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INSTITUTIONAL QUALITY CAUSES SOCIAL TRUST

Evidence from Survey and Experimental Data on Trusting Under the Shadow of Doubt

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ABSTRACT

Social trust is a crucial ingredient for successful collective action. What causes social trust
to develop, however, remains poorly understood. The quality of political institutions has
been proposed as a candidate driver and has been shown to correlate with social trust.
We show that this relationship is causal. We begin by documenting a positive correlation
between quality of institutions, measured by embezzlement, and social trust using survey
data. We then take the investigation to the laboratory: We first exogenously expose
subjects to different levels of institutional quality in an environment mimicking public
administration embezzlement. We then measure social trust among the participants using
a trust game. Coherent with our survey evidence, individuals exposed to low institutional
quality trust significantly less.

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INTRODUCTION

Social or generalized trust is a crucial ingredient to overcome social dilemmas: It is a necessary component of public good provision, tax compliance, pollution abatement and the maintenance of sound and constructive political and economic relationships, to name a few. Social trust stretches beyond individuals who know each other or meet face-to-face. Modern day impersonal relationships and transactions make trust among perfect strangers as essential as ever.[1] Identifying the determinants of social trust, thus uncovering potential policy instruments to spur voluntary collective action and cooperation among strangers, remains one of the key problems in economics, political science and social psychology. This study relies on a novel experimental paradigm to make a step further in the resolution of this decades-long debate by documenting the existence of a causal nexus between quality of the institutional environment and social trust.

Previous research documents that high levels of social trust and social capital are generally attributes of societies characterised by high quality in their institutional environment. In the Nordic countries, known for their high quality of government and low levels of corruption, more than 60% of the population consistently reports that most people can be trusted. In countries suffering from widespread corruption, such as Brazil, the Philippines, and Romania, this percentage drops to less than 10% (Ortiz-Ospina and Roser, 2020: data from 2014). However, the causal link tying institutional quality and social trust is neither straightforward, nor unequivocally established. Some scholars claim that generalized trust precedes institutional quality: Trusting and law abiding societies attaching high moral costs to corruption are capable of putting high quality institutions in place (e.g., Bjørnskov, 2010). Others hold instead the opposite view that stronger institutions create the pre-conditions for generalized trust to develop (e.g., Spadaro et al., 2020; Rothstein, 2013).

We here theorise, and provide evidence for, a positive and *causal* relationship between the quality of an institutional environment and social trust. In doing so, we accompany correlational evidence from survey data, documenting a negative relationship between public sector embezzlement and social trust, with experimental evidence from an environment mimicking embezzlement at the administrative level.

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[1]Generalised social trust is not a virtue or asset for the individual per se. Trusting others in environments in which most people are untrustworthy can be very costly and even dangerous. Social trust is a genuine "collective good": It only is an asset for the individual and for society ("social capital") if most people behave in a trustworthy manner.

In the first part of our investigation, we establish an association between social trust and institutional quality. We first measure institutional quality as administrative and executive embezzlement across countries using data from the World Value Survey, the European Value Survey, and the Quality of Government Institute and then, more broadly, with the European Quality of Government Index across European NUTS2 regions using data from the Quality of Government Institute and Eurostat.

In the second part, we test for the causal effect of institutional quality on trust by conducting a laboratory experiment. We first expose the participants to exogenously varied levels of institutional quality, operationalised as the ability of the institutional setup to constrain corrupt behavior on behalf of public administrators and prevent them from embezzling public funds. To do so, we implement a modified public good game in which the redistribution of the amount contributed by the group to the public good is made responsibility of an individual acting as a public administrator. Our experimental conditions vary the probability with which attempts at embezzling the group's funds will be successfully detected and prevented. We then measure social trust among subjects who have experienced institutions of different quality using a stranger matching protocol. In other words, groups are broken up after the public good phase and subjects re-matched in stranger pairs for the trust game phase.[2]

This experimental design therefore allows us to directly observe, under hard test conditions but in a simple and parsimonious experimental paradigm, the impact of institutional quality on generalised social trust: Reciprocity motives between the public officials and the group members, and among group members themselves, is excluded. Moreover, our analysis allows us to remove expectations about other group members' cooperativeness and about the administrator's embezzlement behaviours as confounds of institutional quality in driving social trust.

In line with previous research, we find that exposure to administrative environments characterised by higher institutional quality systematically leads to higher levels of social trust. In the first part of our investigation we show that the relationship between embezzlement and social trust is significantly negative, strong, and robust. In the second part we show that these correlational findings are mirrored by experimental results identifying a positive causal link running from institutional quality to social trust.

In the next two sections, we review the literature and introduce our theory. We then investigate the correlational link between institutional quality and trust across countries and explore its causality. The final section concludes and suggests avenues for future research.

PREVIOUS LITERATURE

Empirical studies in political science, economics and sociology have tested for the association between institutional quality and social trust. You (2018) provide a comprehensive summary of the major works for the last several decades and conclude that there is strong and robust evidence for a positive correlation between the two (Rothstein and Uslaner, 2005; Kumlin and Rothstein, 2005; Bjørnskov, 2007; Freitag and Bühlmann, 2009; Charron and Rothstein, 2016; Knack and Zak, 2003; Zak and Knack, 2001; Knack and Keefer, 1997; Delhey and Newton, 2005: to name a few).

The causal arguments behind the observed association are divided. One group of scholars claims that social trust leads to higher institutional quality and lower corruption (e.g., Uslaner, 2002,

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[2]Our investigation is limited to providing evidence of the causal impact of institutional quality on social trust, while we remain agnostic on whether causation also runs in the opposite direction. We leave this question for future research.

2008; Bjørnskov, 2010; Graeff and Svendsen, 2013; Wroe et al., 2013; Lambsdorff, 2002). Another group of scholars adopts instead an institutional standpoint and argues that it is higher institutional quality that causes social trust to increase (e.g., Rothstein, 2000; Rothstein and Stolle, 2008; Rothstein and Eek, 2009; Dinesen and Hooghe, 2010; Dinesen, 2012a; Rothstein, 2013; Sønderskov and Dinesen, 2014). The numerous confounding factors and the slow moving nature of the variables under investigation, therefore, prevented scholars from establishing neither a firm causal link between institutional quality and social trust nor its direction, despite the intense and decade-long academic debate.

Only few studies that take institutional approach to understanding the causes of social trust have approached its identification using experimental methods. Among these, Rothstein and Eek (2009) conduct an experiment among graduate students in Sweden and Romania and find that if individuals experience corruption when interacting with healthcare services or police during their travels in an unknown place, they lose both trust in these agencies and trust in people in general. Peter Dinesen and his colleagues have carried out a range of natural experiments with immigrants from low trust/high corruption countries to high trust/low corruption Denmark. They find that both second-generation and first-generation immigrants to Denmark display higher levels of trust after having lived a number of years in a country characterised by higher institutional quality than their country of origin, and they argue that this finding implies a causal effect of institutions on social trust (Dinesen, 2012a,b; Dinesen and Hooghe, 2010; Nannestad et al., 2014; Sønderskov and Dinesen, 2014). The endogeneities plaguing cross-cultural, cross-national research make it, however, hard to clearly pinpoint the causal link behind the observed results. As You (2018: p. 11) note in conclusion to their survey of the literature, more "empirical tests to determine whether corruption really impacts social trust to a considerable extent" are needed.[3]

THEORY AND HYPOTHESES

This paper takes an institutional approach to understanding social trust, focusing on the state as a determinant of social capital (Levi, 1998; Tarrow, 1996). According to this view, social trust comes as a consequence of impartial, uncorrupt, honest and trustworthy institutions (Rothstein, 2000, 2011: among others).[4]

Among the tools a State can adopt in order to spur trust among its citizens is its legal systems. Legal systems ensure reliable contracts, secure rights and enforce rules that sanction non-compliance, protect minorities and support participation (Levi, 1998; Spadaro et al., 2020). Should a state be unable to enforce the observance of contracts and rights, citizens might be skeptical that others will adhere to the prescribed codes of behavior (Rothstein and Stolle, 2008).

Institutions can moreover influence individuals' sense of identification with the group which is governed by these same institutions (Wichardt, 2008; Martinangeli and Martinsson, 2020). Individuals who perceive the institutions as being fair, impartial and honest are more likely to feel a stronger sense of group belonging and make social (group) goals one's own (Wenzel, 2007). For instance, De Cremer et al. (2005) show that inclusiveness and membership feeling increase trust among group members. Similarly, Ostrom (2005: p. 74) demonstrates that individuals with

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[3]Scholars studying drivers of social trust also argued that trust may be found among those involved in corruption and those who profit from an unregulated social environment. Thereby, widespread corruption can be associated with higher overall levels of social trust. Trust that becomes functional in corrupt networks, however, is considered to be *particularised* rather than *generalized* trust (Uslaner, 2002, 2008) and is beyond the scope of this paper.

[4]By institutions we mean "rules of the game in a society", a definition suggested by North (1990).

a stronger sense of group affiliation are more likely to trust others. By increasing identification with the group, high-quality institutions are therefore likely to increase social trust.

We hypothesize that institutions of higher quality, or institutions that are more capable of harnessing public officials and administrators' behaviours, have a positive and causal effect on social trust:

Hypothesis. *Higher institutional quality leads to higher social trust*

CORRELATIONAL EVIDENCE ON INSTITUTIONAL QUALITY AND SOCIAL TRUST

Before exploring the causal link between institutional quality and social trust in an experimental setting, we investigate the association between institutional quality and social trust across countries with the available survey data. While this exercise does not allow us to establish the causal link due to the slow-moving nature of our variables, data availability, and confounding factors, it lays the motivation and the premises for the experimental analysis performed later on, and provides us with useful insights into real world regularities against which to interpret the results there emerging.

For the purpose of this analysis, we use several major datasets available online. First, we use the World Value Survey, which allows us to investigate the relationship between institutional quality, measured as public sector and executive embezzlement, and social trust around the world. Second, we zoom our focus in on Europe and explore the variation in social trust across the European NUTS2 regions using the European Social Survey (ESS) and the survey on the quality of government in the European regions (EQI) from the Quality of Government institute. This focused analysis on Europe allows us to investigate the variation in trust and institutional quality in a relatively homogenous group of countries, and serves as a robustness checks for the relationship found using global data.

In our global analysis, we measure the level of social trust using a weighted country-averaged response to the question "Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?" from the World Value Survey (Inglehart et al., 2014) and European Value Survey (EVS, 2011), merged version, available in the Quality of Government dataset (Teorell et al., 2020).

In operationalizing institutional quality, we use indicators capturing how widespread embezzlement (theft of public funds for private use) is in the countries under analysis available from the Varieties of Democracy (V-Dem) Institute (Coppedge et al., 2020a). The measures are expert answers to the questions: "How often do public sector employees steal, embezzle, or misappropriate public funds or other state resources for personal or family use?" and "How often do members of the executive (the head of state, the head of government, and cabinet ministers), or their agents, steal, embezzle, or misappropriate public funds or other state resources for personal or family use?" (Coppedge et al., 2020b; Pemstein et al., 2020). We reverse the indicators, so that higher values mean larger extent of embezzlement.

We control for natural logarithm (ln) of gross domestic product (GDP) per capita, the level of inequality measured by GINI index (World Bank, 2016) and homicide rates (World Health Organization, 2019), available in the Quality of Government dataset (Teorell et al., 2020). Further, we control for the level of ethnic fragmentation (Ln ethn. gr.), measured by the number of politically relevant groups in a country (Vogt et al., 2015) and the level of democracy measured

by the Electoral Democracy Index (Elect. dem.) from the V-Dem dataset (Coppedge et al., 2020a).

We perform a conservative cross-sectional analysis using data from the latest year in which the measure of trust is available:

$$y = \beta_0 + \beta_1 embezz + \beta_2 X + \varepsilon \qquad (1)$$

where y is the dependent variable measuring country-averaged social trust, $embezz$ is our measure of public sector or executive embezzlement depending on the specification, and X is a vector containing the covariates listed above. When estimating equation (1), we use the average of the trust measure per country, such that countries are our unit of observation.

TABLE 1. OLS REGRESSIONS OF AVERAGE SOCIAL TRUST AND ADMINISTRATIVE AND EXECUTIVE EMBEZZLEMENT ACROSS COUNTRIES.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
			Social trust			
Adm. embez.	-0.051***	-0.045***	-0.091***			
	(0.010)	(0.015)	(0.024)			
Exec. embez.				-0.055***	-0.033*	-0.095**
				(0.015)	(0.019)	(0.039)
Ln GDP p.c.		0.033***	0.032		0.048***	0.054**
		(0.013)	(0.028)		(0.012)	(0.027)
Ln ethn. gr.		0.012	0.024		0.007	-0.008
		(0.024)	(0.033)		(0.024)	(0.032)
Homicide rate		-0.003***	0.002		-0.004***	0.001
		(0.001)	(0.002)		(0.001)	(0.003)
Elect. dem.		-0.155*	-0.521***		-0.117	-0.560***
		(0.085)	(0.181)		(0.091)	(0.196)
GINI (WB est.)			-0.012***			-0.011***
			(0.003)			(0.003)
Constant	0.478***	0.252	1.087***	0.399***	0.003	0.779**
	(0.047)	(0.158)	(0.347)	(0.044)	(0.124)	(0.367)
Observations	103	97	57	103	97	57
R-squared	0.229	0.340	0.522	0.132	0.305	0.477

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. The regressions control for log GDP per capita, log number of politically active ethnic groups, the homicide rate, the score on the electoral democracy index, and the GINI index (World Bank estimate).

Table 1 presents the results of equation 1, analyzing the relationship between average social trust and level of embezzlement across countries. Models 1 through 3 investigate the relationship between the average levels of social trust per country and the level of embezzlement in the public sector. The relationship is negative and significant, implying that countries with higher extent of embezzlement practices in the public sector on average tend to have lower levels of social trust. Models 4 to 6 present the results for the same analysis with the executive embezzlement levels used as an independent variable instead. The relationship is also negative and significant. We summarise these findings in Result 1.

Result 1. *Social trust is positively associated with the level of administrative and executive embezzlement across countries.*

In the next step we perform the analysis for European NUTS2 regions. We measure social trust using a question "On a 1-10 scale, with '1' being 'don't trust at all', and '10' being 'complete trust', how much do you personally trust other people in your region?" from the 2017 European Quality of Government Index survey (Charron et al., 2019). In order to measure institutional quality, we use a comprehensive European Quality of Government Index (EQI) calculated for the European NUTS2 regions by Charron et al. (2019). We control for individual-level factors that can influence how an individual responds to the trust-question, such as age, gender, net household income, education level, perceived state of the economy, and indices of perceived and experienced corruption. [5]. We also control for region-level factors that can influence social trust, such as the level of crime, measured with the number of reported burglaries, homicides and robberies, total population size, per capita GDP, share of the population at risk of poverty, adult unemployment rate, and net migration rate, originating from the Eurostat Regional Database (European Commission, 2020) and available through the EU Regional Dataset (Charron et al., 2020). We use the region-level variables for the latest year available before 2017.

We perform a multilevel mixed-effects linear regression model with random intercepts across regions r and countries k:

$$y = \beta_{0,r,k} + \beta_1 EQI + \beta_2 X + \beta_3 R + \varepsilon \tag{2}$$

where X and R are controls at individual and regional levels respectively. Standard errors are clustered at country level. Corresponding models, in which the slope of the regional EQI score is also allowed to vary across regions and countries, yield the same results.

The results from the estimation of model (2) are reported in Table 2. The positive correlation between social trust and the EQI score in the respondent's region is evident: the coefficient is positive, large and well within 1% significance level in all specifications. This implies that individuals living in regions with higher institutional quality tend to trust others more, which is in line with the findings behind Result 1.

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[5]Details about the construction of our indices of perceived and experienced corruption can be found in Appendix C.

TABLE 2. MULTILEVEL MIXED-EFFECTS LINEAR REGRESSION WITH RANDOM INTERCEPTS AT REGION AND COUNTRY LEVEL OF STATED LEVEL OF SOCIAL TRUST ON THE EUROPEAN QUALITY OF GOVERNMENT INDEX.

	Model 1	Model 2	Model 3	Model 4
		Social t	rust level	
EQI Score	0.493***	0.341***	0.273***	0.313***
	(0.096)	(0.088)	(0.055)	(0.052)
Perceived state of econ.		-0.009***	-0.008***	-0.011**
		(0.002)	(0.002)	(0.004)
Perceived corruption		-0.454***	-0.438***	-0.441***
		(0.040)	(0.041)	(0.046)
Experienced corruption		-0.143***	-0.132***	-0.086***
		(0.020)	(0.029)	(0.028)
Nr. burglaries (x1000)			-0.011*	-0.006
			(0.006)	(0.010)
GDP p.c. (x10000)			0.091**	0.102**
			(0.037)	(0.045)
Share pop. at poverty risk				-0.008
				(0.007)
Constant	6.181***	6.328***	5.982***	6.207***
	(0.150)	(0.138)	(0.185)	(0.215)
Individual controls	✓	✓	✓	✓
Additional regional controls			✓	✓
Observations	59,042	56,045	39,355	26,075
Number of groups				
Region	150	150	100	64
Country	16	16	13	10

Robust standard errors, clustered at country level, in parentheses, *** p<0.01, ** p<0.05, * p<0.1. Individual controls include perceived state of the economy, and (omitted from the table) gender, age, education level and net household income. Regional controls include indices of perceived and experienced corruption, number of reported burglaries, per capita GDP, the share of the population at risk of poverty and (omitted from the table) adult unemployment rate, the number of reported homicides and robberies, net migration rate, and population size.

CAUSAL EVIDENCE ON THE IMPACT OF INSTITUTIONAL QUALITY ON SOCIAL TRUST

In this section we present our experimental investigation exploring the causal link between administrative embezzlement and social trust.

Experimental design and procedures

The experiments proceeded in two phases. In the first phase, we randomly exposed individuals to setups with different institutional quality in the context of a public good game. In the second phase, we elicited *behavioural* measures of individuals' social trust. The participants received the payoff for only one randomly selected phase, after the end of the experiment, and were

informed about this at the beginning of the session.

Public good stage The purpose of the first phase was to expose the subjects to exogenously determined levels of institutional quality, thus breaking the endogeneities that hinder the observation of the causal link between the institutional quality and social trust when using cross-national survey data. We implemented the first phase as a public good game. We deliberately chose to operationalise the institutional framework as a public good game because it allows us to expose the subjects to an environment mimicking that under which the embezzlement of public resources occurs.

Denote a group of size $n = 3$ with G, its members as $i \in \{1, 2, 3\}$, and define

$$Y = \sum_{i \in G} c_i$$

as the sum of all players' contributions c in the public good game. We modified the standard public good game to introduce an intermediate agent (a public official), and an institutional framework in which we experimentally manipulate the institutions' ability to prevent corrupt behaviour on behalf of the intermediate agent. We describe how we manipulate the institutional framework and our experimental conditions in the next section.

The intermediate agent, denoted k and henceforth referred to as to the *Collector*, was one of the three members of the group playing the public good game. The Collector was mandated to collect each of the group members' contributions to the public good and to redistribute them to the group - a task, which is normally automated in experimental implementations of the public good game. Crucially, we allow for the possibility for the collector to embezzle any fraction of the collected amount. We denote the amount redistributed by the Collector as R, with $0 \leq R \leq Y$. If $R = Y$, the entire amount of contributions collected by the group is redistributed, exactly as it would be if the whole procedure were automated. On the other hand, if R=0, the Collector keeps the whole amount for herself and redistributes nothing. The payoffs of player $i \neq k$ are then given by

$$\pi_i = E - c_i + \alpha R, \tag{3}$$

where $\alpha = 0.5$ is the marginal per-capita return of the public good game, E denotes players' endowment and $0 \leq c_i \leq E$ is player i's contribution to the public good. As $1/n < \alpha < 1$, the game induces a conflict between individual self-interest (the full free riding Nash equilibrium) and social welfare (full contributions). We will refer to the players who are *not* Collectors as *group members*. Similarly the Collector's payoffs are given by:

$$\pi_k = E - c_k + \alpha R + Y - R. \tag{4}$$

Clearly, the Collector maximises her own payoff by setting $R = 0$, that is by redistributing nothing of what was collected by the group and keeping instead everything for herself. Notice that this way the Nash equilibrium of zero contributions of the standard public good game is preserved. Importantly, in practical terms, the public good game was played *only once* so as to eliminate any incentive for the Collector to build a reputation by contributing a large amount to signal, for instance, honesty. Moreover, we gave the players no feedback on the individual contributions or on the Collector's choice of how much to redistribute at the end of the public good stage. We instead collected the *group members'* beliefs about each other's contributions. Additionally, we told the group members that the group had collected a total amount of contributions equal to Y, and we asked them to guess how much of that amount

would be redistributed by the Collector. In other words, we elicited the group members' beliefs about R. We incentivise the beliefs against the actually recorded values.

Trust stage In the second phase, we elicited our target variable: A behavioural measure of social trust among the agents. We implemented this phase as a standard trust game (Berg et al., 1995). We matched the subjects in pairs consisting of a sender and a receiver, and each received an endowment of six euros. The senders chose to send any integer amount of their endowment to the receivers, who would receive the amount doubled by the experimenter. What they had not sent, the senders could keep for themselves. The receivers could then choose to send any integer amount of their endowment plus what they had received back to the senders. As receivers maximise their payoff by sending back nothing, it is a dominant strategy for the senders to keep everything for themselves.

As we are interested in the impact of the quality of the institutional environment on people's willingness to trust others, we are particularly interested in the trusting behaviour of the group members (not collectors). For this reason, group members only played the trust game with other group members (not collectors), and were made aware of this. Moreover, and importantly, we made the subjects aware that the public good phase groups were broken up after the end of that phase, and that for the trust game they would be randomly re-matched with other members of the session. We can thus rule out any impact of reciprocal behaviours across phases on the choices in the trust game. For instance, if the person they were playing the trust game was among the same people they played the public good game phase with, a higher trusting behaviour could be driven by knowledge of a greater amount of total contributions to the public good (remember that during the belief elicitation phase group members were made aware of the total amount of contributions collected). A greater amount of contributions would in fact signal a greater willingness to cooperate and perhaps more trustworthiness. By breaking up the public good group and organising subjects in new pairs, we decouple what actually happened in the public good phase from the trust game and are able to isolate the impact of exposure to a weaker institutional environment on generalised social trust.

All subjects played both the roles of sender and receiver in random order. That is, after the trust game pairs were randomly formed, one of the players was assigned the role of sender and the other the role of receiver. They then played the trust game as described above. After both senders and receivers made their choices, the pair was commonly known to be broken up and the players reassigned to a new pair. The trust game was then played a second time in the new pair. However, the senders were now assigned the role of receivers and vice versa.[6] Moreover, we kept feedback at the minimum, only communicating to the receivers the amount available to be transferred back to the sender. Additionally, the instructions informed the players that only one of the two rounds, randomly selected, was valid for payment.

After the trust game was completed, the subjects answered a number of socio-demographic questions eliciting their age, gender, profession and field of study, if a student. Finally, we debriefed the subjects by communicating them their payoffs in the public good and in the trust game stages, including which one of the two would be paid out.

The experiments took place at the ECONLAB laboratory of the Max Planck Institute of Tax Law and Public Finance in Munich, Germany. We collected data from 264 subjects in 11 sessions at the end of February 2020. The average payout was 22 Euros and completion time was approximately 45 minutes.

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[6]As in the first pair assignment, public good group members were again matched with other public good group members and Collectors with other Collectors.

Experimental conditions

In order to introduce exogenous variation in institutional quality in our experimental setup, we introduced an institution which we experimentally make more or less capable of preventing embezzlement on behalf of the collector. To do so, the software randomly drew a number $d \sim U(0, 99)$ where U denotes a uniform distribution of integers between 0 and 99. A check on the amount entered by the Collector would be performed if $d \geq t$ where $t \in \{0, 1, 50\}$ according to the experimental condition (varied between sessions). In case a check occurred and the amount entered for redistribution was found to be incorrect, an error message notified the Collector that the amount entered should be revised for the game to continue. We nevertheless stored information about the incorrect amount entered to measure the embezzlement attempt. Notice that the wording used in delivering our experimental conditions to the participants eliminates the risk that the different conditions might differently focalise their attention on antisociality and unethical behaviour.

Condition *Zero* In condition *Zero* (96 subjects), we implemented an institutional environment fully capable of preventing corrupt behavior on behalf of public officials: A 0% chance that any attempt of stealing the group's contributions might succeed. Here, any attempt at embezzlement on behalf of the Collector was met with an error message.[7]

Condition *One* In condition *One* (96 subjects) the institutional environment allows for a small chance, 1%, that an embezzlement attempt might succeed. The instructions communicated to the subjects that the amount entered for redistribution by the Collector would be checked with 99% probability.

Condition *Fifty* In condition *Fifty* (72 subjects) the institutional environment allowed for a 50% chance that an embezzlement attempt might succeed. The instructions communicated to the subjects that the amount entered for redistribution by the Collector would be checked with 50% probability.[8]

Experimental results

Table 3 displays the results from an OLS regression of the amounts sent in the trust phase of the experiment, restricted to group members only, on the institutional conditions. All subjects participated both as senders and as receivers in random order, such that we have a sending choice for each subject. All regressions control for the order in which the subject participated in the trust game, the subject's gender, age and profession.[9] Moreover, we control for normalised beliefs about the Collector's honesty in the public good phase, that is the amount believed to be redistributed divided by the total amount of contributions collected by the group (Belief(e)), of beliefs about the other group member's contribution (Belief(c)), of own contribution and of total group contributions.[10]

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[7]See the instructions in Appendix F.

[8]The minimal detectable effect over standardised social trust measures (Collectors excluded) across conditions Zero and One is *MDE=0.47*, and *MDE=0.52* in comparison of Condition *Fifty* with Condition *Zero* or *One* at $\alpha = 0.05$ and power $p = 0.8$.

[9]A Kruskall-Wallis test cannot reject the null of equality in the amounts sent between subjects who participated as senders first and receivers later or vice versa; p-value=0.622.

[10]Corresponding Tobit regressions reported in Appendix B confirm the results in Table 3.

TABLE 3. OLS REGRESSION OF AMOUNTS SENT IN THE TRUST PHASE OF THE EXPERIMENT.

	Model 1	Model 2	Model 3	Model 4
		Trust game: amount sent		
Condition _Zero_				
Condition _One_	-0.724*	-0.778*	-0.766*	-0.794*
	(0.413)	(0.412)	(0.413)	(0.405)
Condition _Fifty_	-1.177***	-1.198***	-1.159***	-1.029**
	(0.433)	(0.430)	(0.432)	(0.442)
Own contribution	0.117***	0.086***	0.095**	0.090**
	(0.027)	(0.033)	(0.037)	(0.037)
Group contributions		0.039*	0.026	0.029
		(0.023)	(0.032)	(0.031)
Belief(c)			0.034	0.034
			(0.049)	(0.048)
Belief(e)				1.247*
				(0.657)
Sender first	-0.245	-0.279	-0.255	-0.203
	(0.342)	(0.342)	(0.342)	(0.337)
Constant	3.241***	2.660***	2.599***	1.718**
	(0.613)	(0.742)	(0.734)	(0.814)
Individual controls	✓	✓	✓	✓
Observations	174	174	174	174
R-squared	0.151	0.166	0.169	0.187

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. The regressions control for the order in which the subject participated in the trust game as sender and receiver (Sender first), age, gender and profession. The variable Belief(e) measures normalised beliefs about the amount entered for redistribution by the collector divided by the group's total contributions, while Belief(c) measures beliefs about the other group members' contributions.

Table 3 shows that the amounts sent in the trust game are highly sensitive to the treatment. Even a small 1% chance that an embezzlement attempt might succeed reduces social trust. Moving from 0% probability to 1% probability of successful embezzlement attempts yields a decrease in trust, expressed in the decrease of the amounts sent just below 80 cents, significant at 10% level. When moving from 1% to 50% probability of successful embezzlement attempts, the amount sent decreases on average by 1 Euro, indicating an even larger decrease in the trust levels, significant at 5% level. The effect size is approximately 30% larger than that observed for Condition _One_, though not significantly different.

We summarise these findings in Result 2:

Result 2. _Amounts sent in the trust game phase drop significantly when embezzlement attempts have even a small chance of succeeding._

Result 2 support the hypothesis that trust among strangers is causally eroded by exposure an institutional environment incapable of perfectly harnessing corrupt behaviour on behalf of public officials.

One might ask whether the decrease in willingness to trust others that we observe among those who were exposed to imperfect institutions is driven by the lower earnings the subjects expect to

obtain from the public good game: Successful embezzlement of a positive amount translates into reduced earnings on behalf of the group members. We now show that this mechanism cannot have produced the findings in Result 2.[11] In order to be able to measure beliefs about the amount the Collectors' would attempt to embezzle, we revealed the total amount of contributions collected by the whole group to the subjects (after they had chosen their contribution to the public good). For this reason, we are able to verify, first of all, whether there are reasons to believe the information provided to the subjects about their group's cooperativeness might explain our results. Second, we are able to check whether the beliefs we elicited about the Collectors' honesty can fully account for the variation in trust observed across our experimental conditions. Tables 4 report average total group contributions.

TABLE 4. TOTAL CONTRIBUTIONS COLLECTED ON AVERAGE IN EACH CONDITION.

Condition	Total group contributions	Standard Deviation	KW p-value
Zero	19.25	8.16	
One	20.78	11.19	0.714
Fifty	19.58	9.15	

	Collectors excluded		
Condition	Group member contributions	Standard Deviation	KW p-value
Zero	12.97	7.54	
One	13.66	9.66	0.733
Fifty	11.67	8.34	

The last column displays the p-value from a Kruskall-Wallis (KW) test of equality across populations in the three conditions.

Kruskal-Wallis (KW) tests do not allow us to reject the null hypothesis that total group contributions are equal across conditions, regardless of whether the Collectors are excluded. The same result emerges from the OLS regressions of contributions restricted to group members reported in Table D.1 in Appendix D. These findings reassure us that the group's cooperativeness inferred by group members on the basis of the total contributions collected in the three conditions cannot be the cause of the patterns observed in trusting behaviours.

We now check whether trust patterns can be fully explained by beliefs about the Collectors' honesty. The regressions in Table 1 control for the proportion of group contributions believed to be redistributed by the Collectors and for beliefs about other group members' contributions.[12] Despite beliefs about embezzlement attempts having a sizeable impact on trusting behaviour, neither these nor beliefs about others' contributions exhaustively explain the variation in trust across experimental conditions. The impact of quality of the institutional environment remains stable, strong and significant. Beyond any concern about efficiency or expected earnings, there-

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[11]Recall from Section "Experimental conditions" that the wording used in designing our conditions excludes the possibility of differences in the focality of unethical behaviour across conditions.

[12]Caution is due when interpreting these coefficients: Beliefs about others' contributions and about the amount embezzled by the Collector might very well be endogenous to the experimental conditions. As Tables E.1 and E.2 in Appendix E demonstrate, this suspicion turns out to be well founded, at least for what concerns beliefs about embezzled amounts: The amounts which Collectors are believed to try to embezzle *increase* when the institutions are less capable of preventing success. On the contrary, beliefs about others' contributions do not vary with the experimental conditions.

fore, these findings indicate that the quality of the institutional environment that individuals were exposed to, in terms of its ability to harness unethical behaviours on behalf of the administrators of group resources, is directly capable of decreasing trust among individuals.

DISCUSSION AND CONCLUDING REMARKS

The aim of this paper has been to test a widespread hypothesis in the social scientific literature, postulating that institutional quality affects social trust. We first established the presence of a positive association between institutional quality and social trust on the macro level by analyzing the relationship patterns on a sample of 97 world countries. We then explored the causality in the relationship between institutional quality and social trust by conducting a laboratory experiment.

The results from our correlational analysis show that countries and EU NUTS regions with higher institutional quality on average tend to have higher levels of social trust. These patterns are in accordance with those observed in the previous research, at least in countries characterised by a relatively moderate to high levels of institutional quality. Our analysis uncovers in fact a negative relationship between the level of embezzlement and social trust.

With our experimental investigation we establish the presence of causality in the observed relationship, going from the quality of the institutional environment to social trust. We would like to emphasize, however, that in this investigation we do not falsify the claim that causality running in the opposite direction, from social trust towards institutional quality, exists. It might still be the case that more trusting societies are causally capable of putting stronger institutions in place, such that institutions and social trust reinforce each other. Uncovering whether the relationship is in fact a virtuous circle is outside of the scope of this paper. Instead, we find a strong evidence that exogenous exposure to stronger or weaker institutional environments, measured as their ability to constrain public administrators' behaviours, impacts individuals' willingness to trust others. In particular, we find that social trust is maximal when the institutional environment can perfectly prevent corrupt behaviour on behalf of the public officials. Trust levels are instead significantly lower once perfect control of the public official's behaviour cannot be guaranteed. Noticeably, our analyses suggest that trust may drop discontinuously once institutional quality deviates from perfection even slightly. Willingness to trust others in fact drops sharply once we introduce even an extremely small and nearly irrelevant 1% chance that corrupt administrators might successfully embezzle public money.

This study should be considered as a step forward in resolving the uncertainty surrounding the causal ties between the institutional environment, social trust and, more generally, the social environment. Future research should focus on determining the exact mechanisms behind the causal relationship presented here. For instance, having observed the causal impact of institutional quality on trusting behaviours, the natural way forward is to investigate its effect on perceptions and beliefs about society as a whole. For instance, one relevant question to ask is whether the perception that the administrators engage in less corruption stems from the fact that good-quality institutions render such behaviours (nearly) pointless from a mere moral cost to benefit analysis, or because administrators are more ethical per se. Another relevant question for future research is whether the information on what the society considers the "right thing to do" mediates the relationship we observe in this study. Finally, despite our design controls for it, institutions of varying quality in the real world might differ in their power to focus individuals' attention on the possibility of unethical behaviours on behalf of the administrators, and, in turn, other group members. We hope this article will constitute the starting point for investigations

of all of these and other mechanisms.

In conclusion, this article lends credibility to the arguments assigning the institutional environment a leading role in laying the pre-conditions for the development of a sound and trusting social environment. These findings are consequential. A trusting social fabric is better equipped to provide public goods and coordinated collective actions that benefit the community as a whole than individual self-interest. The examples of such collective actions and public goods are plenty: managing common pool resources, establishing incomplete or hardly enforceable contracts and agreements, containing the adverse consequences of natural disasters, such as pandemics, among others. Crucially, the institutional framework, as opposed to social trust itself, can be manipulated and its quality can be, at least to some extent, improved by design. We provide first experimental evidence that social planners aiming at fostering social trust can, by virtue of the causal relationship uncovered here, count on institutional design among the tools at their disposal to achieve socially desirable objectives.

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APPENDICES

A   MEASURE OF SOCIAL TRUST FROM THE EUROPEAN SOCIAL SURVEY

We check for the robustness of our results in Table 2 by using a measure of social trust from the latest round (Round 9) of the European Social Survey (ESS) 2018. This way, despite an extreme reduction in our sample size, we ensure that our variable of interest and our main determinant come from two different data sources. We correlate the social trust measure from the ESS with the EQI score from the European Quality of Government Index Survey (Charron et al., 2019) and control for the same regional indicators used in the main analysis. Moreover, we control for similar individual-level controls, only taken from the ESS dataset. We again estimate multilevel mixed-effects linear regression models to allow the intercept of our models to vary between countries and regions, and cluster standard errors at the country level. The results reported in Table A.1 confirm the findings from Table 2 and are summarised in Result 1. The correlation between stated levels of social trust and the European Quality of Government Index is positive, strong and significant. As earlier, we control for a number of individual (age, gender, net income, education, perceived state of the economy and overall feeling of safety) and regional (number of reported burglaries, homicides and robberies, per capita GDP, adult unemployment rate, net immigration rate and population size) characteristics.[13] We do not control for the share of the population at risk of poverty because of lack of data.

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[13]Individual feeling of safety replaces stated perception and experience of corruption, which are not elicited in the European Social Survey.

TABLE A.1. MULTILEVEL MIXED-EFFECTS LINEAR REGRESSION OF SOCIAL TRUST LEVELS (FROM EUROPEAN SOCIAL SURVEY) ON THE EUROPEAN QUALITY OF GOVERNMENT INDEX.

	Model 1	Model 2	Model 3
		Social trust	
EQI Score	0.724***	0.605***	0.977***
	(0.120)	(0.119)	(0.286)
Perceived state of econ.		0.234***	0.238***
		(0.018)	(0.022)
Safety feeling		0.434***	0.423***
		(0.089)	(0.103)
Nr. burglaries (x1000)			-0.082**
			(0.034)
GDP p.c. (x10000)			0.144
			(0.169)
Constant	3.685***	3.146***	1.815***
	(0.343)	(0.354)	(0.452)
Additional individual controls	✓	✓	✓
Additional regional controls			✓
Observations	6,638	6,474	3,668
Number of groups			
Region	79	79	50
Country	6	6	5

Robust standard errors, clustered at country level, in parentheses, *** p<0.01, ** p<0.05, * p<0.1. Individual controls omitted from the table include gender, age, education level, and net household income. Regional controls omitted from the table include adult unemployment rate, the number of reported homicides and robberies, net migration rate, and population size.

B TOBIT REGRESSIONS

Table B.1 reports the results from Tobit regressions corresponding to the OLS regressions reported in Table 3, confirming the results there reported.

TABLE B.1. TOBIT REGRESSIONS OF AMOUNT SENT IN THE TRUST PHASE OF THE EXPERIMENT.

	Model 1	Model 2	Model 3	Model 4
	Trust game: amount sent			
Condition One	-1.498*	-1.609*	-1.581*	-1.627*
	(0.903)	(0.899)	(0.898)	(0.889)
Condition Fifty	-2.285**	-2.292**	-2.225**	-1.914**
	(0.966)	(0.956)	(0.961)	(0.958)
Own contribution	0.266***	0.206**	0.221***	0.213**
	(0.070)	(0.079)	(0.084)	(0.083)
Group contributions		0.072	0.050	0.053
		(0.049)	(0.063)	(0.062)
Belief(c)			0.059	0.063
			(0.104)	(0.104)
Belief(e)				2.946**
				(1.456)
Sender first	-0.356	-0.410	-0.373	-0.294
	(0.765)	(0.758)	(0.760)	(0.752)
Constant	3.164**	2.044	1.944	-0.113
	(1.469)	(1.642)	(1.648)	(1.928)
Observations	174	174	174	174

Standard errors in parentheses, *** $p<0.01$, ** $p<0.05$, * $p<0.1$. The regressions control for the order in which the subject participated in the trust game as sender and receiver, age, gender and profession. Belief(e) denotes normalised beliefs about the amount entered for redistribution by the collector divided by the group's total contributions, Belief(c) denotes beliefs about the other group members' contributions.

C   SUMMARY INDICES OF PERCEPTION AND EXPERI-ENCE OF CORRUPTION

We construct our index of individual perception of corruption by performing a factor analysis on all available questions measuring perceptions of corrupt behaviour on behalf of public officials available in the European Quality of Government Index survey (Charron et al., 2019). We then retain individual predicted scores on the first component from the rotated varimax as a summary index of perceived corruption. As a result, the index consists of the following variables, all measured on a scale of agreement ranging from 1 (strong disagreement) to 10 (strong agreement):

1. Corruption is prevalent in my area's local public school system.

2. Corruption is prevalent in the public healthcare system in my area.

3. Corruption is prevalent in the police force in my area.

4. People in my area must use some form of corruption to just to get some basic public services.

5. Corruption in my area is used to get access to special unfair privileges and wealth.

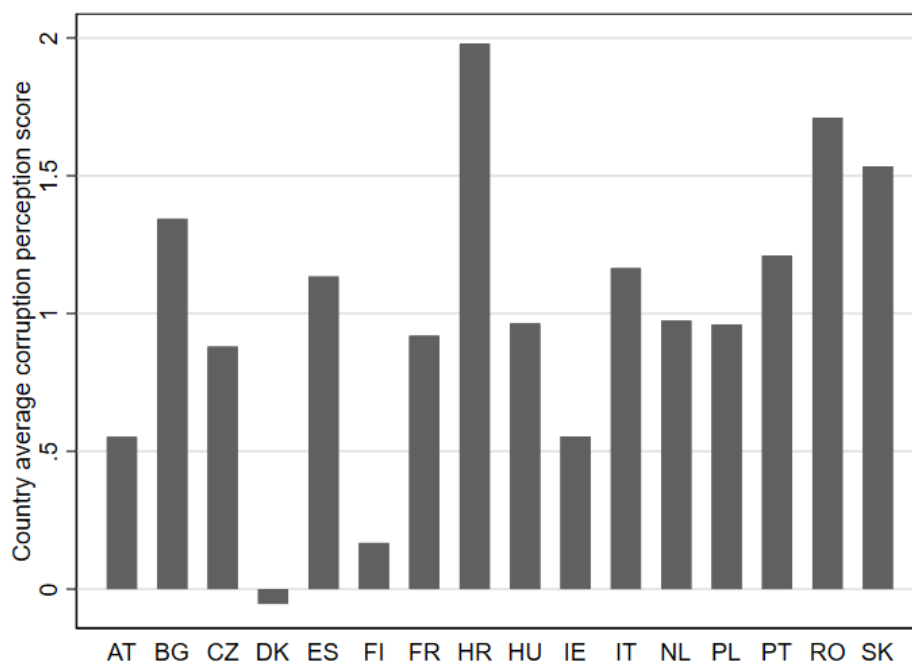6. Corruption is NOT present in elections in my area.

Table C.1 presents the details from the factor analysis. Figure C.1 illustrates the country-averaged scores of perceived corruption, re-centred around 1 (rather than zero) to ease visualization.

TABLE C.1. VARIMAX ROTATED FACTOR ANALYSIS OF THE VARIABLES MEASURING PERCEPTIONS OF CORRUPT BEHAVIOUR AVAILABLE IN THE EUROPEAN QUALITY OF GOVERNMENT INDEX SURVEY.

| Factor analysis | | | First component | |
Factor	Eigenvalue	Expl. variance (%)	Variable	Factor loading
Factor 1 (retained)	3.22093	0.5368	1	0.7969
Factor 2	0.95144	0.1586	2	0.8340
Factor 3	0.79538	0.1326	3	0.8194
Factor 4	0.38086	0.0635	4	0.7656
Factor 5	0.33888	0.0565	5	0.7498
Factor 6	0.31251	0.0521	6	-0.2654

Individual scores on the first component, explaining the largest proportion of variance in the underlying variables, are used as a summary index of perceived corruption. These scores are by construction normally distributed around zero. The table also reports the factor loadings of the single variables on the first retained component extracted from the factor analysis. The coding of variable number 6 is *inverted* relative to the other five, resulting in a negative loading.

We construct the index of experienced corruption as the number of positive answers given by the respondent to all the questions asking whether (s)he has ever witnessed corrupt behaviour on behalf of public officials available in the European Quality of Government Index survey.

The questions are as follows:

In the last 12 months, have you or anyone in your family been asked by a public official to give an informal gift or bribe in:

1. Education services?

2. Health or medical services?

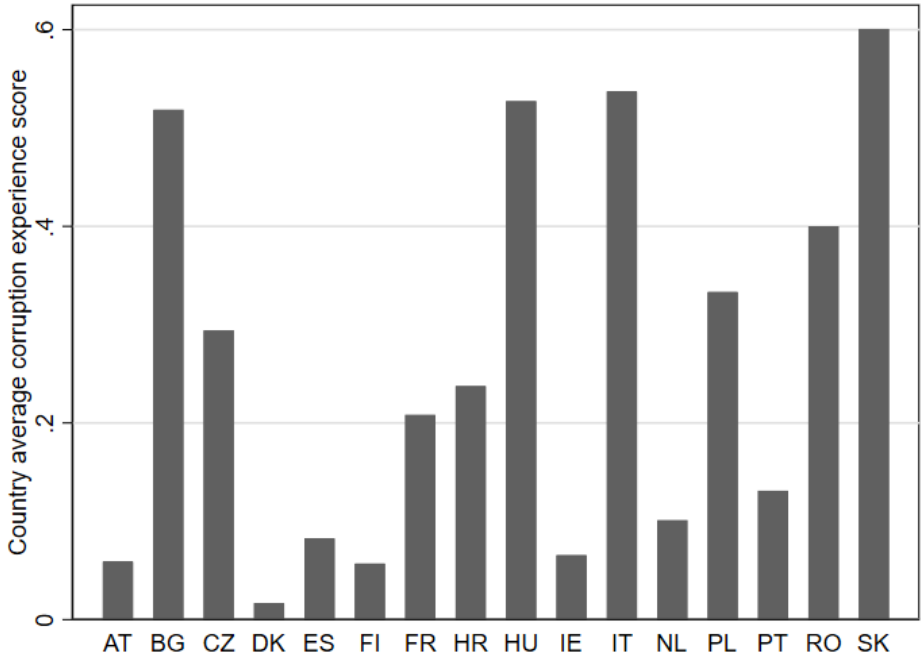3. Police?

4. Any other government-run agency?

In the last 12 months, have you or anyone in your family given an informal gift or bribe in:

1. Education services?

2. Health or medical services?

3. Police?

4. Any other government-run agency?

Figure C.2 presents the distribution of our index of experienced corruption across our estimation sample.

FIGURE C.2. DISTRIBUTION OF PERCEIVED CORRUPTION SCORES ACROSS OUR ESTIMATION SAMPLE.

D PUBLIC GOOD CONTRIBUTIONS

Table D.1 displays OLS regressions of the amounts contributed to the public good by the group members (Collectors excluded) in the public good game phase of our experiment. As evident, contributions are not impacted by our experimental conditions.

TABLE D.1. OLS REGRESSION OF THE AMOUNTS CONTRIBUTED BY THE GROUP MEMBERS IN THE PUBLIC GOOD GAME.

	Model 1	Model 2	Model 3
	Public good contributions		
Condition *Zero*			
Condition *One*	0.240	0.221	0.213
	(1.072)	(1.073)	(1.072)
Condition *Fifty*	-0.833	-0.728	-0.679
	(1.069)	(1.054)	(1.083)
Belief(e)		0.986	1.021
		(1.594)	(1.581)
Belief(c)			0.046
			(0.108)
Constant	3.300**	2.654	2.291
	(1.669)	(1.923)	(2.065)
Individual controls	✓	✓	✓
Observations	174	174	174
R-squared	0.083	0.084	0.086

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. The regressions control for age, gender and profession. Belief(e) = normalised beliefs about the amount entered for redistribution by the collector divided by the group's total contributions, Belief(c) = beliefs about the other group members' contributions. The regressions restrict the estimation sample to group members (non-collectors) only.

E ANALYSIS OF BELIEFS

E.1 Beliefs about embezzlement

We now show that our conditions indeed conveyed the feeling that the institutional environment would be differently capable of preventing corrupt behaviour on behalf of the official. We measure these perceptions with the subjects' beliefs about the amount of contributions collected by the group the Collectors would redistribute to the group. Recall that any amount not redistributed would remain in the Collector's pockets.

Table E.1 presents regressions of the group members' beliefs about the proportion of the total amount of contributions collected by the group which will be redistributed by the Collector.

TABLE E.1. OLS REGRESSION OF NORMALISED BELIEFS ABOUT THE AMOUNT REDISTRIBUTED BY THE COLLECTORS.

	Model 1	Model 2	Model 3
	Beliefs about embezzlement		
	Amount entered for redistribution		
Condition *Zero*			
Condition *One*	0.019	0.021	0.022
	(0.046)	(0.046)	(0.046)
Condition *Fifty*	-0.106**	-0.107**	-0.103*
	(0.052)	(0.052)	(0.053)
Group contributions		-0.001	-0.003
		(0.002)	(0.003)
Own contribution			0.004
			(0.004)
Constant	0.655***	0.676***	0.687***
	(0.069)	(0.084)	(0.084)
Observations	174	174	174
R-squared	0.094	0.095	0.101

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

The proportion of the total amount contributed expected to be redistributed drops significantly in condition *Fifty* compared to when embezzlement on behalf of the collector is prevented with certainty. On the other hand, beliefs in Condition *One* are not statistically different from the baseline. These results point towards a significant increase in the amount that the Collector is expected to attempt to embezzle of group's money when the institutions are not fully capable of preventing successful attempts.

E.2 Beliefs about others' contributions

Table E.2 reports the analysis of beliefs about the other group members' contributions to the public good game, on which we detect no impact of the experimental conditions.

TABLE E.2. OLS REGRESSION OF BELIEFS ABOUT OTHERS' CONTRIBUTIONS.

	Model 1	Model 2
	Beliefs about others' contributions	
<u>Condition *Zero*</u> Condition *One*	0.165	-0.285
	(0.861)	(0.694)
Condition *Fifty*	-0.982	-0.944
	(0.860)	(0.778)
Group contributions		0.279***
		(0.031)
Constant	7.357***	2.276
	(1.501)	(1.455)
Observations	174	174
R-squared	0.028	0.317

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

F   EXPERIMENTAL INSTRUCTIONS

This experiment consists of two parts, Part I and Part II.

At the end of the experiment, only one of the two parts will be randomly selected by the software and will be valid for payment.

Your earnings and your actions in Part I will not affect your earnings or actions in Part II.

Similarly, your earnings or actions in Part II will have no consequence on your earnings or actions in Part I.

In the following pages you will find instructions for Part I. The instructions for Part II will be distributed at the end of Part I.

Part I

You will be randomly assigned to a group of three people.

You and the other people in your group will receive an endowment of 20 Euros each.

Moreover, your group has a project. Your task is to decide how many Euros of your endowment you want to contribute to the project and how many you want to keep for yourself to place in your Purse. At the end, the amount of Euros in your Purse depend on how many Euros you keep for yourself, how many you contribute to the project, and on how many Euros are contributed by the others in your group.

The amount of Euros you will have in your Purse at the end of the session will be paid out to you in cash.

The software will randomly choose one person from your group to be the **Collector**. We will refer to the **other people** in the group as to the **Group Members**. The Collector's task is that of collecting the contributions of all Group Members to the group project, including him or herself, and transferring them to the distribution software.

Once everyone in the group has made their contribution to the group project, the total amount of Euros contributed by the whole group is transferred into the Purse of the Collector. The Collector will then manually enter the amount of Euros collected by the group to the distribution software. The amount they entered will then be re-transferred from their Purse to the distribution software and every person in the group will receive their earnings from the project.

Your earnings are computed as follows.

Your Purse, and that of the other members of your group, will consist of two parts:

(1) The Euros which you have not contributed and kept for yourself are placed in your Purse,

The amount of Euros you can allocate between your private Purse and the project is equal to your endowment. You choose how much to contribute to the project by entering a number between 0 and the amount of Euros in your endowment. As soon as you have defined your contribution you will also have defined the amount of Euros you will keep for yourself. The points you keep for yourself will be automatically placed in your Purse:

Euros kept in your Purse = your Endowment – the Euros you contribute to the project

The second part of your Purse are:

(2) The "**earnings from the project**", for which:

Earnings from the project = 0.5 x amount re-transferred to the distribution software by the Collector.

The earnings from the project will be summed to the Euros you kept in your Purse. Therefore, at the end, the amount of Euros in your Purse will be given by:

Your Purse = Euros kept + 0.5 x (amount re-transferred to the distribution software by the Collector)

The earnings from the project of each person in the group are calculated in the same way. This means that everyone receives the same earnings from the project.

For example, suppose that the sum of all contributions to the project is 10 Euros. In this case everyone in the group earns 0.5*10=5 Euros **from the project**. If the sum of all contributions to the project is instead 30 Euros, then each in the group will earn 0.5*30=15 Euros **from the project**.

Each Euro you keep for yourself is directly put in your Purse. If instead you contributed that 1 Euro to the project, the total contribution to the project would then rise by one Euro, and your earnings from the project would rise by 0.5*1=0.5 Euros.

Similarly, the earnings from the project of each other person in the group would also rise by 0.5 Euros each, so that the total earnings of the group would rise by 0.5*3=1.5 Euros. Your contribution to the project therefore also raises the income of the others. Similarly, your earnings increase for each Euro contributed by the others to the group project.

For each Euro contributed by any other person in your group you earn 0.5*1=0.5 Euros.

Now imagine that everyone contributes 10 Euros, so that the total amount collected by the group is 30 Euros and everyone has 10 Euros in their Purses. The 30 Euros collected by the group are transferred to the Collector's Purse and added to the Euros he or she had kept for herself. Hence, at this point, there are 40 Euros in the Collector's Purse (what he or she had kept plus what collected by the group). The Collector will then transfer the amount collected by the group from his or her Purse to the distribution software, which will then give everyone their earnings from the project: by entering 30, the software will distribute 0.5 x 30 = 15 Euros to each person in the group. Hence, since everyone had contributed 10 Euros and kept 10 for themselves, everyone earns 10 + 0.5 x 30 =25 Euros.

At the end of the session, **the Euros you have in your Purse** will be **paid out to you at the end of the session**.

During the session, you will **not** receive information about what others in your group have done, nor about your earnings until **the very end of the session.**

ONLY DISPLAYED TO PARTICIPANTS IN THE 50% EMBEZZLEMENT CONDITION

Notice that the software will perform **random checks** with a **50%** probability on the amount entered by the Collector in the distribution software. That is, in **50 cases out of 100**, the amount entered will not be checked. *[That is, in **50 cases out of 100**, the amount entered will be checked.]* If the amount entered by the Collector turns out to be different from what it should be, he or she will be asked to correct the entry before proceeding further.

Notice that the software will perform **random checks** with a **1%** probability on the amount entered by the Collector in the distribution software. That is, in **1 case out of 100**, the amount entered will not be checked. *[That is, in **99 cases out of 100**, the amount entered will be checked.]* If the amount entered by the Collector turns out to be different from what it should be, he or she will be asked to correct the entry before proceeding further.

Notice that the software will perform **random checks** with a **100%** probability on the amount entered by the Collector in the distribution software. That is, in **0 cases out of 100**, the amount entered will not be checked. *[That is, in **100 cases out of 100**, the amount entered will be checked.]* If the amount entered by the Collector turns out to be different from what it should be, he or she will be asked to correct the entry before proceeding further.

Do you have any questions? (**If so, please, raise your hand**)

Before starting the session, please take a few minutes to answer some control questions. These are only meant for you to get familiar with the task and gauge your understanding, and will not affect your earnings.

Control questions

Please answer the following control questions. They will help you to gain an understanding of the calculation of your final Purse, which depends on your decision about how you distribute your 20 Euros and with the decision of the others in your group. Please answer all the questions and write down your calculations. The questions will be solved publicly in 10 minutes.

1. Everyone in your group has an endowment of 20 Euros. Assume that no one, including you, contributes anything to the project.

    a. What will your final Purse be? ___20_____

    b. What will the final Purse of the others be? ____20_____

2. Everyone in your group has an endowment of 20 Euros. Assume that everyone, including you, contributes all of their endowment to the project.

    a. What will your final Purse be? __30_____

    b. What will the final Purse of the others be? ___30_____

3. Everyone in your group has an endowment of 20 Euros. The other 2 members contribute a total of 30 Euros to the project.

    a. What will your final Purse be, if you – in addition to the 30 Euros – contribute 0 Euros to the project? ___35_____

    b. What will your final Purse be, if you – in addition to the 30 Euros – contribute 8 Euros to the project? ___31_____

    c. What will your final Purse be, if you – in addition to the 30 Euros – contribute 14 Euros to the project? ___28_____

4. Everyone in your group has an endowment of 20 Euros. You contribute 8 Euros to the project.

    a.   What will your final Purse be if the other group members – in addition to your 8 Euros -contribute another 6 Euros in total to the project? __19_____

    b.   What will your final Purse be if the other group members – in addition to your 8 Euros – contribute another 12 Euros in total to the project? ___22_____

    c.   What will your final Purse be if the other group members – in addition to your 8 Euros – contribute another 22 Euros to the project? ___27_____

Part II

You will now be paired with another participant from this session. Each of you will receive 6 Euros.

Your earnings in Part II will depend on your choice and on the choice of the other. One of you will be randomly selected to be the "sender" and the other to be the "receiver".

A pair of choices.

The **sender** will decide how much, if anything, of the 6 Euros to send to the receiver.

We will multiply the amount sent by a factor of 2. This way, if the sender sends 1 Euro, the receiver will receive 2 Euros. If the sender sends 6 Euros, the receiver will receive 12 Euros.

The **receiver** can then decide how much, if anything, of the amount he or she has (the 6 Euros plus the amount received) to send back to the sender.

After these two choices have been made, you will be re-matched with another participant, you will be assigned the role you were not assigned the first time, and will repeat the choices. Hence if you were assigned the role of "Sender" the first time you will be assigned that of "Receiver", and vice versa.

Hence, you will participate in the pair of choices twice, once as a sender and once as a receiver in random order.

Attention: only one of the two pairs of choices will be randomly selected by the software and be valid for payment in Part II. This can be either your choice as a sender or that as a receiver, depending on which one is selected.

Do you have any questions? (**If so, please, raise your hand**)