



# Entrepreneurship, trust and corruption

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## ABSTRACT

I propose a theoretical model where trust towards strangers is a channel through which institutions determine economic outcomes, in particular, entrepreneurship and corruption. More importantly, I show that the role of trust has been overlooked since high levels of trust do not always enhance desirable economic outcomes. Trust helps individuals to participate in economic exchanges aligned with social welfare, but it also facilitates individuals to cooperate for the achievement of corrupt deals. Under this more general view of trust, the model generates a non-trivial new prediction at the individual level. Specifically, the individual-level relationship between honesty and trust changes depending on the institutional quality of a country. Dishonest individuals are the more trusting individuals in countries with poor institutions, and the less trusting in countries with good institutions. Using individual-level data of 80 countries from the World Value Survey and the European Values Study, I present empirical evidence in support of this prediction.

## 1. Introduction

Trust towards strangers is associated with a number of socially desirable economic outcomes.<sup>2</sup> At the aggregate level, it is positively correlated with income, growth, financial development, a good performance of larger firms, the quality of institutions, and low corruption (Putnam, 1993; La Porta et al., 1997; Knack and Keefer, 1997; Zak and Knack, 2001; Guiso et al., 2004, 2010; Tabellini, 2008, 2010; Algan and Cahuc, 2010). At the individual level, it is correlated with income, education, and entrepreneurship (Alesina and La Ferrara, 2002; Guiso et al., 2006; Batsaikhan, 2017).

One possible interpretation of these links is that there is a causal effect of trust towards strangers on economic outcomes (Algan and Cahuc, 2010; Tabellini, 2010), since trust might assist individuals in achieving socially desirable economic exchanges with strangers in the presence of asymmetric information. At the same time, there is also the view that trust is shaped by the current environment (Alesina and La Ferrara, 2002). For example, individuals may trust strangers if current institutions successfully enforce the law. In this paper I show that trust towards strangers may indeed be a channel through which institutions determine economic outcomes. However, this paper highlights an ambivalent role for trust that has often been overlooked in the existing literature:

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<sup>2</sup> In this paper, I focus on the trust held towards non-personally known individuals and I avoid the term “generalized trust” which is usually used in the literature since the latter could also embrace the trust held towards known individuals.

trusting strangers might not only facilitate cooperation for the pursuit of socially desirable economic exchanges, but it might also promote cooperation for the achievement of illegal transactions.

I focus on the dimension of trust towards strangers that concerns to economic exchanges in which an individual *A* does not completely know if a non-personally known individual *B* is going to provide what individual *A* expects. For example, in the market of second-hand cars, a buyer trusts a seller when the buyer believes that the seller is not providing lemons. On the other hand, in the market of illegal drugs, a buyer trusts a seller when the buyer believes that the seller is supplying high-quality drugs. Certainly, trusting strangers might bring about economic exchanges which are socially desirable but also some others which are not. Given the structure of these situations, I define the ability of an individual *A* to trust a stranger *B* as a situation in which an individual *A* believes that a non-personally known individual *B* will do something that is exactly what *A* is expecting.

Undoubtedly, there are more dimensions and interpretations of trust towards strangers that one can think of. Nevertheless, the considered interpretation of this paper is a natural one in the specific context of economic exchanges with asymmetric information, and it fits to the standard view on trust discussed in the literature. For instance, in his seminal work, Gambetta (2000) defines trust as “a particular level of the subjective probability with which an agent assesses that another agent or group of agents will perform a particular action, both before he/(she) can monitor such an action (or independently of his/(her) capacity ever to be able to monitor it) and in a context in which it affects his/(her) own action”. Moreover, he adds that when we trust someone, “we implicitly mean that the probability that he/(she) will perform an action that is beneficial or at least not detrimental to us is high enough for us to consider engaging in some form of cooperation with him/(her)”. Note that this last statement implies that the ability of an individual *A* to trust a non-personally known individual *B*, in the presence of asymmetric information, can generate beneficial results for both of them. Nevertheless, it is not necessary that the consequences that derive from *A* trusting *B* need to be also beneficial for the rest of society. Precisely, this latter result is the extra assumption that previous literature has also implicitly made. On the contrary, in this article I do not impose any effect of trusting on the rest of society, which is literally what allows me to analyze from a theoretical and an empirical point of view this “dark side” of trusting strangers.

Accordingly, in order to study these two sides of trusting strangers, I introduce a model with two markets, a legal and an illegal one, in a context of asymmetric information. In the model, institutional quality determines the individual levels of trust towards strangers, and those levels of trust affect the following two economic outcomes: entrepreneurship and corruption. In particular, trusting strangers is used for cooperation in economic exchanges in which individuals do not completely know if the other part is going to provide what they expect. These economic exchanges can take place in the legal market or in the illegal one. Whereas trust always assists individuals to bring about transactions that are privately beneficial for them, institutional quality determines whether these exchanges have desirable or undesirable consequences for the rest of society. Individuals willing to engage in lawful transactions trust strangers only when institutions successfully enforce the law. However, individuals who are ready to commit illegal exchanges trust strangers to reciprocate their deals only when institutions cannot enforce the law.

More specifically, I propose a model in which the population is divided into desirable producers, undesirable producers, bureaucrats and consumers. I assume that individuals in the model do not know each other. Desirable and undesirable producers need to decide whether to engage in a home activity where they produce for personal consumption or to become entrepreneurs and sell goods to consumers. However, undesirable producers make useless goods when becoming entrepreneurs, and there is a problem of adverse selection since consumers cannot observe if an entrepreneur is a desirable or an undesirable producer. In order to prevent consumers from buying useless goods, there is a regulatory agency composed of bureaucrats. They can distinguish between the two types of producers and are supposed to issue required licenses for becoming an entrepreneur, the purpose of which is to screen out undesirable producers. However, bureaucrats endogenously choose whether to be honest and act in the public interest, or whether to be corruptible and issue licenses to undesirable producers in exchange for a bribe. For simplicity, I assume that desirable producers can always obtain a license without needing to offer a bribe, and that only undesirable producers have to bribe to obtain the required license. There is also asymmetric information between producers and bureaucrats since the former do not observe if the latter have endogenously chosen to be corruptible or not. Thus, this is a model of asymmetric information with a final goods market and a market for bribes.

The effects of bureaucrats allowing the entry of undesirable producers into the entrepreneurial activity are a reduction in the average quality of goods sold on the market and, as a result, a decline in the equilibrium price. Consequently, desirable producers and consumers are not keen on corruption since it is detrimental for them. For its part, undesirable producers are better off with corruptible bureaucrats, since it is precisely what enables them to become entrepreneurs and does not negatively affect them. Thus, desirable producers and consumers do not tolerate corruption, whereas undesirable producers always tolerate it. Finally, I also assume that there is a positive probability that a corrupt deal between a bureaucrat and an undesirable producer is discovered and, in such a case, the bureaucrat is fired and the undesirable producer cannot sell the good on the market. This probability is a proxy for the institutional quality of a country. In the model, institutional quality, the bureaucrats' wage and the proportion of desirable producers are exogenous, and constitute the current environment; while trust towards strangers, the decision of becoming an entrepreneur, and corruption are all endogenous.

As discussed above, an individual *A* has the ability to trust a non-personally known individual *B* when *A* believes that *B* will do something that is beneficial for *A*. Hence, in the context of the model, trusting strangers is defined as the individual *A*'s belief that a stranger *B* will do something that is beneficial for *A*. Correspondingly, consumers' trust towards strangers is modeled as the belief that a stranger (an entrepreneur) is a desirable producer and sells high-quality goods. That is, consumers trust strangers when they expect a stranger to do something that is good for themselves. Likewise, desirable producers' trust towards strangers is the belief that a stranger (a bureaucrat) is honest and does not allow the entrance of undesirable producers into the entrepreneurial activity through corruption, since this lowers the equilibrium price and therefore the profits of desirable producers. Finally, undesirable

producers' trust towards strangers is the belief that a stranger (a bureaucrat) is corruptible and accepts bribes allowing them to obtain a license. That is, both desirable and undesirable producers trust strangers when they expect a stranger to do something that is good for themselves. Hence, the trust of consumers and desirable producers bring about cooperation for the achievement of legal economic exchanges. On the contrary, the trust of undesirable producers helps them to cooperate with bureaucrats to circumvent a regulation.

The economics literature on trust has taken different approaches to incorporate trust in a theoretical setting. For instance, [Zak and Knack \(2001\)](#) introduce trust as the time not spent in verifying others, [Gennaioli et al. \(2012\)](#) think of trust as a factor that decreases the losses produced by taking risk. And, similar to this paper, trust has also been modeled as the belief that someone is of a given type or that someone will do a particular action ([Cabral, n.d.](#); [Carlin et al., 2009](#); [Butler et al., 2016](#); [Rohner et al., 2013](#)). For instance, [Carlin et al. \(2009\)](#) propose a theoretical model in which a group of heterogeneous agents sell an investment opportunity to a group of clients. Agents can choose to act in the interest of their customers or act opportunistically and ignore their customers' welfare. In their model, the clients' trust is the proportion of agents who act in the best interest of their customers. Correspondingly, my definition of trust is aligned with this one. However, while in [Carlin et al. \(2009\)](#) trust is used to legally invest in a market, in my model, trust can also be used to cooperate for the achievement of corrupt deals.

Moreover, my setting incorporates the essential elements of a corruption model according to [Burguet et al. \(2016\)](#), who review the undertaken research on corruption of the last three decades. They show that a standard model of corruption is usually based on a principal-supervisor-client setting. The proposed model in this paper is, in fact, a reduced version of this structure. Specifically, there is an agency composed of bureaucrats (supervisor) who are delegated the task to screen out undesirable producers from the market and act in the interest of desirable producers and consumers (principal). Nevertheless, bureaucrats might collude with undesirable producers (client) and negatively affect desirable producers and consumers. Thus, the novelty of this paper does not lie on the way of modeling corruption, but in considering the role that trust can play in an illegal setting such as the market for bribes.

The model has a unique equilibrium that depends on institutional quality, the bureaucrat's wage and the share of undesirable producers. When institutional quality is good enough, bureaucrats do not accept bribes. Consequently, desirable producers completely trust strangers and become entrepreneurs. Undesirable producers, in their turn, distrust strangers and engage in home production. As a result, consumers fully trust strangers. Altogether, the aggregate level of trust towards strangers is high and corruption is nonexistent. Conversely, when institutional quality is poor enough, bureaucrats are ready to accept bribes. Undesirable producers trust strangers, and as a consequence, some of them become entrepreneurs through corruption. Desirable producers, in turn, distrust strangers and some of them no longer engage in the entrepreneurial activity, since the entrance of undesirable producers in the entrepreneurial activity crowds them out. In consequence, consumers trust strangers less than in the first case. As a whole, if institutional quality is poor enough, the aggregate level of trust is low and corruption is high. Thus, if countries have different levels of institutional quality, the model reproduces the negative cross-country correlation between trust towards strangers and corruption. Not surprisingly, good institutions generate high aggregate levels of trust towards strangers and low corruption.

Therefore, under the more complex view of trust considered in this paper with respect to the unambiguously positive one which dominates in the literature, the model does not contradict the well-known negative correlation between trust towards strangers and corruption across countries. Nevertheless, the model generates a non-trivial new prediction at the individual level. Individuals who tolerate corruption (undesirable producers) have the highest levels of trust when institutions are bad. Conversely, individuals who do not tolerate corruption (desirable producers and consumers) hold the highest levels of trust when institutions are good. Therefore, the individual-level relationship between honesty and trust towards strangers changes depending on the institutional quality of a country. In countries with good enough institutional quality, more honest individuals are also the more trusting ones. However, in countries with poor enough institutional quality, more dishonest individuals are the more trusting ones. Using data from individuals of 80 countries from the World Value Survey and the European Values Study, I present empirical evidence in support of this prediction.

Challenging the established view, this prediction highlights that trust towards strangers is a doubled-edged sword. In general, and in the context of legal businesses, trusting strangers might help entrepreneurs to follow their honest activities since many deals are done by just shaking hands in the business environment. Nevertheless, entrepreneurs willing to bribe an unknown bureaucrat need to trust the bureaucrat to not report them to the police and accept the bribe, and more importantly, to act as expected since corrupt deals cannot be enforced by any type of legal contract by their nature. Thus, trusting strangers might also assist entrepreneurs to accomplish corrupt transactions. Summing up, I show that trusting strangers can promote cooperation for both socially desirable and harmful activities. Consequently, this paper is also connected to the growing literature which identifies the dark side of social capital ([Lampe and Johansen, 2003](#); [Satyanath et al., 2017](#)).<sup>3</sup>

The model in this paper is similar to the one proposed by [Aghion et al. \(2010\)](#) in the sense that in both models there exist some individuals who need to choose between engaging in an entrepreneurial activity or into an outside option. In their model, however, before deciding what to work on, individuals also have to choose between becoming civic or uncivic. Those individuals who engage in the entrepreneurial activity and who are uncivic impose a negative externality on others. Furthermore, individuals endogenously choose between having an unregulated market or introducing a regulatory agency that can potentially reduce negative externalities albeit forges the favorable conditions for corruption to emerge. The main mechanism of their paper is that the inability to trust others fosters the need for regulation and, at the same time, regulation prevents the creation of trust. This mechanism in [Aghion et al. \(2010\)](#) leads to multiple equilibria. Having multiple equilibria is what allows [Aghion et al. \(2010\)](#) to explain the negative

<sup>3</sup> [Lampe and Johansen \(2003\)](#) point out that trusting strangers allows mutual support and cooperation for the pursuit of transactions of illegal goods between strangers. [Satyanath et al. \(2017\)](#) empirically show that networks of civic associations facilitated the rise of the Nazi Party.

cross-country relationship that exists between trust and regulation and between trust and corruption. My model is also capable of generating this latter relationship. Nonetheless, the equilibrium in my model is unique and depends on several exogenous parameters that include institutional quality. Thus, it is institutional quality that determines whether a country is corrupt or honest and at the same time affects trust. The better institutional quality, the lower corruption, and the higher trust. However, the main addition of my paper is new insight into the role that trust can play in an economy. While Aghion et al. (2010) think of trust as a belief about civiness that determines the equilibrium, I model trust as a belief that can explicitly be used to facilitate socially desirable economic exchanges but might, as well, facilitate the achievement of illegal and corrupt transactions. Hence, I show that trust towards strangers might be a channel through which institutions determine economic outcomes that might be legal but also illegal.

Finally, my model also predicts that the higher the share of desirable producers in an economy, the higher the incentives for bureaucrats and undesirable producers to bring about corrupt transactions since they can get higher economic payoffs, and, consequently, the higher institutional quality needed to fight corruption. This suggests that if the number of desirable producers increases, a country should implement policies that improve the quality of institutions.

The rest of this paper is organized as follows. Section 2 presents and discusses the model. Section 3 empirically tests the main prediction of the model and, finally, section 4 concludes.

## 2. The model

### 2.1. Setup

The economy is inhabited by three groups: producers, consumers and bureaucrats. Each group of the population consists of a continuum of measure one of risk-neutral individuals. I assume that none of them knows each other. Individuals in the first group (producers) can be of two types: a fraction  $\rho \leq \frac{1}{2}$  of them are undesirable producers ( $u$ ) and the remaining ones are desirable producers ( $d$ ). Both types can costlessly produce one unit of a good if they engage in an entrepreneurial activity. However, desirable producers have the ability to produce such a good of high quality (HQ) and undesirable producers, on the other hand, can only make it of low quality (LQ). These goods are sold on the market. Alternatively, these individuals can engage in home production where they produce for personal consumption. Consumers, in their turn, either consume one unit or zero units of the goods produced by the entrepreneurs. They positively value high-quality goods and do not derive positive utility from low-quality ones.

If there were perfect information, consumers would buy goods only from desirable producers. However, I assume the presence of asymmetric information in the sense that consumers only identify the nature of a good after its purchase. In order to avoid that consumers purchase low-quality goods, there is a regulatory agency composed of the last group of the population, the bureaucrats. They can distinguish producers' types and issue a required license to sell on the market in order to prevent undesirable producers from becoming entrepreneurs. These bureaucrats endogenously choose whether to be honest and act in the interest of consumers and, as it will be clear below, in the interest of desirable producers, or whether to be corruptible and issue licenses to undesirable producers in exchange for a bribe. Once again, I assume that there is asymmetric information in the sense that producers do not observe if bureaucrats chose to be honest or corruptible. Bureaucrats and producers, and, entrepreneurs and consumers, are randomly matched. The timing of the model and the payoffs of each group of the population are as follows:

1. I assume that if bureaucrats want to be corruptible, they need to first learn how to accept bribes and how the corruption business works in general. In a similar vein, if they want to be honest they need to learn how an honest person behaves. As a result, I impose that bureaucrats choose whether to become honest or corruptible at the beginning of their professional career before knowing if in the future they will be matched with a desirable or an undesirable producer. Hence, if they decide to be honest, they will never accept a bribe. On the other hand, if they decide to be corruptible, they will accept a bribe when offered one. Later in their life, these bureaucrats are randomly matched with a producer who might or might not ask for a license. In the case that these producers do actually ask for a license, bureaucrats need to decide on granting it or not. In such a case, bureaucrats receive a wage  $w \in [0, 1]$ . If they do not interact with any producer their payoff is simply zero. That is, they receive a positive payment when they carry out their duties as screening agents. Honest bureaucrats always act according to the law and only distribute licenses to desirable producers. Conversely, corruptible bureaucrats also issue licenses to undesirable producers in exchange for a bribe. In this latter case, their payoff is increased by the bribe  $b$  and they obtain  $w + b$ . Yet, there also exists a probability  $\alpha$  that a corrupt transaction is discovered by the state. In such a case, the bureaucrat is fired and receives a payoff equal to zero. I interpret  $\alpha$  as a proxy for enforcement or, in other words, for institutional quality of the country.
2. Producers, both desirable and undesirable, need to decide on becoming an entrepreneur or engaging in home production. If they opt for the entrepreneurial activity, they need to first produce the good and then apply for the license. In case of not obtaining the license, they no longer can engage in home production since they already spent their available time producing the final good and do not have more time to devote themselves to home production. For the sake of simplicity, I assume that desirable producers can always get a license and that the license is free. The payoff of a desirable producer  $i$ , in this case, is  $U_{d,i}(\text{license}) = p$ , where  $p$  is the endogenous price of the good sold on the market.<sup>4</sup> In contrast, undesirable producers need to bribe a corrupt bureaucrat to obtain a license. If an undesirable producer offers a bribe to a corruptible bureaucrat and their deal is not discovered by the state, they obtain a license and are able to sell the good on the market. Yet, if the corrupt deal is discovered by the state

<sup>4</sup> The cost of production and the cost of the license is represented by the opportunity cost of foregone home production.

they get a payoff equal to zero. Therefore, the expected payoff of an undesirable producer  $i$  who offers a bribe to a corruptible bureaucrat equals  $EU_{u,i}(\text{bribe}|\text{corrupt}) = (1 - \alpha)(p - b)$ . Conversely, if they offer a bribe to an honest bureaucrat they are denied the entrance to the entrepreneurial activity, obtaining a payoff equal to  $U_{u,i}(\text{bribe}|\text{honest}) = 0$ .<sup>5</sup> However, undesirable producers do not know if a bureaucrat is honest or corruptible when they decide whether to offer a bribe or not. Both types of producers, alternatively, can engage in home production where they have heterogeneous payoffs. In particular, each producer receives a payoff  $U_{j,i}(\text{home production}) = \psi_i$ , where  $j \in \{d, u\}$  and  $\psi_i$  is distributed uniformly on the unit interval. Note that the payoff they obtain in home production does not depend on whether they are desirable or undesirable producers.

3. Finally, consumers need to decide on buying or not the good sold on the market. If consumers buy a good, their utility equals  $U_c(\text{buy}|HQ) = 1 - p$  or  $U_c(\text{buy}|LQ) = -p$  if the good is from high or low quality, respectively. However, when they are matched with an entrepreneur, they do not know if such an entrepreneur has obtained a license through corruption or not, and thus, whether the good is of high or low quality. In the case that they opt not to buy it, they obtain a utility equal to  $U_c(\text{don't buy}) = 0$ . Moreover, I assume that the price equals the highest level that the market can bear.<sup>6</sup>

## 2.2. Equilibrium

**Definition.** *The equilibrium concept is that of a Perfect Bayesian Equilibrium, and consequently it is characterized as*

1. the fraction of bureaucrats who choose to be honest ( $\sigma$ ),
2. the share of desirable producers who become entrepreneurs ( $\gamma$ ),
3. the proportion of undesirable producers who offer a bribe ( $\delta$ ),
4. the consumers' belief that goods are from high quality ( $t_c$ ),
5. the desirable producers' belief that bureaucrats are honest ( $t_d$ ),
6. the undesirable producers' belief that bureaucrats are corruptible ( $t_u$ ),
7. and the equilibrium price ( $p$ ),

*such that all individuals' strategies are sequentially rational and the beliefs are derived from strategy profiles through Bayes' rule.*

The model is solved by backwards induction. In the last step, consumers are randomly matched with entrepreneurs who have obtained a license.<sup>7</sup> Therefore, conditional on the decisions of desirable and undesirable producers and bureaucrats, a consumer buys a good if and only if

$$t_c(1 - p) + (1 - t_c)(-p) \geq 0, \quad (1)$$

where  $t_c$  is the consumer's belief that a good is from high quality, and  $p$  is the price. Since the equilibrium price is the highest level which the market can bear, such a price will equal the consumer's belief,  $p = t_c$ . Then, by Bayes' rule, the equilibrium price is

$$p = t_c = \frac{(1 - \rho)\gamma}{(1 - \rho)\gamma + \rho(1 - \sigma)\delta(1 - \alpha)}, \quad (2)$$

where  $\gamma$  is the fraction of desirable producers who become entrepreneurs,  $\delta$  is the fraction of undesirable producers who offer a bribe,  $\sigma$  is the fraction of bureaucrats who become honest and  $\alpha$  is the probability that a corrupt agreement between a bureaucrat and an undesirable producer is discovered. That is, price equals the average quality of the good. Accordingly, if only desirable producers become entrepreneurs, consumers are willing to pay one for the good and thus, the equilibrium price equals one. However, as more undesirable producers succeed in obtaining a license, more low quality goods will be sold on the market, and consumers will be willing to pay less than one for the good. As a consequence, as more undesirable producers become entrepreneurs, the price will decrease and the entrepreneurial activity will be less appealing for desirable producers.

In the previous step, conditional on bureaucrats' decision, a desirable producer  $i$  asks for a license and becomes an entrepreneur if and only if

$$p \geq \psi_i. \quad (3)$$

Since  $\psi_i$  is distributed uniformly on the unit interval, the proportion of desirable producers who become entrepreneurs is equal to

$$\gamma = p. \quad (4)$$

<sup>5</sup> I assume that if undesirable producers ask for a license without offering a bribe, the license is denied and they also obtain a payoff equal to zero.

<sup>6</sup> Note that any price  $p^* \in [0, q]$ , where  $q$  is the proportion of entrepreneurs who sell high-quality goods, could be supported as a Perfect Bayesian Equilibrium by some arbitrary beliefs. For instance, assume that consumers believe that a good is from average quality if an entrepreneur posts a price  $p^* \in [0, q]$ , and they believe that it is certainly from low quality if they see any price different from  $p^*$ . Then, consumers would only buy the good if they receive an offer of  $p^*$ . Finally, in equilibrium, all entrepreneurs would post a price equal to  $p^*$ . However, I select the maximum price which the market can bear (i.e.,  $q$ ) in order to focus on the negative feedback from the average quality of the pool of entrepreneurs to the price. The underlying beliefs of this equilibrium price are intuitively appealing and convenient for my model.

<sup>7</sup> I assume that if there are more consumers than entrepreneurs, only a fraction of consumers are matched with entrepreneurs, the remaining ones, do not play any role.



Similarly, an undesirable producer  $i$  offers a bribe to a bureaucrat if and only if

$$t_u(1 - \alpha)(p - b) + (1 - t_u)0 \geq \psi_i, \quad (5)$$

where  $t_u$  is the undesirable producer's belief that a bureaucrat is corruptible. It follows that the proportion of undesirable producers offering a bribe is equal to

$$\delta = t_u(1 - \alpha)(p - b). \quad (6)$$

For the sake of simplicity, I assume that the bribe is set through Nash bargaining between bureaucrats and undesirable producers. If they reach an agreement, the expected payoffs for a bureaucrat and an undesirable producer equal  $w + b$  and  $p - b$ , respectively. If the bargaining process breaks down, I assume that each of them obtains a payoff equal to zero because undesirable producers cannot longer engage in home production and bureaucrats cannot justify that they carried out their duties as screening agents.<sup>8</sup> The Nash bargaining solution results in a bribe equal to  $\frac{p-w}{2}$ .

Note that when producers take their decisions, they have already formed their conjectures about what bureaucrats have chosen in the previous step. Thus, the desirable producers' belief that bureaucrats are honest will be equal to  $t_d = \sigma$  in equilibrium. On the other hand, the undesirable producers' belief that bureaucrats are corruptible will be equal to  $t_u = 1 - \sigma$  in equilibrium. Plugging these beliefs and the equilibrium price, I can find  $\gamma$  and  $\delta$  as functions of  $\rho$ ,  $\sigma$ ,  $\alpha$  and  $w$ ,

$$\gamma = \frac{2(1 - \rho) - \rho(1 - \sigma)^2(1 - \alpha)^2 w}{2(1 - \rho) + \rho(1 - \sigma)^2(1 - \alpha)^2} \quad (7)$$

$$\delta = \frac{(1 - \rho)(1 - \sigma)(1 - \alpha)(1 + w)}{2(1 - \rho) + \rho(1 - \sigma)^2(1 - \alpha)^2}. \quad (8)$$

Finally, in the first step, if bureaucrats decide on becoming honest, their expected utility equals

$$EU_b(\text{honest}) = ((1 - \rho)\gamma + \rho\delta)w, \quad (9)$$

where  $(1 - \rho)\gamma$  is the probability of being matched with a desirable producer who asks for a license and  $\rho\delta$  is the probability of being matched with an undesirable producer who offers a bribe. In contrast, if they become corruptible, their expected utility equals:

$$EU_b(\text{corruptible}) = (1 - \rho)\gamma w + \rho\delta(1 - \alpha)(w + b). \quad (10)$$

Hence, bureaucrats choose to become honest if and only if  $\Delta^b \equiv EU_b(\text{honest}) - EU_b(\text{corruptible}) \geq 0$ .

The model has a unique equilibrium which depends on institutional quality ( $\alpha$ ), the bureaucrats' wage ( $w$ ) and the proportion of undesirable producers ( $\rho$ ). The following proposition characterizes the equilibrium of the model.

**Proposition 1.** *There exists a unique equilibrium that depends on  $\alpha$ ,  $w$  and  $\rho$ :*

1. **Honest case:** If institutions are good enough, i.e.,  $\alpha \geq \frac{1-w}{1+w}$ , then, all bureaucrats are honest ( $\sigma^* = 1$ ). All desirable producers become entrepreneurs ( $\gamma^* = 1$ ). On the other hand, all undesirable producers engage in home production ( $\delta^* = 0$ ). Desirable and undesirable producers' beliefs are equal to  $t_d = 1$  and  $t_u = 0$ , respectively. Finally, the equilibrium price and consumers' belief are equal to  $p^* = t_c = 1$ .
2. **Intermediate case:** If institutions have an intermediate quality, i.e.,  $\tilde{\alpha}(\rho, w) \leq \alpha < \frac{1-w}{1+w}$ , where  $\tilde{\alpha}(\rho, w) \equiv \frac{2\rho w - (1-\rho)(1+w) + \sqrt{(1-\rho)((1+w)^2 - \rho(1+2w+9w^2)}}{2\rho w}$ , then, a fraction  $\sigma^* = 1 - \frac{\sqrt{\rho(1-\rho)(1-\alpha)^2 w(1-\alpha) - (1+\alpha)w}}{\rho(1-\alpha)^2 w}$  of bureaucrats become honest and the remaining ones become corruptible. A fraction  $\gamma^* = \frac{(1+\alpha)w}{1-\alpha}$  of desirable producers become entrepreneurs. A fraction  $\delta^* = \frac{\sqrt{\rho(1-\rho)(1-\alpha)^2 w(1-\alpha) - (1+\alpha)w}}{\rho(1-\alpha)^2}$  of undesirable producers offer a bribe, and hence, a share  $(1 - \sigma^*)(1 - \alpha)\delta^*$  of undesirable producers become entrepreneurs. Desirable and undesirable producers' beliefs are equal to  $t_d = \sigma^*$  and  $t_u = 1 - \sigma^*$ , respectively. Finally, the equilibrium price and consumers' belief are equal to  $p^* = t_c = \frac{(1+\alpha)w}{1-\alpha}$ .
3. **Corrupt case:** If institutions are poor enough, i.e.,  $\alpha < \tilde{\alpha}(\rho, w)$ , then, all bureaucrats are corruptible ( $\sigma^* = 0$ ). A fraction  $\gamma^* = \frac{2(1-\rho) - \rho(1-\alpha)^2 w}{2(1-\rho) + \rho(1-\alpha)^2}$  of desirable producers become entrepreneurs. A fraction  $\delta^* = \frac{(1-\rho)(1-\alpha)(1+w)}{2(1-\rho) + \rho(1-\alpha)^2}$  of undesirable producers offer a bribe, and hence, a share  $(1 - \alpha)\delta^*$  of undesirable producers become entrepreneurs. Desirable and undesirable producers' beliefs are equal to  $t_d = 0$  and  $t_u = 1$ , respectively. Finally, the equilibrium price and consumers' belief are equal to  $p^* = t_c = \frac{2(1-\rho) - \rho(1-\alpha)^2 w}{2(1-\rho) + \rho(1-\alpha)^2}$ .

Proof in [Appendix A](#).

Before describing the results of [Proposition 1](#), I recall how I defined trust towards strangers in the context of an economic exchange with asymmetric information. The individual  $A$ 's level of trust towards a stranger individual  $B$  is defined as the individual  $A$ 's belief that a stranger  $B$  will do something that is beneficial for  $A$ . Therefore, let me illustrate what is trust towards strangers in the context of the model:

<sup>8</sup> If they do not reach an agreement, the undesirable producer might have incriminating evidence that the bureaucrat would have been prepared to break the law and could report the bureaucrat to the state. In such a case, bureaucrats no longer receive their wage.

1. Consumers are randomly matched with entrepreneurs. However, they do not know if an entrepreneur has obtained a license through bribery or not. Then, consumers trust strangers when they believe that a random entrepreneur is a desirable producer. That is to say, consumers' trust towards strangers ( $t_c$ ) is the consumers' belief that a stranger is doing something beneficial for them such as selling high-quality goods.
2. In turn, desirable producers can always obtain a license. However, if a bureaucrat is corruptible and allows the entrance of undesirable producers to the entrepreneurial activity, then, the equilibrium price decreases and they are worse off. Hence, desirable producers trust strangers when they believe that a random bureaucrat does not let undesirable producers enter the market. In other words, desirable producers' trust towards strangers ( $t_d$ ) is the desirable producers' belief that a stranger is doing something beneficial for them such as not accepting bribes. Note that in this case the trust of desirable producers does not directly affect them in order to obtain a license since I assumed that they can always obtain it. However, for general equilibrium effects, their levels of trust determine whether they become entrepreneurs or not.
3. Finally, undesirable producers are randomly matched with bureaucrats. Recall that they do not know if a bureaucrat is corrupt or honest when they need to decide whether to offer a bribe or instead engage in home production. Thus, undesirable producers trust strangers if they believe that a random bureaucrat will accept a bribe. That is, undesirable producers' trust towards strangers ( $t_u$ ) is the undesirable producers' belief that a stranger is doing something beneficial for them such as accepting bribes. Note that when a bureaucrat accepts a bribe, this bureaucrat is performing a beneficial action for an undesirable producer but not for the rest of society. Consequently, trusting strangers does not only allow cooperation for lawful activities, but also for corruption.

Having defined trust towards strangers, I next discuss the results of [Proposition 1](#). If institutional quality is good enough, that is,  $\alpha \geq \frac{1-w}{1+w}$ , an economy is in the honest case. In this situation, bureaucrats never accept bribes. Desirable producers, consequently, completely trust strangers to do something beneficial for them and engage in the entrepreneurial activity. In contrast, undesirable producers do not trust strangers since they cannot expect strangers to accept bribes and, for this reason, undesirable producers engage in home production. Consumers, in turn, completely trust strangers since they are all selling high-quality goods. Note that in this case, trusting strangers only allows cooperation for lawful activities: it allows desirable producers to become entrepreneurs and it also helps consumers to purchase goods. Moreover, as I show below, the aggregate level of trust towards strangers attains its maximum level and corruption is nonexistent in this case.

However, if institutions are poor enough, that is,  $\alpha < \tilde{\alpha}(\rho, w)$ , the equilibrium is such that all bureaucrats always accept bribes. Accordingly, desirable producers cannot trust strangers to do something beneficial for them such as not accepting bribes. Furthermore, it is less appealing for undesirable producers to engage in the entrepreneurial activity since the entrance of undesirable producers on the market reduces the equilibrium price. Hence, only a fraction of desirable producers become entrepreneurs. Undesirable producers, on the other hand, have the highest level of trust towards strangers in the economy since they believe that strangers will do something beneficial for them. Specifically, they expect that their bribes will be accepted. Since undesirable producers trust strangers, some of them engage in the entrepreneurial activity through corruption. Consumers, for their part, cannot completely trust strangers since some of the entrepreneurs have obtained a license through bribery. In this situation, the aggregate level of trust towards strangers is minimal and the aggregate level of corruption is maximal as I show below. Note that in this case, the most trusting individuals are those ones who also engage in corruption. These high levels of trust allow undesirable producers to cooperate with bureaucrats to dodge a regulation.

Finally, if institutions have an intermediate quality, that is,  $\tilde{\alpha}(\rho, w) \leq \alpha < \frac{1-w}{1+w}$ , then, some bureaucrats are corrupt and the rest are honest. In this situation, the aggregate level of trust towards strangers and the aggregate level of corruption have intermediate levels as I show in the following subsection.

It is also important to emphasize that if bureaucrats accept bribes and allow the entrance of undesirable producers into the entrepreneurial activity, there is a reduction in the average quality of goods sold on the market and a decrease in the equilibrium price. Thus, desirable producers and consumers are worse when bribes are accepted than when they are not. Conversely, the presence of corruptible bureaucrats accepting bribes is what allows some undesirable producers to become entrepreneurs and benefit from a higher payoff. Consequently, it can be stated that, in this model, consumers and desirable producers do not tolerate corruption, whereas desirable producers tolerate it. This observation, together with the above proposition, leads to the next corollary which constitutes the main prediction of the model.

**Corollary 1.** *The individual-level correlation between tolerance towards corruption and trust towards strangers changes depending on the institutional quality of a country. In particular, individuals who tolerate corruption more are also, on average, the more trusting in countries with poor enough institutional quality, and the less trusting in countries with good enough institutional quality.*

**Proof of Corollary 1.** By [Proposition 1](#).

The above corollary highlights that desirable producers and consumers completely trust strangers in a country with good enough institutional quality, and do not trust strangers in a country with poor enough institutional quality.<sup>9</sup> On the other hand, undesirable producers do not trust strangers in a country with good enough institutional quality, and fully trust strangers in a country with poor enough institutional quality. Consequently, the association between trusting strangers and corruption toleration at the individual level varies across countries. That is, the individual-level correlation between tolerance of corruption and the level of trust towards

<sup>9</sup> Consumers trust strangers to some extent in a country with poor enough institutional quality, but less than in a country with good enough institutional quality.

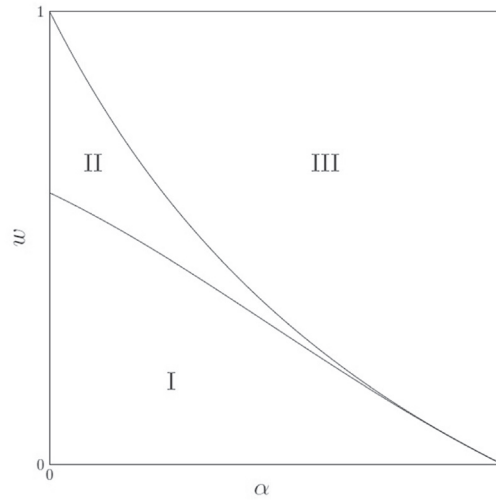


Fig. 1. Parameters' space ( $\alpha$  and  $w$ ) and equilibrium.

strangers is negative for countries with good enough institutional quality and positive for countries with poor enough institutional quality.

### 2.3. Comparative statics

Fig. 1 displays for which combinations of institutional quality ( $\alpha$ ) and bureaucrats' wage ( $w$ ), each of the equilibrium cases shows up. If institutions are poor enough, that is,  $\alpha < \tilde{\alpha}(\rho, w)$ , then,  $\alpha$  and  $w$  are in region I and a country ends up in the corrupt case. On the other hand, if  $\tilde{\alpha}(\rho, w) \leq \alpha < \frac{1-w}{1+w}$ , then,  $\alpha$  and  $w$  are in region II and a country is in the intermediate case. Finally, if institutional quality is good enough, that is,  $\alpha \geq \frac{1-w}{1+w}$ , then,  $\alpha$  and  $w$  are in region III and a country is in the honest situation. Note that, for a given bureaucrats' wage level  $w$ , if institutional quality  $\alpha$  increases sufficiently enough, a country moves from a corrupt to an honest scenario. Likewise, for a given institutional quality  $\alpha$ , if bureaucrats' wage  $w$  increases sufficiently enough, a country moves from a corrupt to an honest scenario in which none of the bureaucrats is corruptible and corruption is nonexistent. In fact, increasing bureaucrats' pay is one of the standard recommendations for reducing corruption and exists cross-country empirical evidence suggesting that the higher the bureaucrats' salaries, the lower the corruption (Van Rijckeghem and Weder, 2001).

Moreover, note that the curve separating regions I and II in Fig. 1 shifts towards the curve separating regions II and III as the share of undesirable producers decreases ( $\frac{\partial \tilde{\alpha}(\rho, w)}{\partial \rho} < 0$ ). Thus, the lower the share of undesirable producers ( $\omega$ ) in an economy, the higher institutional quality and bureaucrats' wage needed to escape from the corrupt case. Why? Bear in mind that the equilibrium price and the bribe are decreasing functions of  $\rho$ . That is, as more desirable producers there are, it is more appealing for bureaucrats to become corruptible and, at the same time, it is also more tempting for undesirable producers to offer a bribe. Consequently, a country that is initially in region II and that succeeds in reducing the proportion of undesirable producers might finish in region I (where all bureaucrats are corruptible) if its institutional quality and bureaucrats' wage remain constant. This observation suggests that countries with intermediate levels of corruption should strive to improve their institutional quality and increase bureaucrats' wage as the share of undesirable producers decreases.

If different countries are to be found in different regions of the parameter space, the model predicts the negative cross-country correlation between trust towards strangers and corruption. On the one hand, I define the aggregate level of trust towards strangers (ALT) as the sum of producers' and consumers' trust, i.e.,  $ALT = \rho t_u + (1 - \rho) t_d + t_c$ . On the other hand, I define the aggregate level of corruption (ALC) as the number of successful corrupt deals in the country, i.e.,  $ALC = \rho(1 - \sigma^*)\delta^*(1 - \alpha)$ . Fig. 2 shows that when the ALT increases, the ALC decreases. The dotted-dashed line illustrates that the aggregate level of trust achieves its lowest level when institutions are poor enough and hence, a country is in the corrupt case. Then, when institutional quality attains in-between values, a country moves to the intermediate case. In this middle region, the aggregate level of trust increases as institutions improve. Finally, when institutional quality is high enough, a country is in the honest case and the aggregate level of trust attains its highest level. The solid line shows that the aggregate level of corruption follows the opposite pattern. That is, corruption achieves its highest level when institutions are poor enough. Then corruption starts to fall as institutional quality increases until institutions reach a sufficiently high level in which corruption is nonexistent.

The comparative statics on the individual levels of trust are illustrated in Fig. 3. When institutions are bad, the most trusting individuals are the undesirable producers since they believe that strangers are doing something beneficial for them. Conversely, when institutions are good enough, undesirable producers cannot longer trust strangers since all bureaucrats are honest. Analogously, the opposite pattern arises for desirable producers and consumers.



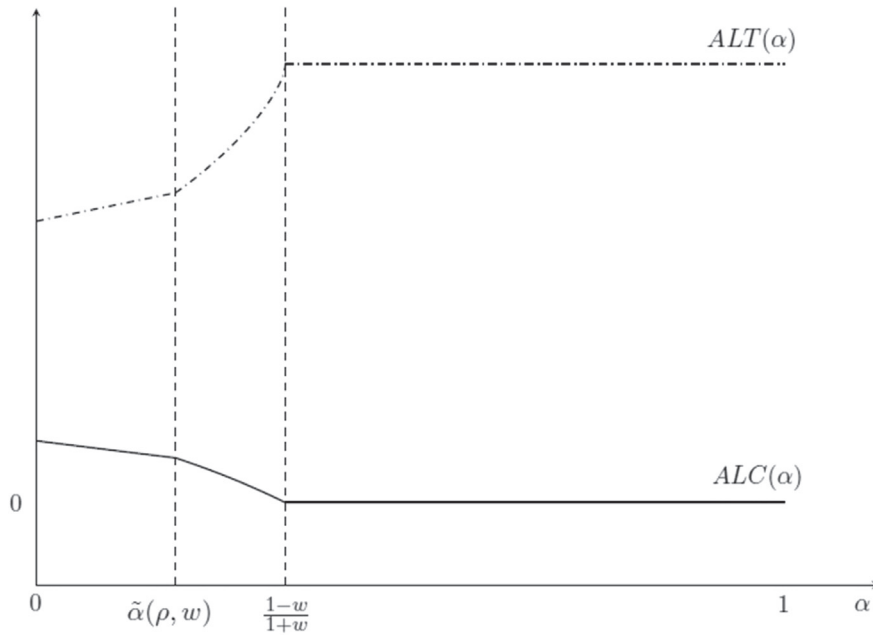


Fig. 2. Aggregate levels of trust and corruption as a function of institutional quality ( $\alpha$ ).

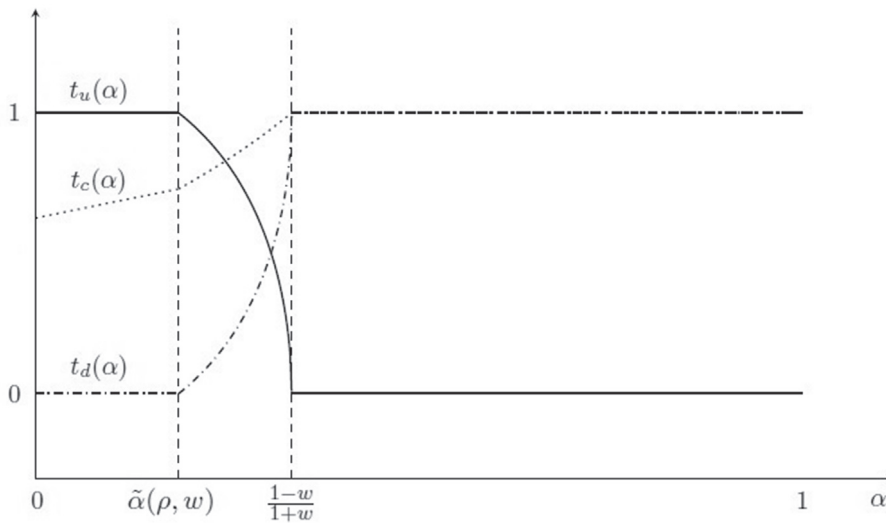


Fig. 3. Individual level of trust of desirable producers, undesirable producers, and consumers as a function of institutional quality ( $\alpha$ ).

Finally, Fig. 4 shows how the proportion of desirable producers who become entrepreneurs ( $\gamma^*$ ) increases as a country achieves better institutions and moves away from the corrupt scenario. Conversely, the proportion of undesirable producers who succeed in becoming an entrepreneur ( $(1-\alpha)\delta^*$ ) decreases. The reason behind is that the equilibrium price decreases as a country becomes more corrupt, and this crowds out desirable producers from the entrepreneurial activity. In the following proposition, I state the above results in a more formal way.

**Proposition 2.** *The higher the quality of institutions,*

1. *the higher the aggregate level of trust towards strangers,  $\frac{\partial ALT}{\partial \alpha} \geq 0$ ;*
2. *the lower the aggregate level of corruption,  $\frac{\partial ALC}{\partial \alpha} \leq 0$ ;*
3. *the higher the trust towards strangers of desirable producers,  $\frac{\partial t_d}{\partial \alpha} \geq 0$ ;*

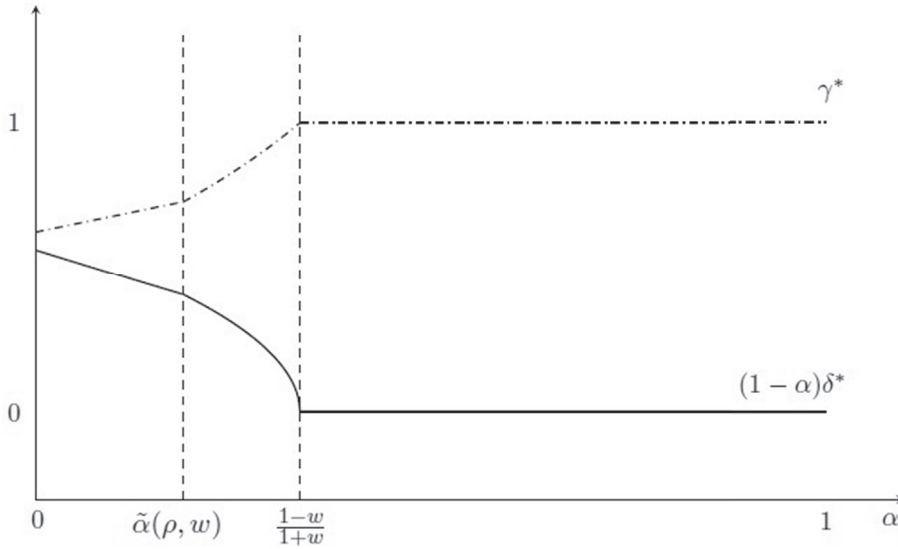


Fig. 4. Proportion of desirable producers who become entrepreneurs and proportion of undesirable producers who offer a bribe to a bureaucrat as a function of institutional quality ( $\alpha$ ).

4. the lower the trust towards strangers of undesirable producers,  $\frac{\partial t_u}{\partial \alpha} \leq 0$ ;
5. the higher the proportion of desirable producers who become entrepreneurs,  $\frac{\partial \gamma^*}{\partial \alpha} \geq 0$ ;
6. the lower the proportion of undesirable producers who become entrepreneurs,  $\frac{\partial (1-\alpha)\delta^*}{\partial \alpha} \leq 0$ ;
7. and the higher the equilibrium price and consumers' trust towards strangers,  $\frac{\partial p^*}{\partial \alpha} \geq 0$ .

Proof in [Appendix A](#).

Finally, my model also predicts that in countries with good institutions, only desirable producers obtain a license to become entrepreneurs. In contrast, in countries with poor institutions, also undesirable but high-trusting individuals engage in the entrepreneurial activity, and, as a consequence, some desirable producers no longer find it appealing to engage in it. Hence, the entrepreneurial licenses are not allocated to the most desirable producers. There exists supporting evidence for this prediction. In corrupt countries, resources are allocated depending on the connections of firms and not because of their productivity ([Khwaja and Mian, 2005](#)). However, how are these connections formed? Contacts, or connections, can be thought of as being a function of trust towards strangers. That is, someone who trusts strangers has a comparative advantage in creating new acquaintances and contacts. In contrast, it is more difficult for someone who cannot trust strangers to make new contacts since they are afraid of being betrayed. All things considered, it seems that trust towards strangers assists undesirable producers in obtaining licenses in countries with poor enough institutional quality.

Summing up, the model illustrated that the current environment determines how much individuals trust strangers, and that those levels of trust affect economic outcomes. That is, depending on institutional quality and on the characteristics of the population, individuals rationally form their levels of trust. Then, those individuals' levels of trust assist them to cooperate with a stranger in situations of asymmetric information. However, while this cooperation is privately beneficial for these individuals, it may have harmful consequences for the rest of society. Furthermore, the model shows that this more general view of trust does not go against the negative cross-country correlation between trust towards strangers and corruption. Nevertheless, it predicted that the individual-level correlation between tolerance towards corruption and trust towards strangers changes depending on the institutional quality of a country. In those countries with poor enough institutional quality, individuals who tolerate corruption more are also the more trusting ones. Conversely, in countries with good enough institutional quality, individuals who do not tolerate corruption are the more trusting ones. In the next section I test this prediction.

### 3. Test of the main prediction

#### 3.1. Data

My main data sources are the World Value Survey and the European Values Study. Both surveys are two-large-scale research programs that interview a representative national sample of at least 1000 individuals in many countries in order to gather comparable data on people's values, beliefs and attitudes. To date, six different waves of the World Value Survey have been published (1981,

1990, 1995, 2000, 2005 and 2010) and four of the European Values Study (1981, 1990, 1999 and 2008). Both surveys share several questions that have been asked in the different waves and some other questions that are only included in some of the waves of either the World Value Survey or the European Values Study. Data in both studies have been harmonized to allow for their combination. These surveys are appropriate for this paper because they contain questions that allow measuring both trust towards strangers and tolerance towards corruption.

As regards to trust towards strangers, I consider the answers to three questions. My main measure of trust towards strangers is based on the following question that has been included in the last two waves of the World Value Survey: “I’d like to ask you how much you trust people from various groups. Could you tell me for each whether you trust people from this group completely, somewhat, not very much or not at all?”. Among the included groups, could be found “People you meet for the first time”. I create a dummy variable called  $trust\_strangers_{ict}$  that equals 1 if a respondent  $i$  from country  $c$  and wave  $t$  answered that she trusts people she meets for the first time completely or somewhat, and 0 otherwise.

The previous question clearly identifies the trust held towards strangers. Nonetheless, the literature has mainly been using another question of the same survey to proxy trust. Specifically, previous studies considered the answers to the following question: “Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?”. This question is indeed included in all the waves of the World Value Survey and the European Values Study, and there exist two possible responses: “Need to be very careful” and “Most people can be trusted”. I create a dummy variable called  $generalized\_trust_{ict}$  which equals 0 if a respondent  $i$  from country  $c$  and wave  $t$  answered “Need to be very careful” and 1 if she answered “Most people can be trusted”.

However, in the context of my model, the trust required by producers, both desirable and undesirable, is the one that they have towards non-personally known bureaucrats. Likewise, the trust needed by consumers is that they have towards non-personally known producers. In this case, it can also be said that consumers’ trust also depends on how non-personally known bureaucrats behave. Therefore, it could be considered that another relevant measure of trust in the context of my model is the trust that individuals have towards the bureaucracy. Accordingly, I also consider the answers to the following question as a robustness check: “I am going to name a number of organizations. For each one, could you tell me how much confidence you have in them: is it a great deal of confidence, quite a lot of confidence, not very much confidence or none at all?”. Among the included organizations, could be found “The civil service”. I create a dummy variable called  $trust\_civil\_service_{ict}$  that equals 1 if a respondent  $i$  from country  $c$  and wave  $t$  answered that she has a great deal or quite a lot of confidence, and 0 otherwise. As with the previous question, this one has been included in both the World Value Survey and the European Values Study.

Therefore,  $trust\_strangers_{ict}$  constitutes my main measure of trust towards strangers and  $generalized\_trust_{ict}$  and  $trust\_civil\_service_{ict}$  are my secondary measures. Regarding the  $generalized\_trust_{ict}$  variable, the crux of the matter is to know what people think when they are asked if “most people” can be trusted. Are they thinking just of strangers or also of some of their acquaintances? In the same manner, regarding to the  $trust\_civil\_service_{ict}$  variable, it is important to know what people think when they are asked about the confidence in the civil service. Are they thinking in the whole institution or in some bureaucrats who might be their acquaintances? For this reason, the variable  $trust\_strangers_{ict}$  might identify trust towards strangers in a more accurate way than  $generalized\_trust_{ict}$  and  $trust\_civil\_service_{ict}$ . However, I also use the other two as robustness checks.

Both surveys have also included in all the waves a question that allows measuring how much individuals tolerate corruption. Specifically, they ask how justifiable is to accept a bribe. In particular, the question is worded as follows: “Please tell me for each of the following actions whether you think it can always be justified, never be justified, or something in between”. Among the included actions it can be found “Someone accepting a bribe in the course of their duties”. I create a variable called  $tolerance_{ict}$  that equals the answer of a respondent  $i$  from country  $c$  and wave  $t$ , which can range from 1 (“never justifiable”) to 10 (“always justifiable”).

In the empirical analysis, I also use several individual characteristics contained in both surveys, such as age, gender, education level, professed religion, if any, and ethnic group. These variables are included as controls in the analysis to reduce the error in the estimations since trust towards strangers and tolerance towards corruption might be correlated with these controls. For instance, it could be the case that the individuals’ tolerance of corruption and their levels of trust towards strangers are correlated with their level of education or their professed religion.

Finally, the country-level data of institutional quality is the Quality of Government index which takes into account the level of perceived corruption, law and order and bureaucracy quality of a country, and which is published in the International Country Risk Guide (ICRG).<sup>10</sup> The Quality of Government variable ranges from 0 to 1. I create a variable called  $institutions_{ct}$  that equals the original value of this measure for a country  $c$  and year  $t$  but rescaled from 0 to 10, where the higher the values, the higher institutional quality. I take this index for the years that correspond to each of the waves of the World Value Survey and the European Values Study. In 2010, this index was available for 150 countries. Finland was the country with best institutional quality with a score equal to 10. In contrast, Somalia with a score of 0.83 was the country with the lowest institutional quality. As it is generally the case with subjective measures of corruption and of institutional quality, some criticisms about their validity exist. As a consequence, there is a growing empirical literature which attempts to study corruption and institutional quality more objectively.<sup>11</sup> I will, however, use a subjective measure since the more objective ones are not available as a cross-country database. Moreover, Fisman and Miguel (2007) show the legitimacy of using perceptions through a natural experiment: they notice a high correlation between an objective measure of the cheating behavior of UN diplomats and the perceived corruption of their country of origin. Additionally, Olken (2009) finds a

<sup>10</sup> The ICRG is produced by Political Risk Services which is a private firm providing risk assessments across countries. I downloaded this data from The Quality of Government Institute, <http://www.qog.pol.gu.se>.

<sup>11</sup> See Olken and Pande (2012) for a review.

correlation, albeit a weak one, between perceptions and a more objective measure of corruption.

Moreover, I also use some other variables to conduct some robustness checks that I introduce in the following section. [Appendix B](#) reports summary statistics for all the variables I use in the paper and a detailed description of them. It also shows the 80 countries which are included in the analysis with the mean of their institutional quality index across the different waves.

### 3.2. Empirical analysis

In order to test the main prediction of the model, I propose to estimate the following linear probability model

$$trust_{ict} = \lambda \log(tolerance_{ict}) + \eta \log(tolerance_{ict}) * institutions_{ct} + \beta_{ct} + X' \gamma + \epsilon_{ict}, \quad (11)$$

where  $i$ ,  $c$  and  $t$  stand for an individual  $i$  in a country  $c$  in wave  $t$ ;  $trust_{ict}$  is one of the three dummy variables that I use in this paper to measure trust held towards strangers ( $trust\_strangers_{ict}$ ,  $generalized\_trust_{ict}$  or  $trust\_civil\_service_{ict}$ );  $\log(tolerance_{ict})$  stands for the logarithm of how tolerant towards corruption an individual is;  $\log(tolerance_{ict}) * institutions_{ct}$  is the interaction term between the logarithm of the individual level of tolerance towards corruption and the country institutional quality index;  $\beta_{ct}$  are country-wave fixed effects to control for country-wave specific characteristics; and  $X'$  are individual controls. Equation (11) is estimated using ordinary least squares where standard errors are clustered at the country level in order to account for intra-class correlation between individuals. Note that I take the natural logarithm of the variable  $tolerance_{ict}$  since its distribution is positively skewed.<sup>12</sup> The main coefficients of interest are  $\lambda$  and  $\eta$  since they allow to assess whether the correlation between tolerance towards corruption and trust is positive or negative depending on institutional quality.

The results of estimating Equation (11) are reported in [Table 1](#). The first panel shows the estimates when I use  $trust\_strangers_{ict}$  as the measure of trust; whereas the second and third panel present the estimates when I use  $generalized\_trust_{ict}$  and  $trust\_civil\_service_{ict}$  as the measure of trust, respectively. Looking first at column 1 in panel A, it can be seen that individuals who tolerate corruption more are also the more trusting in low-institutional quality countries, i.e., the coefficient on tolerance of corruption is positive and statistically significant. However, this association decreases as the level of institutional quality in a country increases, i.e., the coefficient on the interaction term is negative and statistically significant. Column 2 shows that this pattern is robust to the inclusion of ethnic group fixed effects.

Column 3 includes a dummy variable identifying if individuals are socially active or not. Specifically, I introduce a dummy that equals one if an individual is active in any organization that involves social interaction with other individuals. This control is important because in countries with poor institutions, daily life might involve corruption and, therefore, those who have more frequent interactions may both act in a corrupt way and also trust more in order to engage in corruption. Therefore, the positive relationship between tolerance towards corruption and trust towards strangers in countries with poor institutions might be compatible with a story of avoiding cognitive dissonance ([Akerlof and Dickens, 1982](#)). However, column 3 shows that the estimations are robust after controlling for social connections and, thus, provide support to the main prediction of the model.

Column 4, in its turn, exhibit that my results are also robust to the inclusion of a dummy identifying whether the respondents live in an urban area or not since it could be the case that the estimated relationship also depends on the type of municipality in which respondents live. In smaller towns, individuals might trust more strangers since they might believe that their fellow citizens are similar to them. At the same time, they might also be more tolerant towards corruption since in smaller towns, there might be less job opportunities and corruption could permit them to obtain a certain contract or permit.

The second panel displays that analogous results are obtained when using the variable  $generalized\_trust_{ict}$  instead of the variable  $trust\_strangers_{ict}$ . The estimates are robust to this alternative variable since the coefficients on tolerance of corruption and on the interaction term are positive and negative, respectively, and statistically significant in all columns. In the same vein, the third panel shows that when I instead use the variable  $trust\_civil\_service_{ict}$  to measure trust towards strangers, the estimated coefficients on tolerance of corruption and on the interaction term are also positive and negative across all the specifications, and the statistical significance depends on the inclusion of different controls. In any case, the estimates of all three panels suggest that the correlation between tolerance towards corruption and the different measures of trust changes depending on the institutional quality of a country.

While the estimated coefficients are statistically significant and are informative, it remains to be shown how low the level of institutional quality in a country needs to be in order that individuals who tolerate corruption more are also the more trusting ones. Following [Brambor and Clark \(2006\)](#), I graphically show the predicted individual-level correlations between the logarithm of tolerance of corruption and trust towards strangers across the possible range that the institutional quality index in a country can take. In [Fig. 5](#), I show such a graph when using the estimation results from the first column in [Table 1](#).<sup>13</sup> The solid line indicates how the correlation between the variables of interest changes as the institutional quality level in a country varies. The dashed lines indicate the 95% confidence interval that allows seeing whether the correlation is statistically significant, i.e., whenever the upper and lower bounds are both below or above the zero line.

[Fig. 5](#) shows that there exist two thresholds. First, for countries with institutional quality indexes lower than 5.40, the correlation between the logarithm of tolerance of corruption and trust towards strangers is positive and statistically significant. In my sample, 49% of the countries have, on average, institutional quality indexes below this lower threshold. Second, for countries with institu-

<sup>12</sup> Nonetheless, the same results for the whole analysis arise if I do not take the natural logarithm.

<sup>13</sup> I use this column because it uses my main trust measure and, moreover, the first column has used more observations in the estimation than the other three columns that also use the same measure of trust. Yet, this analysis could also be performed by using the estimates in the other columns and is available upon request.

**Table 1**  
Individual-level correlations.

A: Trust towards strangers				
	(1) trust	(2) trust	(3) trust	(4) trust
log_tolerance	0.063*** (0.019)	0.056*** (0.020)	0.050** (0.022)	0.057** (0.024)
log_tolerance*institutions	−0.010*** (0.003)	−0.008** (0.003)	−0.007* (0.004)	−0.008** (0.004)
Country-wave fixed effects	yes	yes	yes	yes
Ethnic fixed effects	no	yes	yes	yes
Social active dummy	no	no	yes	no
Urban area dummy	no	no	no	yes
N	125,668	103,731	80,657	85,764
R <sup>2</sup>	0.091	0.097	0.103	0.098
B: Generalized trust				
	(5) trust	(6) trust	(7) trust	(8) trust
log_tolerance	0.031*** (0.009)	0.032*** (0.011)	0.032** (0.015)	0.033** (0.013)
log_tolerance*institutions	−0.005*** (0.002)	−0.005** (0.002)	−0.005* (0.002)	−0.006** (0.002)
Country-wave fixed effects	yes	yes	yes	yes
Ethnic fixed effects	no	yes	yes	yes
Social active dummy	no	no	yes	no
Urban area dummy	no	no	no	yes
N	296,911	173,341	108,526	136,961
R <sup>2</sup>	0.133	0.131	0.145	0.137
C: Trust towards civil service				
	(9) trust	(10) trust	(11) trust	(12) trust
log_tolerance	0.015 (0.012)	0.021* (0.013)	0.020 (0.014)	0.025** (0.011)
log_tolerance*institutions	−0.004*** (0.002)	−0.006*** (0.002)	−0.005*** (0.002)	−0.006*** (0.002)
Country-wave fixed effects	yes	yes	yes	yes
Ethnic fixed effects	no	yes	yes	yes
Social active dummy	no	no	yes	no
Urban area dummy	no	no	no	yes
N	285,144	166,340	106,671	134,418
R <sup>2</sup>	0.117	0.135	0.138	0.136

All specifications control for dummies of gender, high school education, college education, being under 25 years old, being over 65 years old and professed religion. Coefficients are statistically different from zero at the following levels: \* $p < 0.10$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ . Clustered standard errors at the country level are in parentheses.

tional quality indexes higher than 8.97, the correlation is reversed, and actually becomes negative and statistically significant. In my sample, 12% of the countries have, on average, institutional quality indexes above this upper threshold. This provides empirical support to the prediction of the model. The individual-level correlation between tolerance towards corruption and trust towards strangers varies with institutional quality. In countries with poor institutional quality, individuals who tolerate corruption more are more trusting on average. However, in countries with good institutional quality, individuals who tolerate corruption more are less trusting on average. In low-institutional quality countries, individuals might engage in corruption by the fact that they can trust strangers to reciprocate their corrupt deals. Conversely, in high-institutional quality countries, non-corrupt individuals might engage in honest activities because they trust strangers to cooperate with them and they do not fear to be cheated.

In order to see which is the individual-level correlation between the two variables of interest per each country, in Fig. 6, I also add to the previous graph the estimates that I obtain of regressing trust towards strangers on the logarithm of tolerance towards corruption, the individual controls and wave fixed effects for each country separately. The predicted correlation is negative for countries with good institutional quality as Sweden, Norway or the United States. However, it is positive for countries with poor institutional quality like Azerbaijan, Mali or Iraq.

The above analysis has illustrated that, on average, the more trusting individuals are also those who tolerate corruption more in countries with poor institutions, and who tolerate corruption less in countries with good institutions. However, in order to reinforce the idea that trusting strangers assists in the initiation of corrupt deals in countries with poor institutions, it remains to be shown that the results are true for those individuals who more likely need to engage in corruption. Individuals who are employed in professions that entail interacting with bureaucrats might be more likely to engage in corruption. For instance, businesspeople and managers may need to obtain licenses from the government, and these procedures are prone to corruption. To this end, I estimate equation (11) using the variable *generalized\_trust<sub>ict</sub>* separately per each of the professions reported in the World Value Survey and European

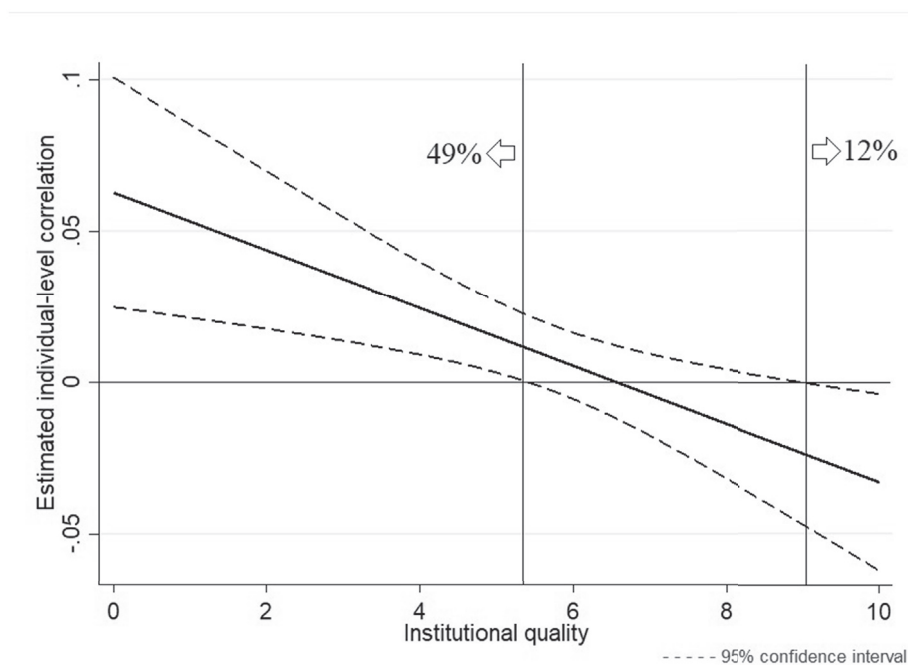


Fig. 5. Institutional quality and the estimated individual-level correlation between tolerance towards corruption and trust towards strangers.

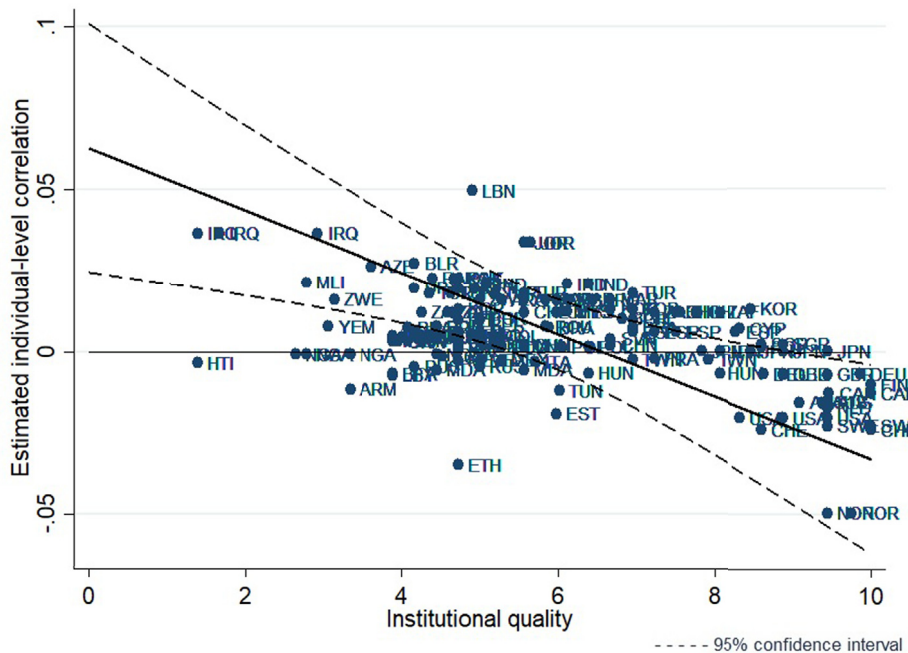


Fig. 6. Institutional quality and the estimated individual-level correlation, including the estimated relation between trust towards strangers and tolerance of corruption per each country separately.

Values Study. Note that in this case I use  $generalized\_trust_{ict}$  instead of  $trust\_strangers_{ict}$ . The reason is that if I use  $trust\_strangers_{ict}$  the information on the individuals' profession is only available in the 2005 wave and for only two countries in the 2010 wave (Netherlands and Turkey).

Table 2 displays the obtained estimates per each of the following professions: employers and managers, professional workers (which includes lawyers and accountants, among others), supervisory and non-supervisory office workers, forepersons and supervi-



**Table 2**  
Professions.

	(1) Employers and managers: trust	(2) Professional workers: trust	(3) Supervisory office: trust	(4) Non-supervisory office: trust
log_tolerance	0.082*** (0.030)	0.042** (0.017)	0.012 (0.022)	0.025 (0.022)
log_tolerance*institutions	−0.013*** (0.004)	−0.007*** (0.003)	−0.003 (0.003)	−0.003 (0.003)
Country-wave fixed effects	yes	yes	yes	yes
N	12,396	19,693	11,320	16,820
R <sup>2</sup>	0.154	0.175	0.187	0.126
	(5) Forepersons and supervisors: trust	(6) Skilled manual: trust	(7) Semi-skilled manual: trust	(8) Unskilled manual: trust
log_tolerance	0.046 (0.054)	−0.001 (0.021)	−0.014 (0.022)	0.012 (0.021)
log_tolerance*institutions	−0.007 (0.008)	−0.000 (0.003)	0.001 (0.003)	0.000 (0.003)
Country-wave fixed effects	yes	yes	yes	yes
N	3593	21,438	12,578	14,441
R <sup>2</sup>	0.170	0.118	0.113	0.126
	(9) Farmers - own farm: trust	(10) Agricultural workers: trust	(11) Army or security: trust	(12) Never worked: trust
log_tolerance	0.145** (0.059)	−0.029 (0.047)	−0.105** (0.045)	0.037 (0.022)
log_tolerance*institutions	−0.022** (0.008)	0.001 (0.008)	0.015* (0.008)	−0.006 (0.004)
Country-wave fixed effects	yes	yes	yes	yes
N	5667	6437	2468	21,066
R <sup>2</sup>	0.152	0.131	0.188	0.110

All specifications control for dummies of gender, high school education, college education, being under 25 years old, being over 65 years old and professed religion. Coefficients are statistically different from zero at the following levels: \* $p < 0.10$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ . Clustered standard errors at the country level are in parentheses.

sors, skilled manual workers, semi-skilled manual workers, unskilled manual workers, farmers who have their own farm, agricultural workers, member of armed forces or security personnel, and people who never had a job. The results on Table 2 show that the estimated coefficients are only statistically significant and with the predicted sign for employers and managers, professional workers, and farmers who have their own farm. It is natural to think that employers and managers might need to deal with bureaucrats in their day to day more frequently than, for instance, their employees. In their turn, professional workers include professions such as lawyers who might need to deal periodically with bureaucrats. Farmers who own their own farms are ultimately entrepreneurs, and they might have to interact with bureaucrats to obtain permits or for their day-to-day business. Therefore, these estimates suggest that the individual-level relationship between trust and tolerance towards corruption is mainly driven by those individuals who need to systematically interact with bureaucrats for their businesses, such as entrepreneurs, and hence, it supports the prediction of my model.

As noted above, for the estimations of Tables 2, I opted for using the variable *generalized\_trust<sub>ict</sub>* to measure trust towards strangers. In any case, I also performed the same analysis using the 2005 wave data and *trust\_strangers<sub>ict</sub>* as my trust measure. These results are provided in Appendix C.1 and show that the estimated coefficients are only statistically significant and with the predicted sign for employers and managers, professional workers and office workers. Individuals with the former professions are likely to interact with bureaucrats for their day-to-day business and hence, these results also support the main prediction of my model.

I likewise perform two additional robustness checks. First, in Appendix C.2 I show that what allows individuals to engage in corrupt deals in low-institutional quality countries is the trust towards strangers and not the trust directed to known people. In particular, if I use measures on how individuals trust their family, their neighborhood or their acquaintances, I do not find that individuals who tolerate corruption more are also the more trusting in low-institutional quality countries, and the less trusting in high-institutional quality ones. Second, in Appendix C.3, I also exhibit that my results are robust to the use of other measures which proxy for the tolerance of corrupt behavior.

#### 4. Conclusions

In this paper I have theoretically illustrated that trusting strangers is one of the channels through which institutions affect economic outcomes, particularly, corruption and entrepreneurship. Furthermore, I proposed that trusting strangers is a doubled-edged sword. On the one hand, trust is a social lubricant that helps individuals for the pursuit of outcomes aligned with social welfare. On the other, it also assists individuals in the achievement of corrupt deals.

Good institutions cause that individuals who do not tolerate corruption hold high levels of trust, and that individuals that tolerate it end up not trusting strangers. As a consequence, honest individuals take part in socially desirable economic exchanges, and corrupt individuals do not engage in corruption. However, when bad institutions are in place, the opposite is true. In particular, individuals who tolerate corruption hold high levels of trust, and this allows them to bribe strangers in order to circumvent a regulation. Using data from individuals of 80 countries, I found empirical support for this prediction.

Clearly this article does not come without limitations. The most important are detailed below. As for the theoretical model, the way I modeled bureaucrats' actions imply that these bureaucrats become "action types" once they have decided whether they want to be honest or corruptible. Therefore, the model would be more realistic if I also would endogenize the actions of bureaucrats once they have to interact with the producers. Nevertheless, I modeled bureaucrats like this for the sake of simplicity and I believe that this should not substantially affect the results of my paper. Regarding the empirical part, in this study, I have only estimated correlations between tolerance towards corruption and trust towards strangers. That is, I do not identify any causality between both variables given the idiosyncrasy of the used data. Therefore, future research that would be able to show a causality between tolerance towards corruption and trust towards strangers in different institutional situations would help expand this strand of the literature that studies this "dark side" of trusting strangers.

#### Declaration of competing interest

None.

#### 5.1. Appendix A

##### Proof of Proposition 1.

1. If bureaucrats choose to become honest, then, by Bayes' rule,  $t_d = 1$  and  $t_u = 0$ . Then, a fraction  $\gamma = p$  of desirable producers engage in the entrepreneurial activity. In contrast, undesirable producers engage in home production ( $\delta^* = 0$ ) since  $\psi_i \geq 0 \forall i$ . By Bayes' rule,  $t_c = p^* = 1$ , and hence  $\gamma^* = 1$ . Given producers' strategies and beliefs, bureaucrats are also optimizing since they are indifferent between becoming corrupt or honest.  $\square$
2. Bureaucrats are indifferent between becoming honest or corrupt if and only if  $\Delta^b = 0$ . Plugging  $\gamma$  and  $\delta$  from Equations 7 and 8 and imposing  $\Delta^b = 0$ , I find that the fraction  $\sigma^*$  equals  $1 - \frac{\sqrt{\rho(1-\rho)(1-\alpha)^2 w(1-\alpha)-(1+\alpha)w}}{\rho(1-\alpha)^2 w}$ . Then, it is easy to show that  $0 < \sigma^* < 1$  if and only if  $\tilde{\alpha}(\rho, w) \leq \alpha < \frac{1-w}{1+w}$ . Next, by Bayes' rule,  $t_d = \sigma^*$  and  $t_u = 1 - \sigma^*$ . Plugging  $\sigma^*$ , I find that  $\gamma^* = \frac{(1+\alpha)w}{1-\alpha}$  and  $\delta^* = \frac{\sqrt{\rho(1-\rho)(1-\alpha)^2 w(1-\alpha)-(1+\alpha)w}}{\rho(1-\alpha)^2 w}$ . Finally, by Bayes' rule, I find that  $p^* = t_c = \frac{(1+\alpha)w}{1-\alpha}$ .  $\square$
3. If bureaucrats choose to become corrupt, then, by Bayes' rule,  $t_d = 0$  and  $t_u = 1$ . Consequently, a fraction  $\gamma = p$  of desirable producers and a fraction  $\delta = (1-\alpha)(p-b)$  of undesirable producers become entrepreneurs. By Bayes' rule,  $t_c = p^* = \frac{2(1-\rho)-\rho(1-\alpha)^2 w}{2(1-\rho)+\rho(1-\alpha)^2}$ ,  $\gamma^* = \frac{2(1-\rho)-\rho(1-\alpha)^2 w}{2(1-\rho)+\rho(1-\alpha)^2}$ ,  $\delta^* = \frac{(1-\rho)(1-\alpha)(1+w)}{2(1-\rho)+\rho(1-\alpha)^2}$ . Given these strategies and beliefs, bureaucrats are also optimizing since in the case of becoming honest their expected utility would be lower than the one they obtain being corrupt under the assumption that  $\alpha < \tilde{\alpha}(\rho, w)$ .  $\square$

##### Proof of Proposition 2. :

1. Recall that  $ALT = (1-\rho)t_d + \rho t_u + p^*$ . If  $\alpha \in (0, \tilde{\alpha}(\rho, w))$ , then  $\frac{\partial ALT}{\partial \alpha} = \frac{4\rho(1-\rho)(1-\alpha)(1+w)}{(2(1-\rho)+\rho(1-\alpha)^2)^2} > 0$ . If  $\alpha \in [\tilde{\alpha}(\rho, w), \frac{1-w}{1+w})$ , then  $\frac{\partial ALT}{\partial \alpha} = \frac{1+\rho(9w-3)-3w-\rho^2(6w-2)-2\alpha(1-w)(1-3\rho+2\rho^2)+\alpha^2(1+w)(1-3\rho+2\rho^2)-4w\sqrt{(1-\alpha)^2\rho(1-\rho)w(1-\alpha-w(1+\alpha))}}{2(1-\alpha)^2\sqrt{(1-\alpha)^2\rho(1-\rho)w(1-\alpha-w(1+\alpha))}} > 0$ . Finally, if  $\alpha \in [\frac{1-w}{1+w}, 1)$ , then  $\frac{\partial ALT}{\partial \alpha} = 0$ . Therefore,  $\frac{\partial ALT}{\partial \alpha} \geq 0$ .  $\square$
2. Recall that  $ALC = \rho(1-\sigma^*)\delta^*(1-\alpha)$ . If  $\alpha \in (0, \tilde{\alpha}(\rho, w))$ , then  $\frac{\partial ALC}{\partial \alpha} = \frac{-4\rho(1-\rho)^2(1-\alpha)(1+w)}{(2(1-\rho)+\rho(1-\alpha)^2)^2} < 0$ . If  $\alpha \in [\tilde{\alpha}(\rho, w), \frac{1-w}{1+w})$ , then  $\frac{\partial ALC}{\partial \alpha} = \frac{-2(1-\rho)w}{(1-\alpha)^2} < 0$ . Finally, if  $\alpha \in [\frac{1-w}{1+w}, 1)$ , then  $\frac{\partial ALC}{\partial \alpha} = 0$ . Therefore,  $\frac{\partial ALC}{\partial \alpha} \leq 0$ .  $\square$
3. Note that  $t_d = \sigma^*$ . If  $\alpha \in (0, \tilde{\alpha}(\rho, w))$ , then  $t_d = 0$ , hence,  $\frac{\partial t_d}{\partial \alpha} = 0$ . If  $\alpha \in [\tilde{\alpha}(\rho, w), \frac{1-w}{1+w})$ , then  $\frac{\partial t_d}{\partial \alpha} = \frac{(1-\rho)(1-\alpha-3w-\alpha w)}{2(1-\alpha)\sqrt{(1-\alpha)^2\rho(1-\rho)w(1-\alpha-w(1+\alpha))}} > 0$ . Finally, if  $\alpha \in [\frac{1-w}{1+w}, 1)$ , then  $t_d = 1$ , hence,  $\frac{\partial t_d}{\partial \alpha} = 0$ . Therefore,  $\frac{\partial t_d}{\partial \alpha} \geq 0$ .  $\square$
4. Note that  $t_u = 1 - \sigma^* = 1 - t_d$ . Since  $\frac{\partial t_d}{\partial \alpha} \geq 0$ , then  $\frac{\partial t_u}{\partial \alpha} \leq 0$ .  $\square$
5. If  $\alpha \in (0, \tilde{\alpha}(\rho, w))$ , then  $\frac{\partial \gamma^*}{\partial \alpha} = \frac{4(1-\alpha)\rho(1-\rho)(1+w)}{(2(1-\rho)+\rho(1-\alpha)^2)^2} > 0$ . If  $\alpha \in [\tilde{\alpha}(\rho, w), \frac{1-w}{1+w})$ , then  $\frac{\partial \gamma^*}{\partial \alpha} = \frac{2w}{(1-\alpha)^2} > 0$ . Finally, if  $\alpha \in [\frac{1-w}{1+w}, 1)$ , then  $\frac{\partial \gamma^*}{\partial \alpha} = 0$ .  $\square$

0. Therefore,  $\frac{\partial \gamma^*}{\partial \alpha} \geq 0$  □
6. If  $\alpha \in (0, \tilde{\alpha}(\rho, w))$ , then  $\frac{\partial(1-\alpha)\delta^*}{\partial \alpha} = \frac{6(1-\alpha)(1-\rho)^2}{(2(1-\rho)+(1-\alpha)^2\rho)^2} < 0$ . If  $\alpha \in [\tilde{\alpha}(\rho, w), \frac{1-w}{1+w})$ , then  $\frac{\partial(1-\alpha)\delta^*}{\partial \alpha} = \frac{-(1-\rho)(2(1-\rho)-\rho(1-\alpha)^2)(1+w)}{(2(1-\rho)+\rho(1-\alpha)^2)^2} < 0$ . Finally, if  $\alpha \in [\frac{1-w}{1+w}, 1)$ , then  $\frac{\partial(1-\alpha)\delta^*}{\partial \alpha} = 0$ . Therefore,  $\frac{\partial \delta^*}{\partial \alpha} \leq 0$  □
7. Note that  $p^* = \gamma^*$ . Since  $\frac{\partial \gamma^*}{\partial \alpha} \geq 0$ , then  $\frac{\partial p^*}{\partial \alpha} \geq 0$  □

## 5.2. Appendix B

**Table 3**

Description and source of the used variables in the empirical analysis.

Variable	Description and source
<i>trust_strangers</i>	This variable is based on the individual answers to: "Could you tell me whether you trust people you meet for the first time completely, somewhat, not very much or not at all?" The responses are set to 0 if an individual responded not at all or not very much, and to 1 if somewhat or completely trust. Source: World Value Survey
<i>generalized_trust</i>	This variable is based on the individual answers to: "Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?" The responses are set to 0 if an individual responded "Need to be very careful", and to 1 if "Most people can be trusted". Source: World Value Survey and European Values Study
<i>trust_civil_service</i>	This variable is based on the individual answers to: "I am going to name a number of organizations. For each one, could you tell me how much confidence you have in them: is it a great deal of confidence, quite a lot of confidence, not very much confidence or none at all?" Among the included organizations, could be found "The Civil service". The responses are set to 0 if an individual responded none at all or not very much, and to 1 if quite a lot or agree a deal. Source: World Value Survey and European Values Study
<i>tolerance</i>	This variable equals the individual answers to: "Please tell me whether you think it can always be justified, never be justified, or something in between for the following action: Someone accepting a bribe in the course of their duties" The responses are set to 1, 2, ..., 10, where the higher the numbers, the higher the justification. Source: World Value Survey and European Values Study
<i>high_school</i>	This variable equals 1 if the highest attained education level for an individual is secondary school (technical or vocational type) and 0 otherwise. Source: World Value Survey and European Values Study
<i>college</i>	This variable equals 1 if the highest attained education level for an individual is university level education and 0 otherwise. Source: World Value Survey and European Values Study
<i>under_25</i>	This variable equals 1 if the reported age for an individual is under 25 years old and 0 otherwise. Source: World Value Survey and European Values Study
<i>over_65</i>	This variable equals 1 if the reported age for an individual is above 65 years old and 0 otherwise. Source: World Value Survey and European Values Study
<i>male</i>	This variable equals 1 if an individual reported to be a male and 0 if a female. Source: World Value Survey and European Values Study
<i>professed_religion</i>	This is a categorical variable reporting the religion that an individual reported to profess. These categories are: Roman Catholic, Muslim, Protestant, Orthodox, Hindu, Buddhist, another religion or no religion. Source: World Value Survey and European Values Study
<i>ethnic_group</i>	This is a categorical variable reporting the ethnic group to which each individual belong. Source: World Value Survey and European Values Study
<i>social_active</i>	This is a dummy variable equal to 1 if an individual is an active member of any of the following organizations: religious, sport or recreational, art, music or educational, labor union, political party, environmental organization, professional association, humanitarian or charitable organization, consumer organization, self-help group or any other organization; and 0 otherwise. Source: World Value Survey
<i>urban</i>	This is a dummy variable equal to 1 if an individual lives in an urban area and 0 otherwise. Source: World Value Survey and European Values Study

(continued on next page)

Table 3 (continued)

Variable	Description and source
<i>profession</i>	This is a categorical variable reporting the profession of each individual. Source: World Value Survey and European Values Study
<i>trust_family</i>	This variable equals the individual answers to: "Could you tell me whether you trust your family completely, somewhat, not very much or not at all?" The responses are set to 0, 1, 2 and 3 if an individual responded not at all, not very much, somewhat and completely trust respectively. Source: World Value Survey
<i>trust_acquaintances</i>	This variable equals the individual answers to: "Could you tell me whether you trust people you know personally completely, somewhat, not very much or not at all?" The responses are set to 0, 1, 2 and 3 if an individual responded not at all, not very much, somewhat and completely trust respectively. Source: World Value Survey
<i>cheat_taxes</i>	This variable equals the individual answers to: "Please tell me whether you think it can always be justified, never be justified, or something in between for the following action: Cheating on tax if you have a chance" The responses are set to 1, 2, ..., 10, where the higher the numbers, the higher the justification. Source: World Value Survey and European Values Study
<i>claim_gov_benefits</i>	This variable equals the individual answers to: "Please tell me whether you think it can always be justified, never be justified, or something in between for the following action: Claiming government benefits to which you are not entitled" The responses are set to 1, 2, ..., 10 where the higher the numbers, the higher the justification. Source: World Value Survey and European Values Study
<i>institutions</i>	This variable equals the mean value of the three components of the political risk rating of the International Country Risk Guide (ICRG) which are: "Corruption", "Law and Order" and "Bureaucracy Quality". It ranges from 0 to 10, where higher values indicate higher quality of institutions. Source: The Quality of Government Institute

Table 4  
Summary statistics

Variable	N	Mean	Std. Dev.	Min	Max
trust_strangers	145,691	0.244	0.430	0	1
trust_generalized	363,568	0.278	0.448	0	1
confidence_civil_service	344,534	0.459	0.498	0	1
tolerance	365,315	1.814	1.796	1	10
institutions	381,076	6.163	2.066	1	10
male	380,751	0.478	0.500	0	1
high_school	332,473	0.436	0.496	0	1
college	332,473	0.147	0.354	0	1
under_25	380,432	0.168	0.374	0	1
over_65	380,432	0.108	0.310	0	1
social_active	163,937	0.388	0.487	0	1
urban	240,247	0.471	0.499	0	1
trust_family	149,583	0.971	0.167	0	1
trust_acquaintances	148,534	0.777	0.416	0	1
cheat_taxes	353,009	2.258	2.193	1	10
claim_gov_benefits	352,106	2.459	2.361	1	10

**Table 5**  
Included countries I

Country	Institutional Quality Mean	Country	Institutional Quality Mean
Albania	4.530	Libya	3.889
Algeria	4.119	Lithuania	5.556
Argentina	5.610	Malaysia	6.089
Armenia	3.333	Mali	2.778
Australia	9.341	Mexico	5.015
Azerbaijan	3.611	Moldova	4.949
Bangladesh	3.995	Morocco	6.231
Belarus	4.592	Netherlands	9.590
Brazil	5.327	New Zealand	9.698
Bulgaria	5.990	Nigeria	3.363
Burkina Faso	3.889	Norway	9.609
Canada	9.719	Pakistan	4.703
Chile	7.209	Peru	4.583
China	5.150	Philippines	5.545
Colombia	4.563	Poland	7.092
Croatia	5.625	Romania	4.811
Cyprus	8.333	Russia	4.093
Czech Republic	7.643	Saudi Arabia	5.556
Dominican Republic	5.556	Singapore	8.611
Ecuador	4.514	Slovakia	7.746
Egypt	4.865	Slovenia	6.941
Estonia	6.572	South Africa	5.622
Ethiopia	4.722	South Korea	7.366
Finland	10.000	Spain	7.550
France	7.650	Sweden	9.686
Germany	9.190	Switzerland	9.457
Ghana	4.371	Taiwan	7.186
Guatemala	3.796	Thailand	4.012
Haiti	1.389	Trinidad and Tobago	4.942
Hungary	7.928	Tunisia	6.019
India	5.986	Turkey	5.132
Indonesia	3.950	Ukraine	4.305
Iran	5.000	United Kingdom	9.159
Iraq	2.693	United States	8.824
Italy	6.898	Uruguay	4.608
Japan	8.348	Venezuela	5.132
Jordan	5.586	Vietnam	5.048
Kazakhstan	4.722	Yemen	3.056
Latvia	5.694	Zambia	4.722
Lebanon	4.907	Zimbabwe	3.125

### 5.3. Appendix C

#### 5.3.1. Appendix C.1: Trust towards strangers and professions

**Table 6**  
Trust towards strangers and professions

	(1) Employers and managers: trust	(2) Professional workers: trust	(3) Supervisory office: trust	(4) Non-supervisory office: trust
log_tolerance	0.194*** (0.054)	0.068* (0.035)	0.100* (0.054)	0.069** (0.031)
log_tolerance*institutions	−0.032*** (0.008)	−0.014** (0.006)	−0.017** (0.007)	−0.009** (0.004)
<i>N</i>	3052	5137	2582	4781
<i>R</i> <sup>2</sup>	0.186	0.180	0.203	0.134
	(5) Forepersons and supervisors: trust	(6) Skilled manual: trust	(7) Semi-skilled manual: trust	(8) Unskilled manual: trust
ltolerance	−0.033 (0.073)	−0.002 (0.028)	0.092 (0.055)	0.088* (0.051)
ltolerance_institutions	0.005 (0.011)	−0.002 (0.004)	−0.016* (0.008)	−0.012 (0.009)
<i>N</i>	800	6475	3652	3845
<i>R</i> <sup>2</sup>	0.160	0.114	0.087	0.095
	(9) Farmers - own farm: trust	(10) Agricultural workers: trust	(11) Army or security: trust	(12) Never worked: trust
log_tolerance	0.068 (0.078)	0.085 (0.141)	0.082 (0.083)	−0.039 (0.109)
log_tolerance*institutions	−0.015 (0.013)	−0.014 (0.029)	−0.023 (0.015)	0.009 (0.019)
<i>N</i>	1599	2083	660	1451
<i>R</i> <sup>2</sup>	0.162	0.095	0.201	0.055

All specifications include country fixed effects and dummies of gender, high school education, college education, being under 25 years old, being over 65 years old and professed religion. Coefficients are statistically different from zero at the following levels: \* $p < 0.10$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ . Clustered standard errors at the country level are in parentheses.

#### 5.3.2. Appendix C.2: Trust towards whom?

Trust might be directed to different types of people, for instance, trust towards a close circle of family and friends as well as trust towards strangers. Next, I will show that my empirical results do not hold when using measures of trust towards personally-known individuals. In particular, the World Value Survey asks individuals how much they trust their family or people they know personally, i.e., acquaintances. Panel A in Table 7 reports the results of estimating Equation (11) when using trust towards family members, and panel B exhibits the estimates when using trust towards acquaintances. These results show that the pattern found for trust towards strangers and tolerance towards corruption does not arise when I use these alternative measures of trust. In fact, individuals who tolerate more corruption have less trust towards their family or their acquaintances in both types of countries.



**Table 7**  
Trust towards different types of people

A: Trust towards family				
	(1) trust	(2) trust	(3) trust	(4) trust
log_tolerance	−0.011* (0.007)	−0.011 (0.007)	−0.012* (0.006)	−0.012 (0.008)
log_tolerance*institutions	−0.000 (0.001)	−0.000 (0.001)	0.000 (0.001)	−0.000 (0.001)
Country-wave fixed effects	yes	yes	yes	yes
Ethnic fixed effects	no	yes	yes	yes
Social active dummy	no	no	yes	no
Urban area dummy	no	no	no	yes
N	128,745	105,674	82,159	87,096
R <sup>2</sup>	0.038	0.042	0.039	0.047
B: Trust towards acquaintances				
	(5) trust	(6) trust	(7) trust	(8) trust
log_tolerance	−0.028** (0.013)	−0.024* (0.013)	−0.022* (0.013)	−0.023* (0.013)
log_tolerance*institutions	−0.001 (0.002)	−0.001 (0.002)	−0.001 (0.002)	−0.000 (0.002)
Country-wave fixed effects	yes	yes	yes	yes
Ethnic fixed effects	no	yes	yes	yes
Social active dummy	no	no	yes	no
Urban area dummy	no	no	no	yes
N	128,056	105,124	81,770	86,658
R <sup>2</sup>	0.111	0.117	0.123	0.121

All specifications control for dummies of gender, high school education, college education, being under 25 years old, being over 65 years old and professed religion. Coefficients are statistically different from zero at the following levels: \* $p < 0.10$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ . Clustered standard errors at the country level are in parentheses.

### 5.3.3. Appendix C.3: Different types of tolerance

The World Value Survey also provides other measures which allow me to proxy for how tolerant towards corruption individuals are. For instance, it asks how much people can tolerate cheating on taxes or claiming government benefits to which they are not entitled. Accordingly, I also study as a robustness check the relationship between the variable *trust\_strangers<sub>ict</sub>* and these alternative measures of tolerance towards corruption. Panels A and B in Table 8 show, respectively, that the same pattern between trusting strangers and tolerance towards corruption arises when using either “justify cheating on taxes” or “justify claiming government benefits” as a proxy for the tolerance of corruption of individuals.

**Table 8**  
Different types of tolerance

A: Cheating on taxes				
	(1) trust	(2) trust	(3) trust	(4) trust
log_tolerance	0.038*** (0.013)	0.035** (0.014)	0.025* (0.015)	0.030** (0.015)
log_tolerance*institutions	−0.006*** (0.002)	−0.006** (0.002)	−0.004 (0.003)	−0.005* (0.003)
Country-wave fixed effects	yes	yes	yes	yes
Ethnic fixed effects	no	yes	yes	yes
Social active dummy	no	no	yes	no
Urban area dummy	no	no	no	yes
N	123,392	101,708	80,437	83,821
R <sup>2</sup>	0.091	0.098	0.103	0.099
B: Claiming non-entitled government benefits				
	(5) trust	(6) trust	(7) trust	(8) trust
log_tolerance	0.035*** (0.012)	0.031** (0.012)	0.020 (0.013)	0.032** (0.013)
log_tolerance*institutions	−0.007*** (0.002)	−0.006*** (0.002)	−0.005** (0.002)	−0.007*** (0.002)
Country-wave fixed effects	yes	yes	yes	yes
Ethnic fixed effects	no	yes	yes	yes
Social active dummy	no	no	yes	no
Urban area dummy	no	no	no	yes
N	124,558	102,788	79,902	84,989
R <sup>2</sup>	0.090	0.097	0.103	0.098

All specifications control for dummies of gender, high school education, college education, being under 25 years old, being over 65 years old and professed religion. Coefficients are statistically different from zero at the following levels: \* $p < 0.10$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ . Clustered standard errors at the country level are in parentheses.

## References

- Aghion, Philippe, Algan, Yann, Cahuc, Pierre, Shleifer, Andrei, 2010. Regulation and distrust. *Q. J. Econ.* 125 (3), 1015–1049.
- Akerlof, George A., Dickens, William T., 1982. The economic consequences of cognitive dissonance. *Am. Econ. Rev.* 72 (3), 307–319.
- Alesina, Alberto, La Ferrara, Eliana, 2002. Who trusts others? *J. Publ. Econ.* 85 (2), 207–234.
- Algan, Yann, Cahuc, Pierre, 2010. Inherited trust and growth. *Am. Econ. Rev.* 100 (5), 2060–2092.
- Batsaikhan, Mongoljin, 2017. Trust, trustworthiness, and business success: Lab and field findings from entrepreneurs. *Econ. Inq.* 55 (1), 368–382.
- Brambor, Thomas, Clark, William Roberts, 2006. Understanding interaction models: improving empirical analyses. *Polit. Anal.* 14 (1), 63–82.
- Burguet, Roberto, Ganuza, Juan-José, Montalvo, Jose G., 2016. The Microeconomics of Corruption. A Review of Thirty Years of Research. (Barcelona GSE Working Paper Series).
- Butler, Jeffrey, Giuliano, Paola, Guiso, Luigi, 2016. The right amount of trust. *J. Eur. Econ. Assoc.* 14 (5), 1155–1180.
- Cabral, Luís M. B. 'The Economics of Trust and Reputation: A Primer'.
- Carlin, Bruce Ian, Dorobantu, Florin, Viswanathan, S., 2009. Public trust, the law, and financial investment. *J. Financ. Econ.* 92 (3), 321–341.
- Fisman, Raymond, Miguel, Edward, 2007. Corruption, norms, and legal enforcement: evidence from diplomatic parking tickets. *J. Polit. Econ.* 115 (6), 1020–1048.
- Gambetta, Diego, 2000. Can we trust trust? *Trust: Mak. Break. Cooperat. Relat.* 13, 213–237.
- Gennaioli, Nicola, Shleifer, Andrei, Vishny, Robert, 2012. Money doctors. *J. Finance* 70 (1), 91–114.
- Guiso, Luigi, Sapienza, Paola, Zingales, Luigi, 2004. The role of social capital in financial development. *Am. Econ. Rev.* 94 (3), 526–556.
- Guiso, Luigi, Sapienza, Paola, Zingales, Luigi, 2006. Does culture affect economic outcomes? *J. Econ. Perspect.* 20 (2), 23–48.
- Guiso, Luigi, Sapienza, Paola, Zingales, Luigi, 2010. Civic capital as the missing link. *Handbook of Social Economics*, 1, pp. 417–480.
- Khwaja, Asim Ijaz, Mian, Atif, 2005. Do lenders favor politically connected firms? Rent provision in an emerging financial market. *Q. J. Econ.* 120 (4), 1371–1411.
- Knack, Stephen, Keefer, Philip, 1997. Does social capital have an economic payoff? A cross-country investigation. *Q. J. Econ.* 112 (4), 1251–1288.
- La Porta, Rafael, Lopez de Silanes, Florencio, Shleifer, Andrei, Vishny, Robert W., 1997. Trust in large organizations. *Am. Econ. Rev. Pap. Proc.* 87, 333–338.
- Lampe, Klaus Von, Johansen, Per Ole, 2003. Criminal networks and trust. on the importance of expectations of loyal behaviour in criminal relations. *Organised Crime, Trafficking, Drugs*, p. 102.
- Olken, Benjamin A., 2009. Corruption perceptions vs. corruption reality. *J. Publ. Econ.* 93 (7–8), 950–964.
- Olken, Benjamin A., Pande, Rohini, 2012. Corruption in developing countries. *Ann. Rev. Econ.* 4 (1), 479–505.
- Putnam, Robert D., 1993. *Making Democracy Work: Civic Traditions in Modern Italy*. Princeton University Press.
- Rohner, Dominic, Thoenig, Mathias, Zilibotti, Fabrizio, 2013. War signals: a theory of trade, trust, and conflict. *Rev. Econ. Stud.* 80 (3), 1114–1147.
- Satyanath, Shanker, Voigtländer, Nico, Voth, Hans-Joachim, 2017. Bowling for fascism: social capital and the rise of the Nazi party in Weimar Germany, 1919–33. *J. Polit. Econ.* 125 (2), 478–526.
- Tabellini, Guido, 2008. Institutions and culture. *J. Eur. Econ. Assoc.* 6 (2–3), 255–294.
- Tabellini, Guido, 2010. Culture and institutions: economic development in the regions of Europe. *J. Eur. Econ. Assoc.* 8 (4), 677–716.
- Van Rijckeghem, Caroline, Weder, Beatrice, 2001. Bureaucratic corruption and the rate of temptation: do wages in the civil service affect corruption, and by how much? *J. Dev. Econ.* 65 (2), 307–331.
- Zak, Paul J., Knack, Stephen, 2001. Trust and growth. *Econ. J.* 111 (470), 295–321.