) while keeping the rule and the voter type constant. We can therefore identify $\alpha_{i,Info2} - \alpha_{i,Info1}$ for rule supporters and $\alpha_{i,Info1} - \alpha_{i,Info0}$ for rule opponents. Note that $\alpha_{i,Info0}$ is not identified separately from the democracy effect. We therefore restrict it to zero, implying that its effect is included in the democratic rule (non-)implementation effect.

3. Empirical results

3.1 Overall democracy effects

In the pooled sample of workers and students we find that contributions under *ExoNoLaw* are on average 47 percent (similar to 48 percent for unconditional contribution in the first round), for *Endo* 50 percent and for *ExoLaw* 60 percent (see Fig.1). In total 42 percent of participants vote for the law in the Endogenous treatment leading to a total of 37 percent of groups enacting the law and 63 percent not enacting the law. The 63 percent of groups not enacting the law are very comparable with the 60 percent obtained by Tyran and Feld (2006), 53 percent by Dal Bo, Foster and Putterman (2010) or the 63 percent by Sutter, Haigner and Kocher (2010) suggesting that our results are not influenced by different preferences for the law itself. The results look similar when analyzing rule following behavior. Under *ExoLaw* 48 percent of all subjects contribute 10 to the public good compared to 28 percent in *Endo* and 21 percent in *ExoNoLaw*.⁸ There are no differences between treatments for the lower end of the distribution. Under *ExoLaw* 26 percent of all subjects contribute nothing to the public good compared to 25 percent in *Endo* and 22 percent in *ExoNoLaw*.

Our major descriptive result for the pooled Chinese sample is that given actual voting outcomes, *Endo* is not significantly better than *ExoNoLaw* (t-value 1.31) and most importantly *Endo* clearly performs worse than *ExoLaw* (t-value -4.20). The inferiority of the Endogenous treatment holds in both the student and worker subsample (compare Table VI). This result contrasts all studies that have been carried out in western countries so far and suggests that in our Chinese samples there is no cooperation benefit from democratic participation. We further find

⁸ In the following we focus on actual cooperation levels instead of binary rule compliance. However our subsequent analysis also holds for rule compliance.

that an exogenously imposed non-deterrent law significantly increases contribution levels compared to a situation without law (t-value 5.56). It is thus striking that non-deterrent exogenous law seems to be highly efficient in the Chinese sample while it can be inefficient in western countries. We provide an overview of our effect sizes compared to the existing literature in the Online Appendix (section 1.4). Our result is also confirmed if we separately analyze behavior of workers and students (see subsection 3.3).

(insert FIGURE I here)

So far we simply compared average contributions under different regimes. Yet, the comparison of Endogenous Law with the exogenous regimes is not fully satisfactory since *Endo* contains situations with and without rule according to the actual voting outcomes. Also, there is additional information revealed through the election process, because individuals make their decision contingent on their peers' agreement (information effect) which is different from a pure participation or democracy effect. Hence, our goal is to disentangle rule effect (which may occur under exogenous and endogeneous implementation), information effect and the democracy effect (more formal details on the identification can also be found in the Online Appendix).

We begin with the identification of the information effect. For rule supporters it does not make a difference for implementation of the law whether one or two co-players vote in favor of the law. In both cases the law will be implemented. We hence compare *Endo1* and *Endo2* for supporters. Analogously, we compare *Endo0* and *Endo1* for opponents/non-supporters. In both cases contribution differences are below 1 percentage point and clearly insignificant (Table III or Appendix 5 for a graphical illustration). Similar to Dal Bó, Foster and Putterman (2010) we hence find no information effect in the *Endo* regime. Since the information effect is essentially

zero (or very close to it) it is much easier to infer the democracy effect, because the democracy effect can now be calculated as follows:

- Without implementation of the law (i.e. 0 or 1 group members voted for the law):

$$\text{Democracy Effect No Law (DENL)} = \text{Endo0} - \text{ExoNoLaw}$$

- With implementation of the law (i.e. 2 or 3 group members voted for the law):

$$\text{Democracy Effect Law (DEL)} = \text{Endo2} - \text{ExoLaw}$$

The two effects are shown separately for Yes and No voters in Table III (and corresponding Appendix 5). We can see that there is only a positive democracy effect for Yes voters and it occurs when the rule is implemented (0.52*, t-value 1.67). As argued in previous studies the positive effect most likely stems from people feeling more self-determined, motivated and satisfied through democratic participation or as “winners” of the election. However, in the three other cases the democracy effects are negative. There is a negative (insignificant) premium for No voters when the rule is implemented in democratic elections (-0.47, t-value -1.49) meaning that Chinese participants are *not* more likely to bow to the majority and cooperate when the law is democratically implemented compared to a situation when the law is exogenously imposed. Most importantly we find a strong negative premium for yes-voters when the law is not implemented in democratic elections (-1.63***, t-value -4.45). We suspect that the effect might come from dissatisfaction because the law was not easily implemented by a strong moral leader in a top-down manner. Furthermore, it might be coupled with some disappointment of not being among the winners of the election.⁹ While this disappointment might also exist in western democracies, there is certainly no bonus for a strong leader. In western democracies the negative

⁹ One could think that anger or disappointment should be smaller when using the strategy method which is a ‘cold’ decision situation. There is mixed evidence on this topic with e.g. Brandts and Charness (2000) finding no differences and Güth, Huck and Müller (2001) more ‘emotional’ behavior in hot situations.

effects of democracy are smaller and likely overcompensated by a much stronger positive premium for democracy, which is very moderate in China. Aggregating over the two voter types we obtain a negative and insignificant democracy premium when the rule is implemented (contribution difference: -0.06), and a large and significantly negative democracy effect when the rule is not implemented (contribution difference: -0.94***). Weighting those two effects with the actual number of cases where the rule is endogenously implemented (37 out of 100) yields the average democracy effect for our sample with a contribution difference of -0.61***. We can now generalize our results and simulate the average democracy effect for an alternative share of Yes voters. The higher the share of Yes-voters, the more we converge to the positive democracy effect for Yes voters under implementation. Our simulation shows that with a share between 64 and 65% Yes voter types, we would reach a positive average democracy effect. The share needed for a significantly positive democracy effect would be even higher.

(insert Table III here)

3.2. Democracy effects and values

What makes exogenous law so effective in the Chinese context? There might be cultural factors leading to the striking difference of our results as compared to those from Western countries. Table IV shows a regression of the contribution difference (Contrib. *ExoLaw* – Contrib. *Endo*) on different socio-demographic variables, cultural factors and player types.

One might have expected that agents' beliefs about the other agents' contributions drives the democracy effect. If, for example individuals have some positive degree of inequity aversion, or are reciprocal then the lack of positive effect of democracy could be driven by the information effect as we would expect conditional cooperators to more readily react to information signals of others voting behavior. However, we do not find that conditional cooperators increase

contributions in the endogenous treatment. This insignificance of conditional cooperators in reacting on information is in line with our previous observation that the information effect is close to zero. Further analysis shows that the information effect is small and insignificant also in the subset of conditional cooperators (results available upon request). Being a “free-rider” significantly increases obedience to exogenous law in the worker sample. All socio-demographic variables and value variables except “obey authority” remain insignificant. The factor “obey authority” is the most important and highly significant explanatory for the superiority of the exogenous law and is robust in both subsamples. According to our estimates a change of one standard deviation in the factor “obey authority” changes the performance of *Endo* relative to *ExoLaw* by approximately 1 contribution point (10% of the endowment).

(insert Table IV here)

To further analyze the relevance of the effect we split the sample in “Low obey” (factor obey authority below average) and “High obey” (factor obey authority above average). In both subsamples we compare the performance of *ExoNoLaw*, *Endo* and *ExoLaw*. This is to assess whether our prior statements on superiority of the exogenous rule holds in general, or whether and to which extent internalizing the value or norm to “obey authority” is an important condition for efficiency of the exogenous law. Interestingly, exogenous law performs not significantly better than endogenous rule in the “Low obey” and only slightly better than no law (t-value *Endo* vs. *ExoLaw* -0.36, *ExoLaw* vs. *ExoNoLaw* 1.91). In contrast, Exogenous law clearly leads to higher contributions in the “High obey” sample and there is not even a significant difference between endogenous rule and no law (t-value *Endo* vs. *ExoLaw* -5.30, *Endo* vs. *ExoNoLaw* 0.24, see Appendix 6 for further details). Thus, obeying authority seems to play an important role and it is therefore an obvious candidate to explain cross-cultural differences in contributions.

We repeat the decomposition of contributions by voter type in Table V below for both the “Low obey” and the “High obey” subsample (also compare Appendix 7 for a graphical illustration). Both the rule supporters and opponents react to the exogenous rule in the “High obey” sample (contribution difference *ExoLaw* vs *ExoNoLaw* is on average 1.77*** for No and 1.76*** for Yes voters). Interestingly, in the low obey sample only those who prefer the rule also react to an exogenous introduction, and the reaction is more moderate than for the “High obey” sample (contribution difference *ExoLaw* vs *ExoNoLaw* is on average 0.18 for No voters and 1.46 for Yes voters). In other words, those who have low attitudes towards following authorities and prefer no rule do not react to *ExoLaw*.

There is no positive democracy effect in the “High obey” sample (n=167). Not even for the yes-voter when the rule is implemented. In contrast, in the “Low obey” sample (n=132) yes-voters have a positive democracy effect under rule implementation (1.40**). Thus, people with lower attitudes to follow authorities display higher cooperation rates when there is an election they win. Nevertheless, the strong negative democracy effect for yes-voters when the rule is not implemented remains large and negative significant both in the “High and Low obey sample”. This means that yes-voters from the “Low obey” sample act like “opportunistic democrats” in the sense that they only cooperate more after a favorable election outcomes.

(**Insert Table V here**)

3.3. Robustness check: Subsample analysis of workers and students

The comparison between the student and worker samples mainly serves as a robustness check; that means, in this paper we do not attempt to explain differences between the groups systematically, though we will notice some important observations that are indicative of possible transitions due to education as outlined in section 2.3. We argue that the impact of cultural

differences and differences in the value system will show up especially clearly if the relative effects between the regimes appear in both the students and the worker sample. That means, even if the two groups manifest level effects that might reflect the impact of education or generational differences, for our reasoning it suffices to state that the role of authoritarian behavioral standards is salient in both samples.

Table VI summarizes our most basic results and clearly shows that the worker and the student sample differ considerably in their *absolute* values: Independent from the treatment, workers consistently show higher contribution levels, with high significance. The worker sample has a contribution rate of 74 percent in *ExoLaw*, 64 percent in *ExoNoLaw* and 63 percent with *Endo* while the student sample has a contribution rate of 45 percent in *ExoLaw*, 29 percent in *ExoNoLaw* and 37 percent with *Endo*. We can safely surmise that this reflects to a large part the previously described fact that workers are selected from pre-existing teams and therefore activate a shared experience of cooperation, fostered by the paternalistic authoritarian corporate culture of Fuxing Company in which loyalty and teamwork are strongly emphasized. To a smaller part it could also be due to generational differences or educational status. However, most importantly, both samples show similar *relative* effects: In both samples *Endo* is conspicuously inferior to *ExoLaw*. This is the central result of our work: Different from pre-existing research on Western samples, the Chinese case reveals that the possibility of voting about the rules of the game does not induce higher levels of cooperation. This holds for the student and the worker subsample.

Yet, there is an interesting difference between the two samples with regard to the comparison between the *Endo* and the *ExoNoLaw* regime. For the students we do observe a positive effect of the *Endo* regime (t-value 2.70), while we do not observe any effect for workers. This seems to reflect the educational and social differences between the students and the workers that are manifested in the lower values of obeying authorities. In fact, without statistical

significance we even observe a slight reduction in workers' contribution levels in the *Endo* regime compared to *ExoNoLaw*. Similarly, there is a difference in voting behavior. In total 42 percent vote for the law in Endogenous treatment with 33 percent of students and 51 percent of workers voting for implementation. Both percentages are not significantly different from the voting outcome of 41% in Tyran and Feld (2006). Despite the differences in levels of cooperation and voting behavior between the two subsamples our treatment effects remain (see Appendix 5).

(insert Table VI here)

3.4 Robustness check: Ordering effects

The treatments were arranged in the way described in Appendix 1-3. One important question is whether there are special order-effects that correlate with the treatments. Note that we do not expect such problems to occur, because we tried to balance treatments across rounds as much as possible. In that sense, we have a between-subject design for each round, where round effects do not play a role. Our design thus combines the advantages of between and within subject designs. Looking only at the second round where we started to implement our three treatments we can calculate a between-subject design. Participants starting with *ExoNoLaw* contributed on average 5.1 (n=60) compared to 5.4 (n=149) in *EndoLaw* and 6.3 in *ExoLaw* (n=60). These figures are slightly higher compared to the within-subject design reported in Figure 1 where participants contribute on average 4.6 (n=299) in *ExoNoLaw* compared to 5.0 (n=299) in *EndoLaw* and 6.0 in *ExoLaw* (n=299) but the relative difference is remarkably similar. With the smaller sample sizes *ExoLaw* is significantly better than *ExoNoLaw* (t-value=1.75) and for one-sided test also better than *EndoLaw* (t-value=1.42).

To test for round effects and the stability of our estimates, we rely on a panel regression that pools all individuals and their relevant decisions across rounds. We regress individual

contribution decisions on their decision type (*ExoLaw*, *Endo0*, *Endo1* and *Endo2* relative to the left out category *ExoNoLaw*) controlling for round and using individual fixed effects. We conduct this analysis separately for the subsamples of students/workers and Yes/No voters. The reason is that if results remain stable for these subsamples, they will also be for more aggregate samples. Table VII below shows the regression results in the columns “Panel regression”. Even though there are round effects on contributions (mostly decreasing contributions over time), our treatment effects remain very similar to what would be predicted by our descriptive results in Appendix 8. Those descriptive differences between *ExoNoLaw* and the other decision categories are calculated and shown for each of the subsamples in the columns “Descriptive difference”. Testing for statistically significant differences between our panel regression coefficients and the descriptive differences results in very low significance levels (p-values between 0.54 and 1.00, mostly greater or equal to 0.85). We can therefore be confident that our analysis is not biased by round effects.

(insert Table VII here)

4. Discussion

Our research contributes to important discussions about culture, law and democracy: First, we show that the efficiency of institutions depends on values and norms. While the expressive function of law in previous studies was boosted with democratic principles the opposite is true for China. In China, when the majority of people have strong norms of obeying authorities, the expressive function of the law is boosted by the moral instance of an authoritarian leader. Thus, expressive law in China is more likely based on strong leadership and not on democratic processes. Our observation is consistent with the idea that humans are norm adopting individuals who are influenced by the broader context they live in (e.g. (Poteete, Janssen, and

Ostrom 2010, Boyd and Richerson 1988, Boyd and Richerson 2009, 1994, Gintis 2007)) and that institutions and norms might be persistent (Acemoglu, Johnson, and Robinson 2001, Acemoglu and Robinson 2008). Thus, there is no blueprint of institutions that should be implemented without considering the broader context or local norms (Ellickson 2009). This finding is too often ignored in policy making (Ostrom, Janssen, and Anderies 2007) and it implies in our case that not all societies might be immediately compatible for the modern Western concept of democracy and reap all its benefits. This is an important lesson for politicians and activists when “experimenting” with democracy outside the laboratory, be it on the workplace, local communities or political systems.

China has a long tradition of emphasizing moral leadership against the role of deterrent formal law in regulating society. The use of deterrent law was seen by Confucian thinkers as already reflecting a failure of the moral order to obey authorities. Hence, the Confucian state saw itself less as an enforcer of rules but as an educator, mainly via moral example (Huang 2006). Paradoxically, this criticism of formal rules was radicalized under Maoist rule which exclusively focused on moral indoctrination (Madsen 1984). Since the inception of reforms, formal rules have been strengthened considerably. Yet, there continues to be a strong role of moral leadership. Especially, the experimental approach in Chinese politics allows for a large scope of local variety and deviance, thus violating prevailing formal laws (Heilmann 2008). Once these experiments are legitimized by changes of formal laws, these laws actually support pre-existing practice, thus have a strong component of moral acceptance, and less of legal enforcement and implementation. In this peculiar institutional setting, the question looms large where the original legitimacy of deviating action can stem from. These are mostly informal groups in which leaders push the case for particular actions. So, for example, as Tsai (2007) has shown, successful production of public goods and local economic development in Chinese villages do not build on formal political

institutions, even including democratic structures such as elections, but on moral leadership in traditional social groups such as lineages or temple associations.

The central claim in our paper is that the fundamental difference between Western and Chinese society lies in the expressive functions of the law and the role of moral authority in establishing commitment to the law. In Western societies, the expressive function roots in the conviction that law should express the opinion of the majority of the people, i.e. democracy. Therefore, democratically established non-deterrent laws lead to stronger rule compliance and cooperation. In China, the majority opinion is not necessarily seen as expressing the appropriate moral standards. However, our findings should be interpreted cautiously with respect to any extrapolations to democracy in China in the long-term. Although the norms and values of obeying to authorities has its roots in Confucianism norms and values, these can change over time and/or with the introduction of new institutions.

The most prominent literature on the effects of democracy highlight two major benefits: accountability of leaders through looming re-election (Barro 1973) and selection of more honest and competent politicians (Besley 2005) leading to more equitable, pro-poor and efficient provision of public goods (Sen 1981, Deacon 2009). Similar positive findings are also reported from village elections in China (Zhang et al. 2004, Wang and Yao 2007, Meng and Zhang 2011) with a decrease of income inequalities through more pro-poor public investment (Shen and Yao 2008). However, Shi (2000) analyzed attitudes and values towards democracy in China and found that people living in areas where these “semicompetitive local elections” were held people’s attitudes towards power and authority have not yet changed. Similarly, as previously mentioned, Tsai (2007) presents empirical evidence that the performance in local public good production in Chinese villages is not improved by the existence of democratic voting procedures, but by enhanced accountability of local leaders in the context of social networks such as kinship

relations, thus establishing and maintaining traditional paternalistic patterns, i.e. accountable authority. Thus, when and whether a changing value system will ignite is an open question.

Our study sheds some light on the process eventually leading to the democracy premium. Consistent with theories that posit education to be the foremost driver for political change we also find a less negative democracy premium in the student sample and that students in general have weaker norms of obeying authorities. In the literature following the Hofstede approach values are often seen as cultural endowments that only change in the very long run and therefore act as constraints on institutional change (Roland 2004). However, this view is strongly criticized by anthropologists who emphasize cultural creativity and agency, thus paradoxically adopting an approach that comes closer to the economic stance of individualism (Beugelsdijk and Maseland 2010: 9ff., 77ff.). This implies, in particular, that there is a strong interdependence between institutions and values, such that institutions become ‘performative’ in the sense of Herrmann-Pillath (2013): That means, existing institutions foster certain values, and these values in turn create preferences for certain institutions (for a related argument in social psychology, see Yamagishi (2010)). These effects are well-established in the experimental literature on intrinsic and extrinsic motivation: Bowles and Polanía-Reyes (2012) discuss a vast array of studies showing that social preferences are endogenous to the settings of experiments, hence the rules and how they are implemented. In particular, there are strong framing effects that result from differences in interpreting rules and incentives. Incentives can obtain an ‘expressive’ function in showing what socially acceptable behavior is, and how different behaviors affect one’s own self-perception and identity. Clearly, these interdependences result into ‘cultural’ difference of behavior if different populations with different interpretive frames are compared. Yet, this does not imply that these cultural differences are stable over the long run, even if we can identify similarities over time. If the hypothesis of strong ‘field dependence’ (Nisbett 2003) of Chinese

subjects is valid, we would expect strong effects of institutional changes on behavior which would contradict culturalist approaches. Similarly in many western countries with the emergence of a political powerful middle classes and/or the introduction of democracy, the power of authorities has been progressively eroded and self-expression values became more widespread (e.g. in Germany or Japan after the Second World War). Also, the example of Taiwan highlights that with a real “big push” a well-functioning democracy can be established in a Chinese cultural context.

5. Conclusion

In our study on Chinese behavior in the context of public goods games we show that a democratically elected non-deterrent law performs worse than the same law being enacted top-down in eliciting cooperation. Also, democratically elected law was not statistically significant superior to exogenous imposition of no law. Our results are robust for a more modern (student) and more traditional (worker) subsample within China and hold when controlling for rule effect and information effect of democracy. While we see some evidence for transition with the more modern student subsample being more receptive to democracy, we neither find an information effect of elections nor an effect for conditional cooperators on contributions under democratic rule or in their information processing. Overall, the weighted effect of democratic rule is negative and significant (-0.61***). We find the strongest negative democracy effect for proponents of the law when the law is not implemented. These findings are in stark contrast to previous results from western democratic countries (Tyran and Feld 2006, Sutter, Haigner, and Kocher 2010, Dal Bó, Foster, and Putterman 2010).

In order to explain these differences we analyze the determinants of the effectiveness of top-down policy making within our two samples. We find a strong positive correlation between

the effectiveness of exogenous top-down implementation and high norms of obeying authorities at the individual level both for students and workers. When people have weaker norms of obeying to authorities we find a positive significant democracy effect for yes-voters when the rule is implemented and no positive effect of no-voters to an exogenous implementation (thus they do not obey the top-down policy). When people have strong norms of obeying authorities both yes-voter and no-voter obey strongly to the exogenous law and cooperate. We believe that the difference of our results in China to other studies in Western countries can be explained by the hierarchical and status oriented character of the Chinese society, emphasizing the role of moral leadership and example in promulgating cooperation and civil order in society. From our findings it follows that the transformation of countries into democratic ones is barely achieved by holding democratic elections. More important are policies that change societal values. This calls for supporting democratic grassroots initiatives and maintaining freedom of expression.

BJÖRN VOLLAN: University Innsbruck, Department of Public Finance, Universitätsstraße 15, 6020 Innsbruck, Austria.

YEXIN ZHOU: Beijing Normal University, School of Development Studies, School of Economics and Resource Management, No. 19, Xijiekouwai Street, Beijing 100875, China

ANDREAS LANDMANN: University of Mannheim, Department of Economics, L7, 3-5, 68131 Mannheim, Germany.

BILIANG HU: Beijing Normal University, School of Development Studies, School of Economics and Resource Management, No. 19, Xijiekouwai Street, Beijing 100875, China

CARSTEN HERRMANN-PILLATH: Frankfurt School of Finance & Management gmbH; Academic Director, East-West Centre for Business Studies and Cultural Science and Master of International Business Programme, Sonnemannstrasse 9-11, 60314 Frankfurt am Main, Germany.

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TABLES AND FIGURES

TABLE I

Different treatments for the one-shot public goods game consecutively played in experimental rounds

	Student sample (n=150)		Worker sample (n=149)	
	No law implemented	Mild law implemented	No law implemented	Mild law implemented
Exogenous imposed (top-down)	<i>ExoNoLaw</i>	<i>ExoLaw</i>	<i>ExoNoLaw</i>	<i>ExoLaw</i>
Endogenously chosen (voted)	Endo0, (Endo1)	(Endo1), Endo2	Endo0, (Endo1)	(Endo1), Endo2

Note. The benchmark case is the *ExoNoLaw* case: There is no law, and the participants cannot vote to apply a punishment. This differs from the setting where participants vote to reject a rule that applies a punishment (Endo0). Next we distinguish between the setting where a punishment rule is imposed by the experimenter (*ExoLaw*) and where the participants vote in favour of such a rule (Endo2). In Endo1 it depends on the person being a Yes or No voter whether the rule will be implemented or not.

TABLE II

Major characteristics of the student and worker sample

	Mean Value		T-Value	Numbers of	
	Students	Workers		Students	Workers
Demographics					
Age	21.71	33.96	-17.17***	150	144
Gender ^a	1.68	1.20	8.36***	150	147
Education ^b	6.37	3.23	28.15***	150	149
Income ^c	381	2266	-20.11***	81 ^g	143
Owe ^d	0.07	0.24	-4.17***	150	145
Life satisfaction ^e	5.95	5.97	-0.11	149	149
Willingness to take Risk ^f	4.68	5.04	-1.45	149	149
Factors					
Obey to authority	-0.46	0.49	-9.14***	147	138
Demand of punish	0.07	-0.08	1.25	147	138
Locus of control	0.06	-0.06	0.99	148	141
Collectivism	0.04	-0.04	0.61	148	140
Competitiveness	-0.16	0.17	-2.89***	148	140
Cooperation type					
Conditional cooperator	0.47	0.51	-0.63	150	149
Freerider	0.14	0.05	2.76***	150	149
Other	0.32	0.34	-0.41	150	149
Altruist	0.01	0.07	-2.95***	150	149
Triangle	0.06	0.03	1.40	150	149

Note. Significance levels: *p < 0.1, ** p < 0.05, *** p < 0.01. Comparative summary of major characteristics of the student and worker sample according to three different classes: socio-demographic properties; attitudes and values as extracted from a set of attitudinal questions by means of factor analysis; types of players as determined by running a first experimental round asking the subjects to make conditional or unconditional contributions. Note: a) Men = 1 Women = 2; b) 1=Elementary, 2=Junior High School, 3=Senior High School, 4=Open University, 5=associate degree(full-time), 6=Bachelor Degree(full-time), 7=Master's Degree(full-time); c) Yuan per month; d) owe money, labor with a value higher than 1000 Yuan 0=No, 1=Yes; e) 9-point scale, 1 (worst possible life) to 9 (best possible life); f) 9-point scale, 1 (not willing to take risk) to 9 (highly willing to take risk); g) As most missing value of students' income actually should be 0, this mean for students is much overestimated.

TABLE III

Descriptive Analysis between treatments and for the full sample between Yes voters (n=173) and No-voters (n=126)

	Mean contribution		Mean difference between No and Yes Voter
	No voter	Yes voter	
Contrib. <i>ExoNoLaw</i>	3.80	5.92	-2.12***
Contrib. Endo	3.58	6.90	-3.32***
Contrib. <i>ExoLaw</i>	4.83	7.56	-2.72***
Contrib. Endo0	3.36	4.29	-0.92**
Contrib. Endo1	3.45	8.02	-4.57***
Contrib. Endo2	4.36	8.07	-3.713***
N	173	126	
	Mean difference		
ExoLaw vs <i>ExoNoLaw</i>	1.03***	1.63***	
Endo vs ExoLaw	-1.25***	-0.65	
Endo vs <i>ExoNoLaw</i>	-0.21	.98 **	
Endo0 vs Endo1	-.08 IE	-3.73***	
Endo1 vs Endo2	-0.91***	-0.06 IE	
Endo0 vs <i>ExoNoLaw</i>	-0.43 ** DENL	-1.63*** DENL	
Endo2 vs ExoLaw	-0.47 DEL	0.52* DEL	

Note. The upper panel shows mean contribution for Yes- and No-voters and their mean difference stated with corresponding t-values (two-sided t-test). Generally, Yes voters make higher contributions irrespective of the treatment. The lower panel displays t-values separated for yes and no voters for all possible treatment combinations. We identify the two information effects (IE) as being insignificant. The two democracy effects when law is not implemented (DENL) are negative significant both for Yes and No voters. The democracy effects when law is implemented (DEL) is positive significant (10%) for the Yes voters and negative but insignificant for No-voters.

TABLE IV

OLS regression with robust standard errors explaining differences in contribution levels between exogenous and endogenous treatment for the pooled sample and each subsample

(Contrib. ExoLaw – Contrib. Endo)	All		Students		Workers	
	coef.	s.e.	coef.	s.e.	coef.	s.e.
Student	1.08	(1.06)				
Age	0.058	(0.046)	0.039	(0.26)	0.033	(0.052)
Gender	0.55	(0.62)	1.01	(0.75)	-1.00	(1.18)
Education	-0.13	(0.29)	0.90	(0.96)	-0.42	(0.36)
Owe money	0.14	(0.74)	0.18	(1.46)	0.11	(0.94)
Life satisfaction	0.18	(0.18)	0.25	(0.27)	0.22	(0.26)
Willingness to take risk	-0.089	(0.13)	-0.047	(0.20)	-0.075	(0.18)
Conditional cooperator	0.57	(0.53)	0.19	(0.72)	0.87	(0.86)
Free rider	0.34	(0.88)	-1.33	(1.00)	4.21**	(1.79)
Obeys to authority	0.96***	(0.30)	0.97**	(0.42)	0.93**	(0.43)
Demand of punish	0.43*	(0.25)	0.36	(0.33)	0.41	(0.43)
Locus of control	-0.12	(0.27)	-0.78*	(0.40)	0.11	(0.39)
Collectivism	0.38	(0.26)	0.62*	(0.35)	0.36	(0.41)
Competitiveness	-0.39	(0.26)	-0.15	(0.36)	-0.45	(0.40)
Constant	-2.27	(2.28)	-8.31*	(5.01)	0.65	(3.08)
N						
R-squared	268		144		124	

Note. Explanatory variables are a dummy for the student sample, socio demographic variables, experimental measures of conditional co-operator and free-rider, and the factors.

TABLE V

Subsample analysis for below (left) and above (right) average of the factor obey authority, treatments and whether person is Yes or No-voters.

	(a)		(b)	
	Democracy effect low obey		Democracy effect high obey	
	Mean contribution		Mean contribution	
	No to rule	Yes to rule	No to rule	Yes to rule
Contrib. <i>ExoNoLaw</i>	3.01	5.75	4.47	6.04
Contrib. Endo	2.78	7.54	4.28	6.46
Contrib. <i>ExoLaw</i>	3.19	7.21	6.25	7.80
Contrib. Endo0	2.85	4.02	3.81	4.47
Contrib. Endo1	2.92	8.46	3.89	7.70
Contrib. Endo2	2.86	8.62	5.65	7.69
N	80	52	93	74
	Mean Difference		Mean Difference	
<i>ExoLaw</i> vs <i>ExoNoLaw</i>	0.18	1.46**	1.77***	1.76***
Endo vs <i>ExoLaw</i>	-0.41	0.33	-1.97***	-1.34***
Endo vs <i>ExoNoLaw</i>	-0.24	1.79***	-0.19	0.42
Endo0 vs <i>ExoNoLaw</i>	-0.16 DENL	-1.73*** DENL	-0.67** DENL	-1.57*** DENL
Endo2 vs <i>ExoLaw</i>	-0.32 DEL	1.40** DEL	-0.60 DEL	-0.11 DEL

Note. The upper panel shows mean contribution for Yes- and No-voters. The lower panel displays mean differences stated according to their t-values separated for yes and no voters for the four democracy effects. The information effects are again insignificant (not shown). For the low obey subsample there is a substantial and significantly positive democracy effect for yes voters under law implementation and only the democracy effect under non-implementation for yes voters is significantly negative. In contrast, all four democracy effects in the high obey subsample are negative, two of them significantly

TABLE VI
Mean contribution of student vs. workers, three regimes

	Mean Value			Mean difference between Students and Workers
	All	Students	Workers	
Voted Law		0.33	0.52	-0.19***
Contrib. <i>ExoNoLaw</i>	4.69	2.97	6.42	-3.45***
Contrib. Endo	4.98	3.67	6.30	-2.63***
Contrib. <i>ExoLaw</i>	5.98	4.54	7.43	-2.89***
Contrib. Endo0	3.75	2.61	4.90	-2.29***
Contrib. Endo1	5.37	4.08	6.67	-2.59***
Contrib. Endo2	5.92	4.74	7.11	-2.37***
N	299	150	149	
Mean Difference				
<i>ExoLaw</i> vs <i>ExoNoLaw</i>	1.29***	1.56***	1.01***	
Endo vs <i>ExoLaw</i>	-1.00***	-0.87***	-1.13***	
Endo vs <i>ExoNoLaw</i>	0.29	0.70***	-0.12	
Endo0 vs <i>ExoLaw</i>	-2.23***	-1.93***	-2.53***	
Endo1 vs <i>ExoLaw</i>	-0.61***	-0.46	-0.76**	
Endo2 vs <i>ExoLaw</i>	-0.06	0.20	-0.32	

Note. The results highlight two insights. First, contribution levels in the worker sample are consistently higher than the contribution levels of the student sample. Second, in both samples the contribution levels in the *ExoLaw* regime are the highest, and there is no substantial “democracy effect” of the Endo regime (see discussion in the main text). However, students also show a positive effect of the Endo regime relative to the *ExoNoLaw* regime.

TABLE VII

Contribution differences between *ExoNoLaw* and other decisions for different subpopulations;
Descriptive results versus regression controlling for round effects

	(1) Student/ No-voter			(2) Worker/ No-voter			(3) Student/ Yes-voter			(4) Worker/ Yes-voter		
	Descriptive difference	Panel regression	p-value	Descriptive difference	Panel regression	p-value	Descriptive difference	Panel regression	p-value	Descriptive difference	Panel regression	p-value
ExoLaw	0.88	0.90**	0.95	1.25	1.25***	1.00	2.98	3.01***	0.96	0.78	0.78*	0.99
Endo0	-0.20	-0.27	0.86	-0.77	-0.60	0.71	-0.69	-0.72	0.96	-2.24	-2.53***	0.54
Endo1	-0.03	-0.097	0.85	-0.81	-0.64	0.71	3.45	3.42***	0.96	1.23	0.94*	0.54
Endo2	0.95	0.88**	0.85	0.01	0.18	0.71	3.45	3.42***	0.96	1.32	1.03**	0.54
Round		-0.15			0.33*			-0.092			-0.44**	
N	505			360			245			385		

Note. The descriptive difference is compared to the corresponding Panel regression coefficients of contributions on round and game type with individual fixed-effects. The p-values give significance levels of a test on equality between the two. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$, for each individual five contribution decisions are in the data (NoLaw, ExoLaw, Endo0, Endo1, Endo2). Observations in EndoPay are dropped.

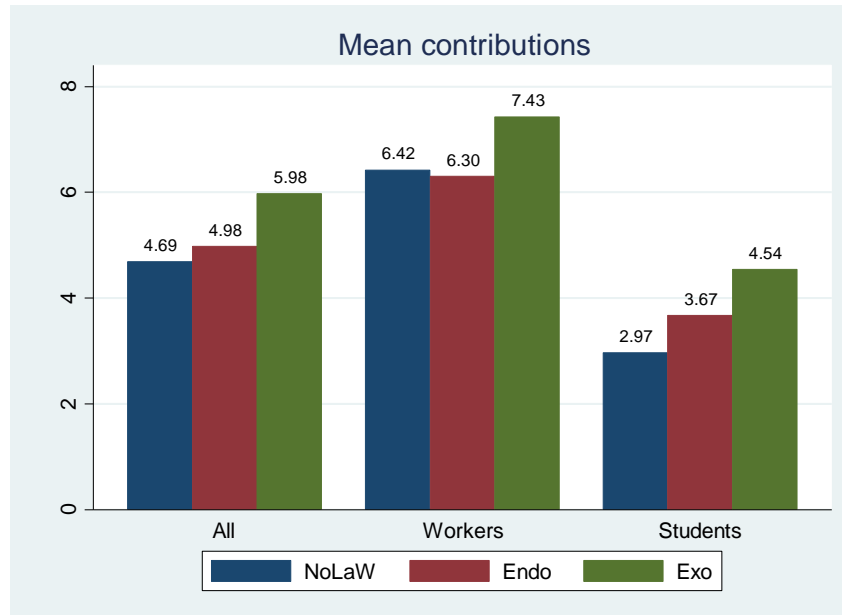


FIGURE I
Mean Contribution in the pooled sample (n=299)

The difference *ExoLaw* vs *ExoNoLaw* (1.29, t-value 5.56***) and *Endo* vs *ExoLaw* (-1.00, t-value -4.21***) are highly significant while the difference between *Endo* vs *ExoNoLaw* (0.29, t-value 1.31) is insignificant.

APPENDIX

APPENDIX 1:

Session	Round			
	2	3	4	5
1	Endo	ExoLaw	NoLaw	EndoPay
2	Endo	NoLaw	EndoPay	ExoLaw
3	NoLaw	EndoPay	Endo	ExoLaw
4	ExoLaw	EndoPay	NoLaw	Endo
5	EndoPay	Endo	ExoLaw	NoLaw
6	Endo	ExoLaw	NoLaw	
7	Endo	NoLaw	ExoLaw	
8	NoLaw	Endo	ExoLaw	
9	ExoLaw	NoLaw	Endo	
10	Endo	ExoLaw	NoLaw	

Chronologic treatment plan, by session and round: The first round is omitted as at the beginning of each session we tested for conditional cooperation. We did not conduct *EndoPay* with workers (sessions 6-10). We arrange different treatments at random as the table shows to avoid round effect.

APPENDIX 2:

Session	Round			
	NoLaw	ExoLaw	Endo	EndoPay
1	4	3	2	5
2	3	5	2	4
3	2	5	4	3
4	4	2	5	3
5	5	4	3	2
6	4	3	2	
7	3	4	2	
8	2	4	3	
9	3	2	4	
10	4	3	2	

Round number for different games, by session.

APPENDIX 3:

Session	NoLaw	ExoLaw	Endo	EndoPay
students	2	2	2	2
	3	3	2	3
	4	4	3	3
	4	5	4	4
	5	5	5	5
workers	2	2	2	
	3	3	2	
	3	3	2	
	4	4	3	
	4	4	4	

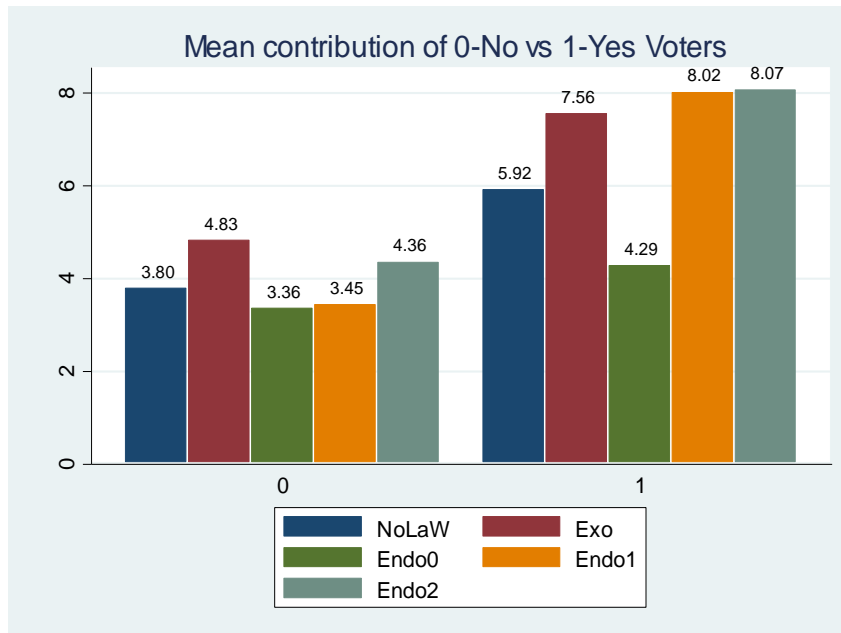
List of rounds in which treatments are played, by student/worker: This table helps to detect whether certain treatments were systematically played in later/earlier rounds.

APPENDIX 4:
Responses to attitudinal questions

	Mean Value		T-Value	Std. Dev.		Number of	
	Students	Workers		Students	Workers	Students	Workers
Working/living atmosphere^a							
Most people in this university (factory) are basically honest and can be trusted.	1.93	2.14	-2.76***	0.47	0.68	150	148
People in this university (factory) are mostly interested in their own well-being.	2.09	1.99	1.92*	0.56	0.67	150	146
In this university (factory) one has to be alert, or someone will take advantage of you.	2.96	2.61	4.73***	0.54	0.71	150	147
If you have a problem there is always someone in this university (factory) to help you.	1.89	1.97	-1.56	0.49	0.47	150	148
Items of the Factors^a							
People who break the law should be given stiffer sentence.	2.57	2.34	2.49***	0.65	0.70	150	146
Schools should teach children to obey authority.	3.27	2.84	5.38***	0.55	0.70	150	147
Young people today do not have enough respect for traditional values.	2.07	2.05	0.33	0.56	0.53	150	148
People don't know the difference between right and wrong anymore.	2.58	2.61	-0.43	0.69	0.72	149	145
Our leaders know what is best for us.	2.97	2.23	8.86***	0.67	0.65	148	145
Obedience and respect for authority are the most important values children should learn.	3.27	2.64	6.84***	0.72	0.80	150	147
Getting promotions is about hard work and persistence, not who you know.	1.86	2.12	-3.04***	0.66	0.72	148	146
Most people can learn to be leaders- it's not a matter of birth.	2.06	2.03	0.63	0.68	0.72	148	145
I am very persevering – and I usually accomplish what I set out to do.	2.04	1.95	1.57	0.56	0.56	148	146
Because no one can predict the future there is little point in making plans.	3.11	2.99	1.92*	0.61	0.62	148	142
Winning is everything.	2.95	2.78	2.3**	0.67	0.71	148	145
When another person does better than I do, I get tense and aroused.	2.16	2.15	0.20	0.54	0.58	148	144
Without competition it is not possible to have a good society.	2.13	2.00	1.67*	0.64	0.54	148	145
I feel good when I co-operate with others.	1.9	1.97	-1.26	0.48	0.43	148	143
It is my duty to take care of my family, even when I have to sacrifice what I want.	1.91	1.92	0.00	0.62	0.58	148	142
I respect the majority's wishes in groups of which I am a member.	1.91	1.92	-0.25	0.42	0.38	148	142
I am more likely to accomplish my goals if I work by myself.	2.53	2.33	2.48***	0.68	0.63	148	144

The questions are standard questions that aim at identifying attitudinal stances with reference to psychological patterns such as collectivism, respect for authority or attitudes towards competition and locus of control. The table represents the order the questions were asked in the ex-post questionnaire. Statistically significant differences between workers and students emerge especially regarding the general level of trust (which is higher in the worker sample) and the attitude towards authority (students are less supportive of norms of obedience). a) 4-point scale: 1 (strongly agree), 2 (agree), 3 (disagree), 4 (strongly disagree).

APPENDIX 5:



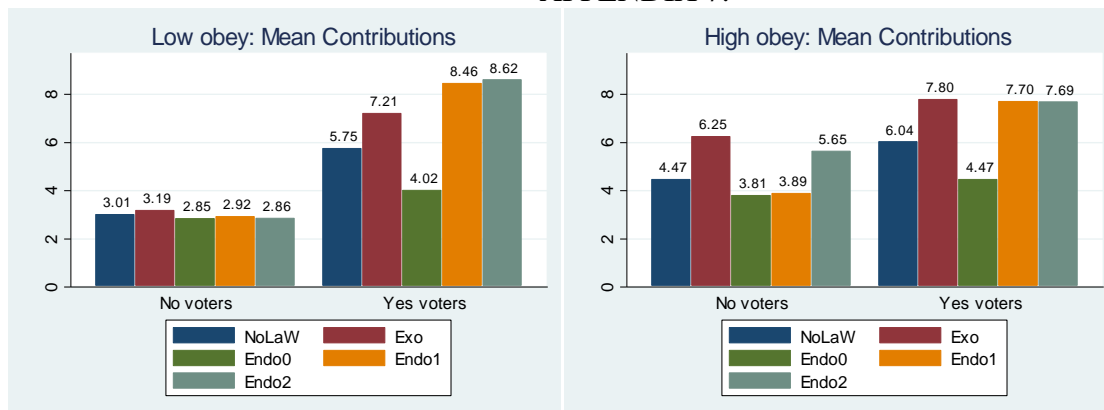
Mean contribution of No- versus Yes-voters depending on information about shares of rule supporters (graphical illustration of Table III in the main text). Contribution levels in the *Yes* sample are consistently higher than the contribution levels of the *No* sample. In the *No* voter and *Yes* subsample, *ExoLaw* rule results into higher contribution than *ExoNoLaw*. *Endo* generate more contribution than *ExoNoLaw* and *Endo2* also a contribution more than *ExoLaw* in *Yes* subsample. The information effects, defined as *Endo1* vs. *Endo2* of those voting “yes” and *Endo0* vs. *Endo1* of those voting “no”, are not significant.

APPENDIX 6:

	Low obey	High obey
	Mean Value	
Contrib. <i>ExoNoLaw</i>	4.09	5.17
Contrib. Endo	4.65	5.25
Contrib. <i>ExoLaw</i>	4.77	6.93
N	132	167
	Mean Difference	
<i>ExoLaw</i> vs <i>ExoNoLaw</i>	0.68*	1.76***
Endo vs <i>ExoLaw</i>	-0.12	-1.68***
Endo vs <i>ExoNoLaw</i>	0.56*	0.07

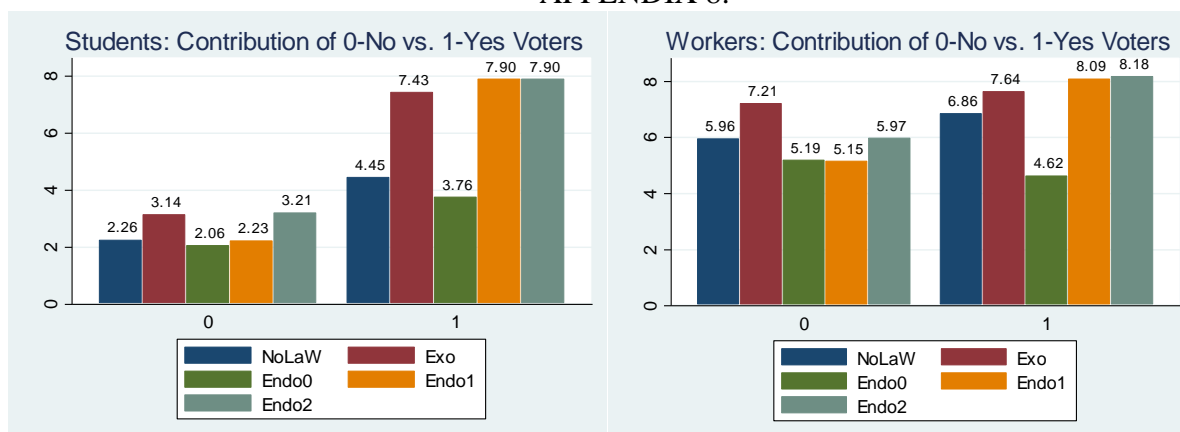
Descriptive Analysis between treatments, by Low obey (n=132) and High obey (n=167)

APPENDIX 7:



Mean Contribution between treatments by voter type for subsamples of Low obey (n=132) and High obey (n=167).

APPENDIX 8:



Mean contribution of No- versus Yes-voters depending on regime and information about shares of rule supporters, separately for students (left) and workers (right). A visual inspection of the graphs suggests that there is no information effect (Endo0 = Endo1 for No voters, Endo1 = Endo2 for Yes voters). Again, we find slightly positive democracy effects when the rule is implemented for Yes voters (Endo2>ExoLaw) and substantial negative democracy effects if the rule is not implemented (Endo0<NoLaw). In tendency, the negative democracy effects under no implementation become stronger in the worker subsample and for rule supporters.

Supplementary Online Appendix:

The following pages are not intended to be published. They will be made available on the homepage of the journal.

They are included here for the convenience of the reviewers, but are not essential for the main paper.

1.1 Factor analyses

Factor analysis of the responses to the attitudinal questions allows for clustering a set of six more general attitudinal stances (Table I). We use these factors to explain the observed behavior in the experiments:

1. “Obey authority” reflects the tendency to expect obedience from subordinates, which in the Chinese case refers to the Confucian value of “filial piety” (obedience to parents and elders). In the cited literature on cross-cultural value comparisons, attitudes towards authority are mostly measured by the indicator of ‘power distance’, based on questions such as whether subordinates should always obey to the superiors, or whether rank should be reflected in privileges. However, these indicators might also capture intolerance, aggression, and conservatism that differ from authoritarianism ([Feldman 2003](#)). Recent works have reached the conclusion that child-rearing values are a better indicator of authoritarianism since they avoid reference to specific political situations ([Stenner 2005](#)). Especially good measure is the world value survey item “whether one considers it especially important for children to learn obedience”. Related measures to obeying authorities with apparently better cross-country comparability are the ‘power distance dimension’ ([Hofstede 1980](#)) or the ‘vertical vs. horizontal self-construal’ where vertical type differentiates the self according to social status, ages, or genders ([Triandis 1990](#), [Triandis and Gelfand 1998](#)).
2. “Demand for punishment” reveals dissatisfaction with societal states in which deviance is not adequately sanctioned.

3. "Locus of control" gives information about the degree by which an individual perceives herself to be in charge of actions taken and believes that action results are determined by individual efforts.
4. "Collectivism" reflects the tendency to subordinate individual interest to the interest of the group to which the individual assigns herself.
5. "Competitiveness" manifests the willingness of the individual to compete against others and to perceive individual satisfaction in terms of performance in competitive contexts.

TABLE I

Results of factor analysis of attitudinal questions

Factors	Items	Loadings					
		1	2	3	4	5	6
Obey authority (33%) ^a	Schools should teach children to obey authority.	0.828					
	Our leaders know what is best for us.	0.604					
	Obedience and respect for authority are the most important values children should learn.	0.839					
Demand for punishment (25%)	People who break the law should be given stiffer sentence.		0.483				
	Young people today do not have enough respect for traditional values.		0.660				
	People don't know the difference between right and wrong anymore.		0.813				
Locus of control (40%)	Getting promotions is about hard work and persistence, not who you know.			0.703			
	Most people can learn to be leaders- it's not a matter of birth.			0.722			
	I am very persevering – and I usually accomplish what I set out to do.			0.687			
	Because no one can predict the future there is little point in making plans.			0.339			
Collectivism (23%)	I feel good when I co-operate with others.				0.701		
	It is my duty to take care of my family, even when I have to sacrifice what I want.				0.566		

	I respect the majority's wishes in groups of which I am a member.	0.622
Competitiveness	Winning is everything.	0.580
(20%)	When another person does better than I do, I get tense and aroused.	0.627
	I am more likely to accomplish my goals if I work by myself.	0.692

Factor analysis of the responses to the attitudinal questions allows for clustering a set of six more general attitudinal stances: Obey authority, Demand for punishment, Locus of control, Collectivism and Competitiveness. All of the response directions to these questions are adjusted in the data. Original data was recoded in order to have larger values (4) correlate positively with the factor. Thus, the scale of most variables in APPENDIX 8 of the Maintext were changed so that 4=strongly agree. Extraction method: The eigenvalues of the factors were all >1; The used Kaiser-Meyer-Olkin measure was always > 0.6, therefore acceptable for factor analysis. The items of the factors "Obey authority" and "Demand for punishment" were examined together. The items of "Collectivism" and "Competitiveness" factors were considered together, one item was removed. The locus of control factor includes all four examined items. a) The percentages represent the proportion of explained variance.

1.2 Formal identification of partial effects

Subsequently, we try to disentangle different effects that work behind the generation of the results. Following earlier related contributions, we need to consider different factors that may influence the behavior of the subjects.

Let us consider the contributions for individual i under any scheme, resulting from the combination of the following effects:

1. $Contr_{i,NoLaw}$ is the baseline contribution under no law and no democracy;
2. $\alpha_{i,ExoLaw}$ is the effect of an exogenous rule;
3. $\alpha_{i,Demo(Law)}$ is the additional rule effect if it is chosen democratically
4. $\alpha_{i,Demo(NoLaw)}$ is the effect on top of $Contr_{i,NoLaw}$ if no rule is democratically chosen
5. $\alpha_{i,Info\#}$ is the information effect of observing $\#$ co-players voting for a rule (relative to some expected number)

So, we have:

$$Contr_i = Contr_{i,NoLaw} + \alpha_{i,ExoLaw} Law + \alpha_{i,Demo(Law)} Law \square Endo + \alpha_{i,Demo(NoLaw)} (1 - Law) \square Endo + \alpha_{i,Info\#} \quad (1)$$

Information Effect ($\alpha_{i,Info\#}$)

We can identify $\alpha_{i,Info2} - \alpha_{i,Info1}$ for *Yes* voters and $\alpha_{i,Info1} - \alpha_{i,Info0}$ for *No* voters, as indicated in the main text. In both cases the information on co-player types varies without changing other circumstances:

$$\alpha_{i,Info2} - \alpha_{i,Info1} = Contr_{i,Endo2} - Contr_{i,Endo1} \quad \text{for Yes voters}$$

$$\alpha_{i,Info1} - \alpha_{i,Info0} = Contr_{i,Endo1} - Contr_{i,Endo0} \quad \text{for No voters}$$

In both cases the effect is very small and statistically indistinguishable from zero (shown in Table 1 in the main text / Appendix 4). If there was an information effect, this should mean a change in $\alpha_{i,Info\#}$ depending on $Info\#$. Therefore we feel confident to assume $\alpha_{i,Info\#} = 0$ and hence:

$$Contr_i = Contr_{i,NoLaw} + \alpha_{i,ExoLaw} Law + \alpha_{i,Demo(Law)} Law \square Endo + \alpha_{i,Demo(NoLaw)} (1 - Law) \square Endo \quad (1^*)$$

Exogenous Rule Effect ($\alpha_{i,ExoLaw}$)

Here we simply compare contributions under *ExoLaw* vs. *ExoNoLaw*, because

$$\alpha_{i,ExoLaw} = Contr_{i,ExoLaw} - Contr_{i,ExoNoLaw}$$

The estimated effect is 1.29*** (see Table VI).

Democracy Effect ($\alpha_{i,Demo(Law)}$, $\alpha_{i,Demo(NoLaw)}$)

For the democracy effect, let us use special cases of equation (1*):

$$Contr_{i,Endo2} = Contr_{i,ExoNoLaw} + \alpha_{i,ExoLaw} + \alpha_{i,Demo(Law)} \quad \text{and} \quad Contr_{i,ExoLaw} = Contr_{i,ExoNoLaw} + \alpha_{i,ExoLaw}$$

$$\text{Hence} \quad \alpha_{i,Demo(Law)} = Contr_{i,Endo2} - Contr_{i,ExoLaw}$$

$$\text{Similarly} \quad \alpha_{i,Demo(NoLaw)} = Contr_{i,Endo0} - Contr_{i,ExoNoLaw}$$

In the data this on average looks as follows (computed from Table III in the main text):

Yes voters?	0	1	ALL
Democracy effect \	(N=173)	(N=126)	(N=300)
$\hat{E}[\alpha_{i,Demo(NoLaw)}]$	-0.43	-1.63	-0.94
$\hat{E}[\alpha_{i,Demo(Law)}]$	-0.47	0.52	-0.06

Weighting the two democracy effects with the proportion of groups where the rule is implemented (37 out of 100), we obtain an overall democracy effect of -0.61***. The variance of the overall democracy effect is calculated along the following lines¹⁰:

$$\begin{aligned} & Var(w_0 \hat{\alpha}_0 + w_1 \hat{\alpha}_1) \\ & = w_0^2 Var(\hat{\alpha}_0) + w_1^2 Var(\hat{\alpha}_1) + 2w_0 w_1 Cov(\hat{\alpha}_0, \hat{\alpha}_1) \end{aligned}$$

A common problem in the literature is that groups implementing the law are compared with non-implementing groups. This comparison obviously suffers from a selection problem, because groups enacting the law consist of a higher share of Yes voters. We avoid selection effects by having each participant making choices under all possible treatments: Groups enacting the rule consist of different types and more cooperative people are more likely to end up with the law enacted (selection effect). Simply comparing contributions with and without the rule in the endogenous setting would yield a biased estimate, because more Yes voters are in groups endogenously enacting the rule. Doing this ‘wrong’ across-subject design shows that contributions are 3.88 points higher where the rule is implemented. Note that there are more workers that support the rule than students and workers have higher contribution levels. However, the tendency of rule supporters to contribute more holds in both the student and the worker subsample. This means that there would be a selection effect in the endogenous schemes.

¹⁰ Estimating the respective variances and covariances by their sample analogues results in a standard deviation of the overall effect of 0.15. The exact calculation algorithm is available upon request.

Groups that enact a rule probably consist of more cooperative types. Accordingly, for rule supporting individuals Endo does much better than *ExoNoLaw* and not significantly worse than Exo while in the opponents subsample Endo does no better than *ExoNoLaw* and much worse than Exo.

1.3 Comparing our results to the literature

Local level studies suggest that democratic procedures make citizens respond more cooperative to the implemented policies; especially that policies or laws directed towards cooperation are more efficient when the policies or the laws have been elected in a democratic process. For example, this has been prominently stated by Ostrom ([1990](#)) in her design principles for successful local common pool resource management. When individuals affected by a resource regime participate in decision-making and modifying their rules those rules are more likely to be perceived as fair and tailored to the local circumstances. Bardhan ([2000](#)) found by analysing forty-eight irrigation systems in India that the quality of maintenance was lower for those where farmers perceived a local elite to have made the rules. Those farmers who responded that the rules have been crafted by most farmers had a positive attitude towards water allocation and higher rule compliance. Sekher ([2000](#)) found similar results for forest management in India and Yoder ([1994](#)) and Lam ([1998](#)) for farmer-designed-and-governed irrigation systems in Nepal. Also Swiss cantons that have higher democratic participation have lower tax evasion ([Pommerehne and Weck-Hannemann 1996](#)). Most studies on the relationship of participation at the workplace and productivity show also positive results ([Zwick 2004](#)) except Godard and Delaney ([2000](#)) and Cappelli and Neumark ([2001](#)). As argued throughout the main text, our results are in sharp contrast to a large number of experiments from western democratic countries

using different experimental designs (18-20). Not all setups are directly comparable, but we try to provide the essence of the most prominent studies in this section. Comparability is not a problem with the Tyran and Feld (2006). Because of our choice to implement the public good game as in (Tyran and Feld 2006), their numbers can be easily compared to our own. They find contribution rates of 30% under no law (*NoLaw*), 38% under exogenous mild law (*ExoLaw*) and 47% under endogenous rule choice (*Endo*)¹¹. This means that even if not all groups implement the rule, it still performs better than when a rule is set exogenously for everybody. In contrast to us, they cannot infer the voter type in the exogenous institutional settings, though. Sutter, Haigner and Kocher (2010) plays a public good game with rewards and peer punishment as two alternative rule options that can be added to a standard voluntary contribution mechanism either exogenously or by vote. They find a premium of about 8.5% when the institution is determined endogenously (effect of +1.7 when maximum contribution is 20, compare column 3 of table 4).

Dal Bó, Foster and Putterman (2010) is the paper we most closely relate to regarding the identification strategy for the democracy effect. They play prisoners' dilemma games with a possible fine as a rule that makes cooperation an additional equilibrium. Their outcome is the rate at which players play the cooperative strategy. In the Table III below we report contribution rates of *Yes* and *Novoters* under *ExoNoLaw*, *ExoLaw*, *Endo0* and *Endo2*. These figures are the basis to calculate the democracy effects (see Online Appendix 1.3). Additionally we calculate democracy effects under *no law* (DENL) and *law* (DEL) for *Yes* and *No* voters. All those numbers are available for the Dal Bó et al.'s paper (Dal Bó, Foster, and Putterman 2010), which makes it an interesting benchmark. We show our results separately for the worker and student sample, as the latter is probably more comparable to the student sample used in Dal Bó, Foster and Putterman

¹¹ Figures on mild exogenous law and no law are taken from Tyran and Feld (2006) (page147). Note that the contribution under *Endo* is calculated as the weighted average of the 40% endogenously implementing a mild rule (contribution rate 64%) and the 60% not implementing it (contribution rate 22%). Those numbers are given on page 149.

(2010). Most importantly, Dal Bó, Foster and Putterman (2010) find a large positive democracy effect under law implementation for *Yes* voters. We find no such positive effect in neither of our subsamples. To the contrary, we even find substantial negative democracy effects especially in the worker sample.

TABLE III

Comparison of democracy effects under *no law* (DENL) and *law* (DEL) for *Yes* and *No* voters between China's sample and Dal Bó et al.'s.

	China: Workers	China: Students	Dal Bó, Foster and Putterman (2010)
game	Public good game		Prisoners' dilemma
outcome	Contribution rates		Rates of cooperation
no: <i>ExoNoLaw</i>	60%	23%	4%
no: <i>ExoLaw</i>	72%	31%	42%
no: <i>Endo0</i> (no rule)	52%	21%	15%
no: <i>Endo2</i> (rule)	60%	32%	41%
yes: <i>ExoNoLaw</i>	69%	45%	24%
yes: <i>ExoLaw</i>	76%	74%	58%
yes: <i>Endo0</i> (no rule)	46%	38%	24%
yes: <i>Endo2</i> (rule)	82%	79%	82%

no: DENL	-8%**	-2%	11%
	(0.04)	(0.26)	(0.28)
no: DEL	-12%**	1%	-1%
	(0.02)	(0.86)	(0.95)
yes: DENL	-22%***	-7%	0%
	(0.00)	(16)	(0.97)
yes: DEL	5%	5%	24%***
	(0.19)	(0.18)	(0.01)

Note. Contribution rates from the China sample are equivalent to the rates displayed in Appendix 5. The prefix “yes” / “no” indicates the subsamples of *Yes* and *No* voters. The democracy effects under no law (DENL) are calculated by $Endo0 - ExoNoLaw$, democracy effects under law (DEL) by $Endo2 - ExoLaw$, p-values of differences are in brackets. Figures from (Dal Bó, Foster, and Putterman 2010) are copied from table 5, column 2 (p. 2215). In their paper $ExoNoLaw = ExoNot$, $ExoLaw = ExoMod$, $Endo0 = EndoNot$, $Endo2 = EndoMod$.

1.4 The Endogenous Pay Treatment (students only)

The treatment *EndoPay* (“pay for voting”) has not been tested by Tyran and Feld (2006). This treatment elicits behavior of subjects with a stronger preference for *ExoNoLaw* or *Law*. In case at least two subjects decided to pay the *Endo* treatment was implemented. In case less than two participants from the group of three were willing to pay 2 Yuan from their show-up fee (similar to 2 tokens) we randomly decided whether *ExoNoLaw* or *ExoLaw* was played (hence there was no prior default). Participants had to vote and contribute ($Endo0$, $Endo1$, $Endo2$, $ExoLaw$, $ExoNoLaw$) without knowing whether more than two participants had paid for the referenda. Our hypothesis was that especially those subjects who decided to pay and voted “yes” have the strongest positive democracy effect. In total 31% of students were willing to pay in order to vote. Already this figure shows a high acceptance of the idea of voting among Chinese

students. In Sutter, Haigner and Kocher (2010) the share of students participating in costly voting was 44% given lower costs (5% of endowment compared with 20% in our case). This might indicate our interpretation of students (especially the older ones) being in favour of democratic principles. The great majority, however, decided not to pay and voted against the law (69%).

The reason for deducting the money from the show-up fee instead of the endowment was to have comparable contribution decisions between treatments. Thus, irrespective of their decision to pay for voting, both in *NoEndPay* and *MildEndPay* participants had ten tokens endowment. Due to the higher complexity of this treatment we did not carry it out with the sample of workers. By using the strategy method in the endogenously chosen treatments we can further distinguish contributions conditional on the law being in place or not. Thus, we have all required decisions within one session in order to identify the democracy effect (including everybody's contribution decisions when enough group members decide to pay for voting).

TABLE IV

Student sample with the distinction between normal treatment and payment for the right to vote

	Mean Value		Mean difference between Normal and EndoPay
	Normal (Students)	EndoPay (Students)	
Pay for vote	--	0.31	--
Voted Law	0.33	0.31	0.02
Contrib. <i>ExoNoLaw</i>	2.97	2.83	0.14

Contrib. Endo	3.67	3.38	0.29
Contrib. ExoLaw	4.54	4.66	-0.12
Contrib. Endo0	2.61	2.64	-0.03
Contrib. Endo1	4.08	3.63	0.45*
Contrib. Endo2	4.74	4.96	-0.22
N	150	150	

Mean Difference

ExoLaw	vs	1.57***	1.83***
<i>ExoNoLaw</i>			
Endo vs ExoLaw		-0.87***	-1.28***
Endo	vs	0.70***	0.55**
<i>ExoNoLaw</i>			
Endo0 vs ExoLaw		-1.93***	-2.02***
Endo1 vs ExoLaw		-0.46	-1.02***
Endo2 vs ExoLaw		0.20	0.30

Average contributions are very similar in EndoPay as compared to Normal. Only contributions of Endo1 are slightly higher in Normal ($p < 0.10$). Also the differences between contributions under different decision types and their significance are very similar. Only in the comparison Endo1 vs ExoLaw the one in EndoPay is significant and the other in Normal not. In sum, effects found in the main analysis can be confirmed in the additional treatment. We do not find stronger democracy effects if people have to pay for voting.

TABLE V

Student sample comparison between No or Yes to rule subsamples under the distinction between normal treatment and payment for the right to vote

Students in Normal		Students in EndoPay	
Mean Value	Mean	Mean Value	Mean

	No to rule	Yes to rule	difference between No and Yes to rule	No to rule	Yes to rule	difference between No and Yes to rule
Contrib. <i>ExoNoLaw</i>	2.26	4.45	-2.19***	2.25	4.15	-1.9***
Contrib. Endo	2.35	6.41	-4.06***	2.17	6.11	-3.94***
Contrib. ExoLaw	3.14	7.43	-4.29***	3.77	6.65	-2.88***
Contrib. Endo0	2.06	3.76	-1.70**	2.20	3.63	-1.43**
Contrib. Endo1	2.23	7.90	-5.67***	2.15	6.98	-4.83***
Contrib. Endo2	3.21	7.90	-4.69***	3.90	7.34	-3.44***
N	101	49		104	46	
<hr/>						
Mean Difference						
ExoLaw vs <i>ExoNoLaw</i>	0.88**	2.98***		1.53***	2.50***	
Endo vs ExoLaw	-0.79**	-1.02		-1.07***	-0.80	
Endo vs <i>ExoNoLaw</i>	0.09	1.95***		-0.08	1.96***	
Endo0 vs Endo1	-0.17	-4.14***		0.05	-	3.35***
Endo1 vs Endo2	-.98**	0.00		-1.75***	-0.37	
Endo0 vs <i>ExoNoLaw</i> (DENL)	-0.20	-0.69		-0.05	-0.52	
Endo2 vs ExoLaw (DEL)	0.07	0.47		0.12	0.70*	

The students voting Yes significantly increase the contribution in all of the treatments for both of Normal and Endopay. The contribution changes of Yes/No-voters for different comparison are almost consistent. Compared with ExoLaw, Endo decrease the cooperation for No-voters in both of Normal and Endopay. Endo1 results in higher contribution than Endo0 for Yes-voters but Endo2 higher than Endo1 for No-voters. Again, there is no sign for an information effect (Endo1=Endo2 for yes voters, Endo0=Endo1 for no voters).

1.5 Determinants of rule choice

In the prior analysis we have seen that *Yes* and *No* voters contribute quite differently under the same circumstances. In particular, individuals in favour of an efficiency-enhancing rule seem to be more cooperative and contribute more, whether a rule is present or not. Correlating the voter type to other individual characteristics might give a better understanding of important differences between types. We hypothesize that determinants of rule choice are whether the person was identified to be a conditional co-operators or free-rider and factors for collectivism, individualism, locus of control, obey to authority, demand for punishment and some socio-demographic variables. We displayed the distribution of these variables and their factor loadings are displayed in tables S1-3. We further include a trend variable for each round to capture possible learning effects. The estimated Probit models for rule choice are shown in Table VI in Online Appendix.

We would expect that conditional co-operators would vote for the law in the endogenous treatment. Tyran and Feld ([2006](#)) analysed expectations of players and found that subjects expect higher compliance with mild law if many others express support for the law and that subjects tend to comply with the law if they expect many others to do so. Closely related to the concept of beliefs and expectation is the notion of conditional cooperation. While in the former the subjects have some uncertainty about the level of others contribution in the latter subjects are told the level of others contribution. Following Tyran and Feld ([2006](#)) we would thus expect that conditional cooperators are more likely to vote for the law as they will perceive the signal of others as valuable information about their likely contribution. Interestingly, we only find this relation for the student sample. Of the conditional co-operators in the student sample, 43 percent voted for the law and 23 percent of those who are not conditional co-operators voted for the law ($n=150$; $\chi^2=4.8$; $p<0.05$). In the worker sample it is the other way round. Of the conditional co-operators in the worker sample 46 percent voted for the law and 57 percent of those who are not

conditional co-operators voted for the law. In the student sample we only find a very weak effect of conditional co-operators on voting for the introduction of the law (sig. at 10% level) and selfish players are less likely to vote for the law (sig. at 5% level). In columns three and four we also find that conditional co-operators are more likely to pay money for the possibility of voting (sig. at 10% level). However, in the worker sample we surprisingly obtain a negative effect for conditional co-operators. Instead of using the possibility of signalling one's intention to the other workers, the workers who were conditional co-operators prefer not to have the law introduced. We conjecture that the already high contribution of the workers (average 6.2 in round 1) and the high social capital among them did make the law not necessary for the conditional co-operators; further, matching with the argument on information effects previously, workers might think that the introduction of the law would express mistrust into others, which contradicts their common knowledge in the shared workplace setting. Of those who voted not to have the law 29% contributed 8 and more points (17% contributed fully) when they knew the law was not enacted (i.e. they voted "no" and make their contribution knowing that only one other person voted for the law). Thus, the conditional co-operators do not necessarily change their behavior due to the possibility of voting but they also don't see the need for the law. Our results on conditional cooperators are rather weak and overall it seems that Chinese do not consider the voting information to be important, similarly we did not find an information effect on contributions (compare section Online Appendix 1.3). Also if we repeat the analysis for conditional cooperators only, we do not find an information effect (table available upon request). Hence there might be no reason to send the voting signal.

Interestingly, we see that workers who articulated to have a high demand for punishment are more likely to vote for the law. Thus, personal opinions that workers have about the society

greatly influence their decisions in the experiment. In the pooled sample the effect of the selfish types remains strong and negative and in addition we discover that risk taking in real life becomes positively related to voting for the law (as well as for paying to vote). This might have two reasons: First, people might be unsure about the “value of voting” and thus perceive its use as risky. For example it is also often found that more risk-loving people in developing countries are the first to take-up micro insurance because insurance is perceived as a new and risky product ([Giné, Townsend, and Vickery 2008](#)). Secondly, people might act strategically and vote for the law to increase other players’ contribution and at the same time do not comply to the law themselves; again, this matches with the incentive system analysis of the information effects, as the introduction of the law would be a signal that the majority of people are opportunists. This strategy could be profit maximizing but it seems rather unlikely given that contributions in endogenously chosen law are not much higher than without law. Also the correlation between risk taking and being a selfish type is zero in our sample and we find that in the case when a very risk-loving player (scale 7-9) votes “yes” and knows that one other player also voted for the law only four players contribute nothing, eight players less than ten, but the large majority of twenty two player contribute fully. Thus, we rather think that voting for the law was perceived as risky by some people in our sample.

TABLE VI

Probit regression of rule choice on possible determinants

	voted Yes		paid for voting		voted Yes		voted Yes	
	Student sample		Student sample		Worker sample		Pooled sample	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
conditional cooperator	0.16*	0.16*	0.12	0.17*	-0.14*	-0.27***	0.0004	-0.04
	(0.08)	(0.09)	(0.08)	(0.09)	(0.08)	(0.11)	(0.06)	(0.07)
free rider	0.21**	-0.26***	-0.02	0.03	-0.33**	-0.39***	-0.29***	-0.32***
	(0.10)	(0.10)	(0.12)	(0.14)	(0.15)	(0.15)	(0.08)	(0.08)
obey to authority		0.09		-0.04		-0.07		0.03
		(0.06)		(0.05)		(0.06)		(0.04)
demand of punish		-0.03		0.007		0.16***		0.03
		(0.05)		(0.04)		(0.06)		(0.03)
locus of control		0.01		0.02		0.08		0.04
		(0.05)		(0.05)		(0.05)		(0.04)
collectivism		0.004		0.03		-0.04		-0.003
		(0.05)		(0.05)		(0.06)		(0.04)
competitiveness		-0.03		0.03		0.006		-0.02
		(0.05)		(0.04)		(0.05)		(0.03)
age		-0.04		0.06*		-0.007		-0.01
		(0.04)		(0.03)		(0.01)		(0.01)
gender		-0.12		0.11		-0.14		-0.09
		(0.10)		(0.09)		(0.15)		(0.08)
education		0.22*		-0.18		-0.009		0.015
		(0.13)		(0.12)		(0.05)		(0.04)
owe money		0.34*		-0.07		-0.01		-0.007
		(0.20)		(0.20)		(0.12)		(0.09)

happiness	0.03		0.002		0.05		0.02	
	(0.04)		(0.04)		(0.04)		(0.03)	
life satisfaction	-0.02		-0.06		0.02		0.02	
	(0.04)		(0.04)		(0.04)		(0.03)	
willingness to take risk	0.04		0.07**		0.02		0.04**	
	(0.03)		(0.03)		(0.02)		(0.02)	
round	0.01	0.01	-0.12***	-0.06	-0.05	-0.02	-0.02	
	(0.03)	(0.04)	(0.04)	(0.05)	(0.06)	(0.03)	(0.03)	
student						-0.16***	-0.15	
						(0.06)	(0.11)	
Observations	150	143	150	143	149	124	299	267
r2_p	0.06	0.15	0.02	0.15	0.03	0.14	0.05	0.10

Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. In the student sample, conditional co-operators are more likely to vote for the introduction of the law ($p < 0.10$), free riders are less likely to vote for the law ($p < 0.05$), and conditional co-operators are more likely to pay money for the possibility of voting ($p < 0.10$). However, conditional co-operators of workers prefer not to have the law introduced. Thus this negative effect makes conditional co-operators not significant any more in pooled sample. Risk taking in real life becomes positively related to voting for the law for pooled sample and to paying for the law for students.

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Experimental protocol, decision sheet and visualization

When participants arrive

[Each participant arriving gets a random player number. Prepare cards with participant IDs corresponding to the seat numbers in the room, so that participants can be randomly allocated to seats.]

“Good afternoon, we are glad that you are participating in our experiment. You will learn in the lab what the experiment is about. In our experiment you will be divided into groups of three members. Therefore, we need a number of participants that is divisible by three. Now there are [xx] people present.”

If the number of show-ups is divisible by three: “We can now begin the experiment”.

[Participants are assigned a seat according to the player number. All participants are seated behind blinds facing outwards.]

If the number of show-ups is not divisible by three: “The number of participants needs to be divisible by three. Currently, xx people are present. Is there anybody who would like to leave voluntarily?”... “In case there are no volunteers, we will choose the participants by a lottery: Everybody has to draw a card with a participation ID on it. This number corresponds to the seat number. Those who draw a card with an X on it cannot participate and receive [the show-up fee].”

Basic instructions

Thank you all for coming today. In this experiment today you can earn a considerable amount of money you are permitted to keep and take home. You must understand that this is not [Name of experimenter] private money but given to him by their university for research. If you read the following instructions carefully, you can, depending on your decisions and the decisions of the other participants, earn a considerable amount of money. It is therefore very important that you listen to these instructions with care. We are interested in your decision during the experiment. However, there are no “right” or “wrong” answers.

The experiment is divided into four/five rounds. In each round the participants are divided into groups of three. You will therefore be in a group with two other participants. In each round, the composition of your group will change: your probability of interacting more than one time with the same two people is very low. You will not be informed of the identity of the other group members. You will be paid 10 Yuan for coming to the experiment plus the additional earnings that you have kept during one of the four experimental rounds.

During this experiment we will not speak in terms of Yuan, but in points. At the end of the experiment the total amount of points you have earned in the selected round will be converted to Yuan at the following rate:

$$1 \text{ point} = 1 \text{ Yuan}$$

After the experiment you have to answer a questionnaire. Then, each player will come one by one to [insert name of experimenter], who will hand out these earnings to you and you sign the receipt and are free to leave.

Some important remarks before we can start:

1. The experiment will take about two hours, including waiting time. If you find that this experiment is something that you do not wish to participate in for any reason, **or you already know that you will not be able to stay for the two hours**, please let us know immediately so that we can replace you with somebody else.
2. In the experiment, your identity will be kept anonymous. This means that except for [Name of experimenter], no one will come to know of your identity. I am interested only in the decisions made by you and not your identity. This is the reason that we will not ask your name in any of the experiment. We will identify your decision in the game with an identity card like this (show player ID card). Please do not lose this card.
3. It is very important that you understand the game. Therefore we will check your understanding by asking each of you test questions about the experiment. If you do not understand the experiment you may always ask the assistants to explain them. **But if you cannot answer the test questions after explaining them again, we will have to exclude you from the experiment and you will receive 10 YUAN from us.** Therefore, it is important that you listen to the instructions carefully.
4. We would like to keep the game anonymous, therefore, please do not discuss the game with each other. In case we find that you are discussing the game with other players, we will exclude you immediately from the game. In this case, you will not receive any money.
5. **If you have questions, always raise your hand and wait until one of the assistants comes to you. Then you can ask your question and the assistant will answer it. You are not allowed to talk to other participants during the experiment.** You are not allowed to leave the room without permission. Please switch off your mobile phones and PCs. If you violate this rule, you will be dismissed from the experiment and forfeit all payments.

Thank you in advance for your effort and time.

At the beginning of the game, each player will receive ten Points from us. Now you have to decide how many from the ten Points to put into a private account and how many into a group project. You may put any amount between 0 and 10 Points into the project.

Now let us assume that out of 10 Points, you put zero Points into the project. Ask the group:

Can you tell me how many Points there are in the project? How many Points does the player have in his private account? Have you understood this?

Now, let us assume that out of ten, you put one Point into the project. How many Points are in the project? How many Points does the player have in his private account? (Carry on with examples for 2, 5, 10Points). Have you understood this part? Do you need additional examples?

The following will happen with Points you contributed to the project: [Name of experimenter] will add 0.5 Points to each Points you and the other two group members contributed to the project. For example, if you put 0 Points into the project, the project amount will be increased by 0 Points. Now, the final amount of money in the project is 0 Points. If you put 1 point into the project, the project amount will be increased by 0.5Points. Now, the final amount of money in the project is 1.5 Points. (Carry on with examples for 2, 5, 10Points). I repeat, the project amount will be increased by half the number of Points that you put in the project. Have you understood this? Do you need additional examples? (If yes, select another person and repeat the examples in the same order).

After the project money has increased, it will be divided equally between you and the other two players in your group, irrespective of how much you have put into the project (Please repeat this again). For example, if the project contains 0 Points, it will be increased by 0 Points and then divided equally between you and the other two players in your group. However, since zero does not increase, both you and the other two players will get zero Points from the project. For example, if the project contains 1 point, it will be increased by 0.5 Points. Now the total value of the project is 1.5 Points, and both you and the two other player get 0.5 Points each from the project (Carry on with examples for 2, 5, 10Points). Have you understood this part? Do you need additional examples?

Please remember that any money that you put into the project is first increased and then divided equally among the three players in your group. Any amount that you put in your pocket remains the same. If you put 1 point in your pocket, it remains 1 point. It neither increases nor is it divided.

Your final earning from the game is the sum of the amount you have in your pocket and the amount you receive from the project.

Let us make a few examples: Please note that since this is an example, we will tell how many Points to put into the project. But when we play the actual game, you will have to decide this on your own, without any help from us. Remember you have to decide how many Points you want to contribute to the project and how many Points you want to keep for yourself:

[SHOW ALL EXAMPLES ON THE POSTER]

1. Let us say you contribute 10 points to the project, the second member 6 points and the third member 0 points then the total group contribution is 16 points. For each Point contributed [Name of experimenter] adds 0.5 points. Thus, the sum is $16+8= 24$ points. Because everybody of you receives the same income from the project, irrespective of your contribution, we divide the 24 points by 3, which is 8 points. Thus, everybody of you will earn 8 points **from the project**. But remember, this is only the first part of your earning. To get your total earning, you have to add the Points you kept for yourself. Let's take a look at yours and the other group members' earnings:

You contributed 10 points. Thus your earning from the private account is 0. You get 8 points from the project. In total you receive $0 + 8 =$ points 8.

The second player contributed 6 points. His/her earning from the private account is therefore $(10 - 6) = 4$ points. 4 points plus the 8 points from the project means a total earning of 12 points.

The third member of the group, who contributed nothing to the project, also gets 8 points from the project. Additionally he/she gets the 10 points he/she kept in his/her private account. His/her total income is therefore 18 Points.

2. The other two players decide to contribute 10 points to the project, you decide to contribute nothing. In this case the group contribution is $(10 + 10 + 0 =)$ 20 Points. For each Point contributed [Name of experimenter] adds 0.5 points. The sum is $20 + 10 =$ 30 Points. Because everybody of you receives the same income from the project, irrespective of your contribution, we divide the 30 points by 3, which is 10 Points. Thus, everybody of you will earn 10 Points **from the project**.

You will receive 10 Points from the project plus the 10 points you kept yourself = 20 Points. The second and third member both contributed points 10, thus they did not put Points in their private accounts. Their total earnings are points 0 from the private account plus points 10 from the project is equal to 10 Points.

3. Each Player contributes all points 10 to the community project. Thus, the total contribution is 3 times 10 = points 30. For each Points contributed, [Name of experimenter] will add 0.5 points. This sum is $30 + 15 =$ 45 Points. 45 Points divided by 3 is 15 Points. Thus, everybody's earning from the project is 15 Points. Since nobody kept any Points for himself, this is also the total earning for everybody.
4. Each player decides to keep his Points for himself. Thus nobody contributes to the project. In that case everybody will earn 10 Points from the private account and nothing from the project, because none of you contributed to the project. Thus, the total income of each member is 10 Points.

If you have any questions, you may ask them now. Otherwise, we will call you one by one and ask seven questions to check if you have understood the game or not. Please note that if you answer these questions wrong, we will give you 10 Points and request you to leave the game venue. Therefore, please tell us if we need to repeat the examples or not (If yes, repeat the examples in the same order).

Control questions

1. How many points do you get at the start of the game?

2. What decision do you have to take in the game?
3. Suppose, you decide to put X points into the project, how much is left in your private account?
4. What happens to the money in the project?
5. If you put X points into the project, by how much will this increase?
6. If you put X points into the project and another player also puts X points into the project, who earns more?
7. If you put Y Points into the project and your partner puts Z Points into the project, who earns more?

(For those who answer 5-7 questions correctly, ask them to sit back in the room. Pay the remaining players 10 Yuan and request them to leave).

Additional question in EXOGENOUS

8. When does the deduction rule apply to you?
9. How many Yuan do we deduce from your earning if you put X [8, 10] Yuan in the project?

Additional question in ENDOGENOUS

10. When does the deduction rule apply to you? [Answer: If two people have voted for the deduction rule and I have contributed less than 10]
11. How many Yuan do we deduce from your earning if you put X [8, 10] Yuan in the project and zero of the other participants in the group have voted for the deduction rule?
12. How many Yuan do we deduce from your earning if you put X [8, 10] Yuan in the project and both you and another participants in the group have voted for the deduction rule?
13. How many Yuan do we deduce from your earning if you put X [8, 10] Yuan in the project and both you and two other participants in the group have voted for the deduction rule?

Additional question in ENDOPAY

14. How can your group decide to have a deduction rule? [Answer: If at least two people have paid for the right to vote and two people voted for the deduction rule]
15. What happens if less than 2 participants in your group decide not to pay for the voting? [Answer: We will randomly decide whether your group will play with or without the rule]
16. What happens if more than 2 participants in your group decide to pay for the voting? [Answer: The group will vote whether to have the rule or not]

17. How many Yuan do we deduce from your earning if you put X $[8, 10]$ Yuan in the project and zero of the other participants in the group have paid and voted for the deduction rule?
18. How many Yuan do we deduce from your earning if you put X $[8, 10]$ Yuan in the project and both you and another participants in the group have paid and voted for the deduction rule?
19. How many Yuan do we deduce from your earning if you put X $[8, 10]$ Yuan in the project and both you and two other participants in the group have paid and voted for the deduction rule?

Round 1

Each player writes his decision on a decision sheet. Please remember that you will not come to know the identity of your partner players or the amount they put in the project. There you have to decide how many of your 10 points you want to contribute to the project. You can contribute any amount from 0 to 10. [Name of experimenter] will put your contribution into the project account and the remaining amount will be stored in your private account.

Decision Task 1 [Unconditional decision]

Each player writes his decision on a decision sheet without knowing what the other two players contribute to the project.

Decision Task 2 [Conditional decision]

In the first task, you did not know the amount the two other partner player put into the project. But in this task, we will ask you to decide how much you want to put in the project in case you know the Points your partner player put into the project. There are eleven decisions to be made in this game. Each decision is independent of the other. Please note that you will get a fresh endowment of ten Points at the start of each decision. We will now give you illustrations on how this game is played. Please listen carefully. While we give examples, no one is allowed to speak.

Example 1: The two other player in the game put on average out of ten - zero Points into the project (put no money on the table). Now, out of ten Points, how much would you like to put into the project? After you have made your decision, the decision is over.

Example 2: The two other player in the game put on average out of ten - one Points into the project (put one Points on the table). Now, out of ten Points, how much would you like to put into the project? After you have made your decision, the decision is over. (Carry on till 10 Points.)

After all participants in one group made their entries, a random device (computer choice) elects one subject of each group to be the “conditional contributor”. This subject’s contribution is determined by her contribution table. For the remaining two subjects the unconditional contribution is decisive.

Do you have any questions?

There are eleven decisions to be taken in this game. Your partner players on average puts 0, how much would you like to put; Your partner players on average puts 1, how much would you like to put; Your partner players on average puts 2, how much would you like to put; Your partner players on average puts 3; how much would you like to put; Your partner players on average puts 4, how much would you like to put; Your partner players on average puts 5, how much would you like to put; Your partner players on average puts 6, how much would you like to put. How many decisions do you have to take in this game? Your partner players on average puts 7, how much would you like to put. Your partner players on

average puts 8, how much would you like to put. Your partner players on average puts 9, how much would you like to put. Your partner players on average puts 10, how much would you like to put. How many decisions do you have to take in this game?

At the beginning of each decision, you will get 10 Points, just like in the examples you saw. Each decision is independent of the other. A very important point is that we will pick only one of these eleven decisions to decide your earnings. So please take all the decisions seriously. Do you have any questions?

Round 2-5

TREATMENT 1 (No law)

The groups are reshuffled after the last round. You are randomly matched with two players from this room. Except [Name of experimenter], nobody knows who is in which group. Neither before, nor after the experiment, will you learn which people were in your group.

As before, at the beginning of the game, each player will receive ten Points from us. Now you have to decide how many from the ten Points to put into a private account and how many into a group project. You may put any amount between 0 and 10 Points into the project. You only make one decision and you do not know the contribution of the other two players to the group account.

TREATMENT 2 (Exogenous rule)

The groups are reshuffled after the last round. You are randomly matched with two players from this room. Except [Name of experimenter], nobody knows who is in which group. Neither before, nor after the experiment, will you learn which people were in your group.

As before, at the beginning of the game, each player will receive ten Points from us. Now you have to decide how many from the ten Points to put into a private account and how many into a group project. You may put any amount between 0 and 10 Points into the project. You only make one decision and you do not know the contribution of the other two players to the group account. Additional to the rules before this round is played with a deduction rule.

Consequences of the deduction rule

As explained before, your point income consists of your income from the private account plus the income from the group account. **Each group member contributing less than 10 points** to the group

account will incur a deduction of 2 Points if the deduction rule is applied. To repeat, a member of your group will be deducted 2 Points of income if the following conditions apply:

1. The group has accepted the deduction rule (i.e. at least 2 group members vote yes).
2. The contribution of the group member to the group account is less than 10 Points.

Ask: Did everybody understand the deduction rule?

TREATMENT 3 (Endogenous rule)

The groups are reshuffled after the last round. You are randomly matched with two players from this room. Except [Name of experimenter], nobody knows who is in which group. Neither before, nor after the experiment, will you learn which people were in your group.

As before, at the beginning of the game, each player will receive ten Points from us. Now you have to decide how many from the ten Points to put into a private account and how many into a group project. You may put any amount between 0 and 10 Points into the project. You only make one decision and you do not know the contribution of the other two players to the group account. Before making your decision, you participate in a referendum on the introduction of a deduction rule.

Referendum on the deduction rule

You and the two other group members vote in a referendum on a deduction rule. The deduction rule will be applied if a majority of voters (i.e. 2 or 3 voters) approves of it. The deduction rule will not be applied if a minority (i.e. 0 or 1 voter) approves.

Consequences of the deduction rule

As explained before, your earning consists of your income from the private account plus the income from the group account. **Each group member contributing less than 10 points** to the group account will incur a deduction of 2 Points if the deduction rule is applied. To repeat, a member of your group will be deducted 2 Points of income if the following conditions apply:

1. The group has accepted the deduction rule (i.e. at least 2 group members vote yes).
2. The contribution of the group member to the group account is less than 10 Points.

Ask: Did everybody understand the referendum and the deduction rule?

TREATMENT 4 (EndoPay: pay for referendum & endogenous rule)

The groups are reshuffled after the last round. You are randomly matched with two players from this room. Except [Name of experimenter], nobody knows who is in which group. Neither before, nor after the experiment, will you learn which people were in your group.

As before, at the beginning of the game, each player will receive ten Points from us. Now you have to decide how many from the ten Points to put into a private account and how many into a group project. You may put any amount between 0 and 10 Points into the project. You only make one decision and you do not know the contribution of the other two players to the group account. Additional to the rules before this round starts with the possibility to implement a deduction rule.

Pay for referendum

You can influence whether you want to continue to play this game as before or with the possibility that players who are not contributing all their money to the group project get 2 Points deducted from their final earnings. The deduction rule can be implemented after a referendum. We first explain the process to have a referendum.

Your group can have a referendum when a majority of players in your groups (i.e. 2 or 3 players) decide to pay 2 yuan (similar to 2 points) from his/her show-up fee. When nobody or only one player pays 2 yuan of his show-up fee we will randomly decide whether you will get a deduction rule or not.

If two or three players did pay 2 yuan (similar to 2 points), you and the two other group members vote in a referendum on a deduction rule. The deduction rule will be applied if a majority of voters (i.e. 2 or 3 voters) approves of it. The deduction rule will not be applied if a minority (i.e. 0 or 1 voter) approves.

Consequences of the deduction rule

As explained before, your point income consists of your income from the private account plus the income from the group account. Each **group member contributing less than 10 points** to the group account will incur a deduction of 2 Points if the deduction rule is applied. To repeat, a member of your group will be deducted 2 Points of income if the following conditions apply:

1. The group has paid to have a referendum (i.e. at least 2 group members pay 2 yuan from their show-up fee).
2. The group has accepted the deduction rule (i.e. at least 2 group members vote yes).
3. The contribution of the group member to the group account is less than 10 Points.

Or:

1. The group has **not** paid to have a referendum (i.e. less than 2 group members pay 2 yuan from their show-up fee).
2. We randomly decided to have the deduction rule (50% chance)

We will now distribute the decision sheets. You are not allowed to talk to others about your decisions. It is your private choice whether you want to pay for having a referendum and continue with the deduction rule or not.

[All decision sheets were handed out and explained on a poster]

[Decision sheet for first round]

Player ID:

Your decision (integer number between 0 and 10)

Your contribution to the group project

Please indicate for each possible average contribution level (0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10) of the other group members how many of your 10 points you allocate to the group project.

Average contribution of the other two group members to the group project	Your <i>conditional</i> contribution to the group project
0	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Note after all participants in one group made their entries, a random device (throw of a die) elects one subject of each group to be the “conditional contributor”. This subject’s contribution is determined by her contribution table. For the remaining two subjects the unconditional contribution is decisive. Note that only decision at the actual outcome will be relevant for your income.

[Decision sheet for No Law]

Player ID:

Your decision (integer number between 0 and 10)

Your contribution to the group project

[Decision sheet for exogenous rule]

Player ID: _____

Your decision (integer number between 0 and 10)

Your contribution to the group project

Remember: If you contribute less than 10 points, we will deduct 2 points.

[Decision sheet for endogenous rule]

Player ID:

Referendum: Deduction rule

Each member of the group that contributes less than 10 points to the group account will incur a deduction of 2 points. Do you want to accept the deduction rule?

Yes

No

Please tick one.

Please note:

1. Your group consist of three people, including yourself.
2. The deduction rule passes if at least two (i.e. two or three) group members approve.

In case zero of the other two group members approves of the deduction rule (This means that there is no deduction rule.):

Your decision (integer number between 0 and 10)

Your contribution to the group project

In case one of the other two group members approves of the deduction rule (This means that it's up to your voting decision whether there is a deduction rule or not.):

Your decision (integer number between 0 and 10)

Your contribution to the group project

In case two of the other two group members approve of the deduction rule (This means that there is a deduction rule.):

Your decision (integer number between 0 and 10)

Your contribution to the group project

[Decision sheet for Endo Pay] [Page 1]

Player ID: _____

Proposal: Pay 2 Yuan from your show-up fee of ten Yuan for having a referendum on a deduction rule. A referendum will be held if at least two members of your group pay 2 Yuan.

Do you want to pay two Yuan for the referendum?

Yes

No

Please tick one.

In case no group members or only one group member paid for the vote we randomly decide whether to have a deduction rule or not.

In case of **no** deduction rule, your decision (integer number between 0 and 10)

Your contribution to the group project

In case of a deduction rule, your decision (integer number between 0 and 10).

Your contribution to the group project

[Page 2 EndoPay]

Player ID: _____

In case two or three group members paid for the vote there will be a referendum on the following rule: Each member of the group that contributes less than 10 points to the group account will incur a deduction of 2 points. Without knowing whether there will be a referendum would you want to accept the deduction rule?

	Yes	No
Please tick one.	<input type="checkbox"/>	<input type="checkbox"/>

Please note:

1. Your group consist of three people, including yourself.
2. The deduction rule passes if at least two (i.e. two or three) group members approve.

In case zero of the other two group members approves of the deduction rule (This means that there is no deduction rule.):

Your decision (integer number between 0 and 10)

Your contribution to the group project

In case one of the other two group members approves of the deduction rule (This means that it's up to your voting decision whether there is a deduction rule or not.):

Your decision (integer number between 0 and 10)

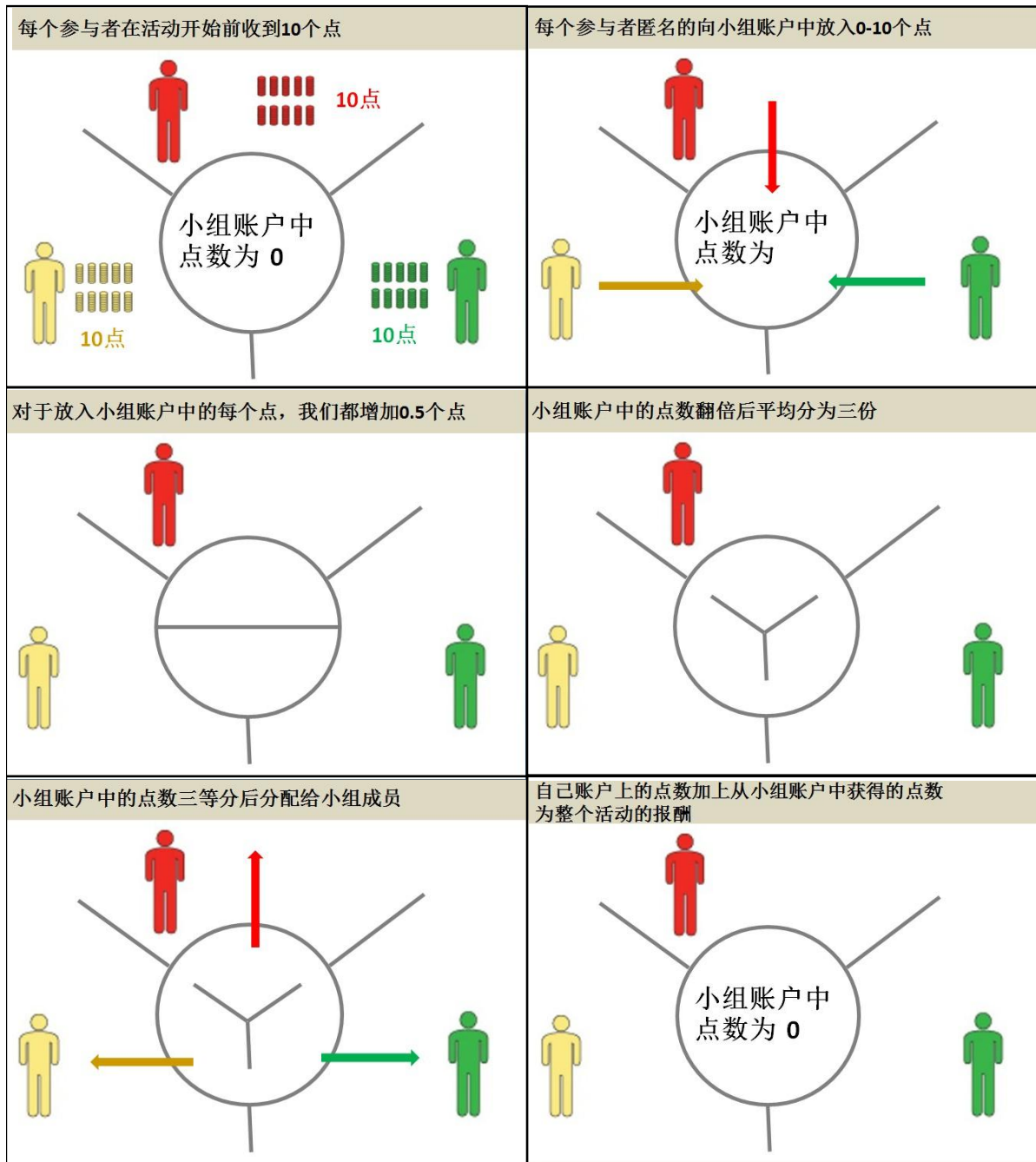
Your contribution to the group project

In case two of the other two group members approve of the deduction rule (This means that there is a deduction rule.):

Your decision (integer number between 0 and 10)

Your contribution to the group project

[Poster used to explain the examples for the public goods]



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University of Innsbruck

Working Papers in Economics and Statistics

2013-14

Björn Vollan, Yexin Zhou, Andreas Landmann, Biliang Hu, Carsten Herrmann-Pillath

Cooperation under democracy and authoritarian norms

Abstract

There is ample evidence for a “democracy premium”. Laws that have been implemented via election lead to a more cooperative behavior compared to a top-down approach. This has been observed using field data and laboratory experiments. We present evidence from Chinese students and workers who participated in public goods experiments and a value survey. We find a premium for top-down rule implementation stemming from people with stronger individual values for obeying authorities. When participants have values for obeying authorities, they even conform to non-preferred rule. Our findings provide strong evidence that the efficiency of political institutions depends on societal norms.

ISSN 1993-4378 (Print)

ISSN 1993-6885 (Online)