

# Trust, Honesty and Regulations\*

Paolo Pinotti

Bank of Italy and Universitat Pompeu Fabra

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## Abstract

This paper investigates the importance of cultural traits for understanding the causes and consequences of government intervention in the economy. First, it presents a simple model in which, under reasonable assumptions about the structure of the economy and the individual values and beliefs, more trustful individuals prefer lower product market regulation. This theoretical prediction is supported by evidence from international survey data. Second, it shows that, if trust predicts trustworthiness across countries, lower honesty would drive both greater regulation and higher incidence of illegal activities. It follows that some of the negative effects usually associated with government intervention may indeed be a consequence of underlying cultural traits. In particular, evidence from cross-country data suggests that a large part of the effect of regulation on corruption and unofficial activity estimated in previous studies can be attributed to omitted variation in trust and honesty.

**Keywords:** trust, honesty, regulations, corruption, unofficial economy

**JEL codes:** L51, Z10, D02, K42.

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\*Contacts: Bank of Italy, Research Department, Via Nazionale 91, 00184 Roma. Email: paolo.pinotti@bancaditalia.it. I wish to thank Milo Bianchi and Enrico Sette for useful comments on an earlier draft of this paper. The opinions expressed herein are my own and do not necessarily reflect those of the Bank of Italy.

# 1 Introduction

During the last few years liberalization and deregulation have redrawn the borders of government intervention in the economy. Several indicators suggest that, around the turn of the century, regulatory barriers dropped sharply in all OECD countries (see Figure 1).<sup>1</sup>

These reforms are in line with the prescriptions of public choice theories that consider regulation a purely rent-seeking device which benefits bureaucrats and politicians (Tullock (1967), Stigler (1971) and Peltzman (1976)). Such conclusions are backed by recent evidence of large inefficiencies associated with government intervention in the economy. According to many studies, extensive regulation increases the scope for corruption of public administrators (De Soto (1990), Shleifer and Vishny (1998) and Djankov et al. (2002)). Also, burdensome regulation could drive individuals and firms out of the formal economy and into the unofficial sector (Johnson et al. (1998), Friedman et al. (2000) and Schneider and Enste (2000)).

Yet, from a political point of view, regulatory reform remains a controversial issue. Actually, in the same countries and period Figure 1 refers to, about half of the people thought that government should have *increased* control over firms (Figure 2). On the other hand, this fraction was much lower among bureaucrats and politicians which is strongly at odds with the predictions of rent-seeking models of regulation.<sup>2</sup>

Why do people like regulations? And why is this even more so among the non-insiders? The large literature on regulation has so far paid only scant attention to non-predatory motives behind preferences for government intervention in the economy.

The first contribution of this paper is to make a step in this direction by studying how cultural values and beliefs shape preferences for regulation. In particular I will show, both theoretically and empirically, that greater trust toward the others lowers individual demand for regulation. The second contribution of this paper is to explore the implications of this relationship for interpreting previous evidence about the negative effects of regulation. In particular, I will show that omitting cultural values and beliefs may severely bias upward the estimated effect of regulation on corruption and unofficial activities.

The basic intuition for the existence of a relationship between trust and regulation is that individuals could demand regulation as a barrier against frauds made possible

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<sup>1</sup>These measures of regulation are from Conway et al. (2005), who provide an in-depth description of these trends.

<sup>2</sup>These results refer to a sample of 23,365 individuals from 19 OECD countries interviewed during the period 1999-2002. The questionnaire and the data are described in great detail in the next sections.

by some types of market failure. This is also the view maintained by the public interest theory of regulation initiated by Pigou (1938). As a matter of fact, all countries impose pervasive regulations in those sectors characterized to a greater extent by incomplete information and moral hazard, like for instance food, health care, financial services and so on. One feature that is common to all these markets is that the quality of products can not be verified prior to purchase (and sometimes not even after). As such, those products are sometimes referred to as ‘experience’, ‘credence’ or even ‘*trust*’ goods, exactly because trust is always necessary (possibly along with reputational mechanisms) to sustain transactions in these markets.<sup>3</sup> Alternatively, regulation is often invoked as a second-best solution (Akerlof (1970), Leland (1979) and, more recently, Stiglitz (2002)).

Therefore, one may wonder whether individuals characterized by lower trust, who attach a greater probability to the event of being exploited in transactions, do favor regulations relatively more. In the next Section I incorporate this possibility in a simple model in which agents have heterogeneous values and beliefs. In particular, a subset of agents are honest and always say the truth, while the others lie whenever it is in their economic interest to do so. Trust is the (subjective) probability attached to the event of meeting an honest agent. In this framework, asymmetric information between producers and consumers introduces the possibility for inefficient producers to remain in the market by cheating consumers (that is, by selling low quality goods claiming that they are instead of high quality).

In this economy, regulation imposes a burden on all entrants in the market.<sup>4</sup> Crucially, I assume that it is relatively more costly for inefficient producers to comply with regulation, which eventually drives them out of the market. In this sense, regulation acts as a screening device in a way analogous to Banerjee (1997). Indeed, regulation effectively screens entrants in the market, but it does so inefficiently because, by being imposed on all producers (even the efficient ones), it raises prices. However, the price change affects all consumers in the same way, while their evaluation of the alternative option (that is, no regulation) will differ according to their beliefs about the incidence of dishonest producers. Thus, those among them characterized by lower (higher) trust will prefer more (less) regulation.

My theoretical framework delivers empirical implications for the effect of trust on regulation at the individual level, which I test in Section 3. Individual estimates allow

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<sup>3</sup>Seminal work in this area is due to Nelson (1970) and Darby and Karni (1973); see Dulleck and Kerschbamer (2006) for a recent review of the literature.

<sup>4</sup>Regulation may require compliance with the red tape, disclosure of additional informations, certification of safety procedures, and so on. It may also include bribes to bureaucrats and politicians. In this sense, my model is general enough to accommodate different views of regulation.

to extensively control for institutional differences at the national level by simply introducing country fixed effects, thus greatly reducing the scope for omitted variable and endogeneity bias (which may instead plague cross-country estimates). When moving to the cross-country empirical analysis (Section 4), I will deal with these issues by using religion as an instrument for trust. Overall, I find that trust has a robust, negative effect on both individual preferences for regulation and actual regulatory barriers across countries.

Finally, in Section 5 I will consider the implications of this finding for interpreting previous evidence about the effect of regulation on corruption and the size of the unofficial economy. In particular, I will show that controlling for average trust greatly reduces the estimated effect of regulation on corruption. As for the size of the unofficial economy, the estimated effect of regulation is not significantly different from zero once I keep trust constant across countries. My interpretation of these findings is that individual trust reflects, to some extent, trustworthiness of other agents in the economy. Therefore, trust should be negatively correlated, across countries, with the incidence of illegal activities. Since trust does also affect, negatively, regulations, omitting trust will bias the estimated effect of regulations on illegal activities upward.

This paper contributes to a large body of research, initiated by Putnam (1993) and Fukuyama (1995), which investigates the effect of cultural traits on economic activity (see Tabellini (2007a) for a review of the literature). In particular, it relates to recent work on the role of trust in sectors characterized by incomplete information and moral hazard. In a series of papers Guiso, Sapienza and Zingales find that trust fosters financial development, stock market participation and international exchange; see Guiso et al. (2004, 2005, 2007), respectively. More closely related to this paper, Algan and Cahuc (2006) emphasize the importance of trust for institutional design, while La Porta et al. (1997) and Slemrod (2002) explicitly consider the effect of trust on tax evasion, which is one aspect of the unofficial economy.<sup>5</sup> I contribute to this strand of literature by investigating the relationship between trust and the regulation of economic activity.

This paper is also related to the literature on the effects of regulation. My contribution in this respect is to show that cultural traits may be an important variable omitted from previous analyses. Of course, this does not mean to deny that regulation may entail severe drawbacks. It simply means that, when evaluating these effects, it might be important to account for the fact that regulation itself could have been enacted in response to widespread opportunistic behavior in the economy (this view is maintained,

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<sup>5</sup>An important antecedent to the literature on trust is Arrow (1972), who remarked that ‘much of the economic backwardness in the world can be explained by the lack of mutual confidence’.

among others, by Banerjee (1997) and Acemoglu and Verdier (2000)).

## 2 Theoretical framework

Consider an economy populated by two groups of (infinitesimal) agents, *producers* and *consumers*, with size 1 and  $N$ , respectively. All consumers are endowed with a unit of wealth, which they use to purchase a good made by producers. The quality of this good can take two levels, *high* ( $h$ ) or *low* ( $l$ ), and consumers value only consumption of the  $h$  quality. In particular, assume for simplicity that consumers' utility equals the consumption of high quality products.

The producers can be of two types, *advanced* ( $A$ ) and *backward* ( $B$ ), the size of the two groups being  $\alpha$  and  $1 - \alpha$ , respectively. Production costs vary with the quality of the good and the type of producer. In particular, denote the total cost function by

$$TC = c_p(F, Y, q),$$

where  $F$  is a fixed cost of production,  $Y$  is the quantity produced,  $p = A, B$  is the type of producer and  $q = h, l$  is the quality of the good. The cost function has the usual properties: it is continuous, increasing and convex in  $Y$  and increasing in  $F$ . In addition, for any value of  $F$  and  $Y$ ,

$$c_A(F, Y, l) = c_B(F, Y, l) = c_A(F, Y, h) < c_B(F, Y, h). \quad (1)$$

that is, advanced producers can provide both high and low quality at the same cost, while backward producers can provide high quality only at a higher cost.

Finally, there is asymmetric information in that consumers can neither observe the type of producer nor the quality of the good. Let me now introduce another set of assumptions about individual values and beliefs.

### 2.1 Honesty and trust

Agents are heterogeneous in terms of values. In particular, a fraction  $\tau$  of them are *honest* and always say the truth; the remaining part are *opportunists* and lie whenever this is optimal from an economic point of view.<sup>6</sup>

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<sup>6</sup>At a first sight, the existence of intrinsically honest individuals may seem to conflict with methodological individualism, which is the traditional paradigm in economics. However, honesty can be easily accommodated for in terms of exogenous differences in the tastes governing the utility function, as in Hart and Holmstrom (1986) and Kandel and Lazear (1992)

Agents have also heterogeneous beliefs about the fraction of honest individuals in the economy. By the law of large numbers, this must also be the (subjective) probability of meeting a honest producer. Let denote such probability by  $TRUST$  and assume that it is independently distributed across individuals according to

$$TRUST = \tau + \omega, \tag{2}$$

where  $\omega$  is an error term distributed over the support  $\Omega$  according to the cumulative density function  $\Phi(\cdot)$ , with  $\int_{\Omega} \omega d\Phi(\omega) = 0$ .<sup>7</sup> These assumptions imply that, on the one hand, individual trust predicts the fraction of honest agents in the economy only with error. On the other hand, individual beliefs are *not* systematically biased, so that average  $TRUST$  across individuals correctly predicts the incidence of honesty in the economy. I turn next to characterize the purely competitive equilibrium.

## 2.2 Equilibrium without regulation

Given the preferences of consumers and the cost function in 1, advanced producers have no incentive to under-provide quality. At the opposite, the only way for backward producers to remain in the market is taking advantage of asymmetric information and selling low quality products claiming that they are instead of high quality. However, honest producers never lie, while opportunist (backward) producers may consider this opportunity in order to enter the market.

Therefore, advanced producers (whether honest or opportunist) will solve the usual profit maximization problem, which implies that the price of the high quality good is set equal to the marginal cost of production:

$$P = \frac{\partial c_A(F, Y, h)}{\partial Y}. \tag{3}$$

As far as the set of potential entrants in the market is non-empty, the zero profit condition implies that price must also equal average costs:

$$P = \frac{c_A(F, Y, h)}{Y} \tag{4}$$

The two conditions taken together implicitly determine the equilibrium price and quantity in the market,  $P^*$  and  $Y^*$  respectively.<sup>8</sup>

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<sup>7</sup>Notice that, in order for the subjective probability  $TRUST$  to lie in the interval  $[0, 1]$  for all individuals, it must be that  $\Omega \subseteq [-\tau, 1 - \tau]$ .

<sup>8</sup>The condition for the set of potential entrants to be non-empty can be easily found by imposing

Given asymmetric information, opportunistic, backward producers will find it optimal to enter the market by producing the low-quality good and then mimicking the behavior of advanced producers, thus charging the same prices and selling the same quantities. Therefore, part of the products exchanged in the market will be of the low quality type, which delivers no utility to the consumer. Thus, the expected utility of the individual consumer, conditional on beliefs  $TRUST$ , will be

$$U^* = \frac{1}{P^*} \left[ \frac{\alpha}{\alpha + (1 - \alpha)(1 - TRUST)} \right], \quad (5)$$

where the first term on the right hand side is the quantity purchased and the last term is the (subjective) probability that the product is of high quality. Next, I introduce the possibility of regulating entry in the market and I ask under which conditions this raises individual expected utility.

### 2.3 Equilibrium with regulation

Consider the possibility of introducing a bureaucratic barrier to entry whose only effect is imposing additional effort on each producer who wants to sell in the market. Crucially, efficiency in complying with the regulatory burden reflects the overall efficiency of each producer. In particular, regulation increases fixed costs by  $E$  to the advanced producers, and by  $\tilde{E}$  to the backwards, with  $\tilde{E} > E$ . This has two effects on the market equilibrium.

First, the fact that burdensome regulation adds up to fixed costs raises the price charged by advanced producers up to  $P^{**} > P^*$ . This is immediate to see by adding  $E$  to  $F$  in the equilibrium condition 4, and it is represented in Figure 3 by the upward shift of the average cost curve from  $AC$  to  $AC'$ .

The second effect of regulation is to drive backward producers out of the market, due to the differential effect of red tape on the cost structure of the two types of producers (i.e.  $\tilde{E} > E$ ). This is represented in Figure 3 by the fact that the average cost curve of the backward producers shifts to  $AC'' > AC'$ , which prevents them from mimicking the prices and quantities offered by the advanced ones. Indeed, if they did so, they would incur losses equal to the shaded area  $L$ .

Given that with regulation only advanced producers enter the market, the expected

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the market clearing condition  $\frac{N}{P} = YM$ , where  $M$  are the firms active in the market. Recalling that honest, backward producers do not enter the market and plugging condition 4, a sufficient condition is  $\frac{N}{c_A(\tilde{E}, Y^*, h)} \leq \alpha + (1 - \alpha)(1 - \tau)$ .

utility of the individual consumer is

$$U^{**} = \frac{1}{P^{**}}. \quad (6)$$

Therefore, each consumer will prefer regulation if and only if, conditional on beliefs  $TRUST$ , expected utility when there is regulation exceeds that with no regulation, i.e.  $U^{**} > U^*$ . Using equations 5 and 6 and rearranging delivers the condition

$$TRUST < \theta = \frac{1 - \alpha(P^{**}/P^*)}{1 - \alpha}, \quad (7)$$

that is, all consumers whose trust is below (above) the threshold  $\theta$  will prefer to regulate (not to regulate) entry in the market. Thus, the prediction of the model is that less (more) trustful consumers will be more (less) favorable to regulation. Instead, trust is irrelevant for the preferences of producers toward regulation. The next Section examines empirically these model implications through the use of international survey data.

### 3 Individual-level evidence

The model in the previous section implies that, at the individual level, demand for regulation should be decreasing in trust across a group of individuals (the consumers) and independent of it across another group (the producers).

#### 3.1 Individual data and methodology

In order to test these predictions, I will use information contained in the World Values Survey (WVS hereafter). This is an ongoing international survey program, which has so far collected detailed individual data along several dimensions (economic, social, cultural, etc.) for more than 200,000 people in 83 countries.<sup>9</sup>

The results of this survey provide measures of both trust and preferences for regulation. Starting with the former, a widely adopted measure of trust is answer to question A165: ‘*Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?*’. I define a binary variable  $TRUST$  equal to 1 if the answer was ‘*Most people can be trusted*’ and 0 otherwise.<sup>10</sup>

<sup>9</sup>Throughout this paper I will refer to version v.20060423 of the database (FOUR-WAVE INTEGRATED DATA FILE, 1981-2004), which is available at <http://www.worldvaluessurvey.org/>. See the documentation available therein for an exhaustive description of the survey.

<sup>10</sup>This is by far the most widely used measure of trust adopted in the literature; examples include Knack and Keefer (1997), Guiso et al. (2006) and Tabellini (2005).

Turning to the dependent variable, question E042 in section ‘Politics and Society’ asks each individual whether ‘*The state should give more freedom to firms*’ or rather ‘*The state should control firms more effectively*’. The answer to this question consists of a variable taking on discrete values between 1 and 10, with higher values corresponding to preferences for more state intervention. Since the dependent variable is ordered and discrete, I will estimate the effect of trust on preferences for regulation using an ordered probit model. The question about regulation was included in the survey sent to 32 European countries participating to the fourth wave of the survey (1999-2004), which are listed in Table 1.<sup>11</sup>

The wealth of information provided by the WVS data allows to control extensively for several individual characteristics like occupation, age, gender, income, education and so on. Occupation is particularly important in order to distinguish individuals belonging to each of the two groups in my model, consumers and producers. For this purpose, I relied on question X036 of WVS, which asks ‘In which profession/occupation do you or did you work?’. Respondents are then classified in one of 20 categories, and I identified as producers all and only the individuals belonging to categories ‘entrepreneurs/managers’ and ‘farmers: has own farm’, while all other individuals were identified as consumers. The complete list of variables, along with detailed definitions, is presented in the Appendix; the correlation matrix and the summary statistics are reported in Table 2.

Estimating the effect of trust at the individual level across different countries allows to control for unobserved heterogeneity at the country level by simply introducing country fixed effects. These will capture the effect of any cross-country difference in institutional characteristics that could possibly impact on both individual preferences for government intervention and trust. In particular, fixed effects will greatly reduce the scope for omitted variable bias and reverse causality due to differences in the quality of regulation, the level of corruption of administrative bureaucracy, the degree of enforcement, and so on.

One complication with this approach is that fixed-effects are unattractive in non-linear models (like the ordered probit) because of the so-called incidental parameters’ problem. Basically, problem is that the estimator of each fixed effect uses only information from the corresponding group. When the size of each group is limited and possibly small the variance of the estimator (both of the intercepts and the slope) does not asymp-

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<sup>11</sup>Table 1 reports also the total population of each country, which makes apparent the unbalanced coverage of WVS across countries (coverage is much lower for larger countries). I thus weighted observations according to the product of national sampling weights (provided by the WVS) and country populations. However, all results presented below are unaffected when using unweighted observations (not reported, available upon request).

totically converge to 0 (see, for instance, Greene (2004)). This is usually the case for panels of  $N$  cross sectional units observed over  $T$  periods. However, I have thousands of (individual) observations available to estimate each (country) fixed effect, so that in this particular case the relevant asymptotics allow for consistent estimation.

### 3.2 Individual estimates

Tables 3 and 4 present the ordered probit estimates of the effect of trust on preferences for regulation across individuals within each of the two groups, consumers and producers, respectively. Starting with the former, the univariate regression in column (1) is negative and very statistically significant. The effect of trust is halved in magnitude once cross-country heterogeneity is removed (column (2)), but it remains strongly statistically significant. Columns (3) to (5) control for some individual characteristics which are likely correlated with both trust and preferences for regulation: gender, age, income, schooling, labor market status and a full set of occupation fixed effects.

Column (6) distinguishes between bureaucrats and politicians (*BURPOL*) and other individuals. In line with the descriptive evidence in Figure 2, bureaucrats and politicians do *not* seem to be more attached to regulations relative to other individuals. Finally, the last column distinguishes between individuals professing a hierarchical religion and other individuals. Yet, religion does not seem to have a direct effect on preferences toward regulation; I will come back on this finding in the next section.

The coefficient of *TRUST* remains negative and strongly statistically significant across all specifications. As for its magnitude, Figure 4 shows the predicted probabilities of each outcome for the two groups of trustful and non-trustful individuals (i.e.  $TRUST = 1$  and  $TRUST = 0$ , respectively), according to the model estimated in column (7) of Table 3. The difference between the two is substantial. It averages 16% across all possible outcomes of the dependent variable, ranging from 3% for intermediate outcomes to more than 30% for the most extreme ones; on average, it is equal to 16%.

The model in Table 4 re-estimates the same specification for the sole producers (entrepreneurs, managers and farmers). The most striking difference is that *TRUST* does *not* significantly affect preferences for regulation anymore (while the results for the other variables are broadly consistent with those obtained for consumers). This is in line with the predictions of the theoretical model, according to which trust should matter toward preferences for regulation only for the group of consumers.

Results presented in Tables 3 and 4 are robust to controlling for additional individual characteristics reported in the WVS: among others, regional (rather than country) fixed

effects, marital status, parenthood, size of the household and size of the town of residence. They are also qualitatively and quantitatively very similar when performing OLS (which do not suffer from the incidental parameters problem) rather than Maximum Likelihood estimates and when using unweighted rather than weighted observations.<sup>12</sup> Overall, these findings suggest that trust is an important determinant of preferences for regulation at the individual level. The next Section asks whether this relationship carries over across countries.

## 4 Evidence across countries

The results presented above suggest that, within each country, trust is a significant determinant of preferences for regulation. In this Section I turn to examine aggregate data in order to see whether trust significantly affects also the levels of regulation actually observed across countries.

### 4.1 Cross-country data and methodology

The measure of regulation adopted here is the (log of) number of procedures required to start a new business, *ENTRY*, which was first introduced by Djankov et al. (2002) and is currently updated yearly on behalf of the World Bank's Doing Business project. Procedures include '*obtaining all necessary licenses and permits and completing any required notifications, verifications or inscriptions with relevant authorities*' and range, for instance, from opening a bank account to scheduling sanitary inspections to the production plants.

Of course, any variable aimed at measuring a complex concept like regulations has its own shortcomings.<sup>13</sup> On the other hand, the Doing Business indicators have the advantage of being available and roughly comparable across almost all countries in the world. Most importantly, they underlie the bulk of evidence about the causes and consequences of regulation (in addition to Djankov et al. (2002), see for instance Acemoglu and Johnson (2005), Klapper et al. (2006) and Ciccone and Papaioannou (2007)).

Turning to the main explanatory variable, I will use the average level of *TRUST* within each country. In order to maximize the number of observations, and given that cultural values and beliefs are extremely persistent over time, I combined data on *TRUST* from the last two waves of WVS (1994-1999 and 1999-2004).

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<sup>12</sup>The results of these robustness checks are not presented but are available upon request.

<sup>13</sup>Woodruff (2006) provides a critical review of several measures of institutions, while Arruada (2007) focuses on the specific case of the Doing Business indicators.

While estimating the effect of trust, I will control for the main determinants of regulation identified by previous studies: the level of development, as proxied by the log of income per capita at constant 2000 PPP exchange rates (*GDP*); the log of total population (*POP*); and whether the country’s legal system is Common Law (*COMMON LAW*).<sup>14</sup>

In this paper I use Doing Business data for year 2005. Accordingly, this will be also the reference year for control variables. In the end, the final sample includes 78 countries, which are listed in the Appendix. The correlation matrix and summary statistics of all variables across countries are reported in Table 5.

## 4.2 Cross-country estimates

Table 6 reports the empirical evidence about the relationship between trust and regulation across countries. Columns (1) to (3) report the results of OLS regressions that control for level of development, total population and legal system. In line with the individual-level results, the estimated coefficient of *TRUST* is negative and statistically significant. According to these estimates, a standard deviation increase in the percentage of trustful individuals within the population cuts the red tape by between 30 and 40 percent.

In principle, I cannot rule out reverse causality. For instance, introducing regulation could affect average honesty by increasing the incentives for predatory practices and corruption, which would in turn impact (negatively) on *TRUST* because of equation 2.<sup>15</sup> For this reason, in the last three columns *TRUST* is instrumented by the share of population professing either Catholic, Jewish or Muslim religion, as reported by McCleary and Barro (2006). Since the seminal work by Putnam (1993), in fact, many empirical studies have confirmed that hierarchical religions have a negative effect on trust relative to other religions (see Guiso et al. (2003)). In addition, individual level estimates presented in the previous section seem to exclude that religion affects directly preferences for regulation (after controlling for trust). These two conditions allow for using religion as an instrument for trust, as it is done also in La Porta et al. (1997). The results of IV

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<sup>14</sup>The level of GDP per capita is included as a control in every cross-country regression explaining either trust or regulations (see for instance Djankov et al. (2002) and Zak and Knack (2001), respectively). The importance of population and the type of legal system relates instead to the argument of Demsetz (1967), according to which the creation of institutions requires a fixed cost and is therefore limited by the size of the market and the level of transaction costs. Mulligan and Shleifer (2005) provide evidence in this respect for the specific case of regulations.

<sup>15</sup>Indeed, many papers show how honesty may respond endogenously to incentives because of evolutionary forces (Hirshleifer (1984) and Frank (1987)), rational choice (Benabou and Tirole (2006)) and intergenerational transmission (Bisin et al. (2004) and Tabellini (2007b)).

estimates confirm that trust has a robust, negative effect on regulation. Actually, the magnitude of the IV coefficient is about twice that of the OLS one. Therefore, if there is indeed a feedback effect going from regulation to trust, this should be positive.

In table 7 I investigate whether the causal effect of trust on regulation actually goes through the channel advanced in this paper. If this is the case, lower *TRUST* should increase the demand for regulation (as captured by the number of procedures), but *not* its costs, which depend on other factors (like rent-seeking behavior by bureaucrats and politicians). This is exactly the picture emerging from table 7. In the first two columns the dependent variable is (log of) total costs of entry procedures.<sup>16</sup> There is some weak evidence of a negative relationship with *TRUST*, but it is not significant anymore once I control for *GDP*. Moreover, total costs should reflect, at least in part, the overall number of procedures, which in turn depend on trust. For this reason, in the last two columns, the dependent variable is the average cost per procedure, which does not seem to depend on trust.

Overall, it seems that trust actually exerts a significant, negative effect on regulation, both at the individual and at the cross-country level. In the next section I turn to examine the implications of these findings for interpreting the cross-country pattern of trust, regulation, corruption and the size of the shadow economy.

## 5 The effects of regulation

To the extent that corruption and unofficial activities are illegal (which is the case in most countries in the world), engagement in these activities should depend, negatively, on the fraction of honest individuals in the population. This implies that lower average honesty could drive both greater illegal activity and (according to equation 2) lower trust, which in turn raises preferences for regulation. As a consequence, the effect of regulation on corruption and the size of the unofficial sector that is estimated in previous studies could depend, at least in part, by (omitted) variation in honesty and trust.

In order to explore this possibility, I first investigate the plausibility of equation 2. According to this assumption, average trust should equal the fraction  $\tau$  of honest individuals in the economy:

$$\overline{TRUST} = \int_{\Omega} (\tau + \omega) d\Phi(\omega) = \tau.$$

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<sup>16</sup>The total costs of entry regulations also come from Doing Business.

Evidence from WVS data is suggestive in this respect. In questions F114 to F117 of the survey, individuals were asked to which extent they justified some illegal activities like paying a bribe and cheating on government benefits, taxes and public transport fares. The answer consists of a variable taking on discrete values between 1 and 10, where 1 means ‘*Never justifiable*’ and 10 means ‘*Always justifiable*’. Actually, table 8 shows that such attitudes are significantly correlated with trust across countries. In particular, widespread propensity to commit illegal activities is associated with less trust toward the others. Trust is also strongly and negatively correlated with the level of corruption, as perceived by international independent agencies like Transparency International. All these correlations are not driven by omitted variation in levels of development (column (2) of table 8 reports the correlation coefficients after all variables have been regressed on real GDP per capita). Overall, these findings seem consistent with the hypothesis advanced in equation (2), namely that individual trust may predict to some extent fellow citizens’ attitudes toward illegal activities.<sup>17</sup>

This last finding suggests that, in order to avoid omitted variable bias, it may be important to control for trust when estimating the effect of regulation on activities such as corruption and hiding in the informal economy. In fact, positive correlation between regulation and illegal activities could depend on the fact that the latter are more widespread in countries where the fraction of honest individuals is lower; lower honesty also decreases trust, which in turn raises demand for regulation. In the remaining part of this Section I will investigate this possibility by regressing measures of corruption and unofficial economy on *ENTRY* and checking whether controlling for *TRUST* actually makes a difference for the estimated coefficient of regulation.

A widely adopted measure of corruption is the Corruption Perceptions Index (*CORRUPT*), managed by Transparency International, which is a continuous index ranging from 1 to 10, with higher values corresponding to greater corruption.<sup>18</sup> As for the size of the unofficial activity, its (estimated) weight over the total economy is reported by Doing Business (*SHADOW*).

In the first column of table 9 the estimated effect of *ENTRY* on *CORRUPT* is

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<sup>17</sup>Of course, this picture is consistent also with other interpretations. Particularly, experimental evidence presented by Glaeser et al. (2000) suggests that trust may reflect the individual’s own trustworthiness (rather than beliefs the others). See also Sapienza et al. (2007). However, what matters for the issues discussed here is simply that trust and trustworthiness are strongly correlated across countries (whatever the channel behind this fact).

<sup>18</sup>Actually, in the original index provided by Transparency International higher values correspond to greater ‘control’ of corruption, thus lower corruption. I simply computed the negative of the original index in order to make its interpretation similar to that of the other measures of illegal activity used in this paper.

positive and strongly statistically significant, which is in line with previous findings in the literature. It is also high in magnitude, a standard deviation increase in regulation corresponding to an increase in corruption of 1.5 points (on a scale of 10). However, once I add trust and income per capita on the right hand side, the estimated effect of regulation is halved in magnitude and less precisely estimated than before.

The importance of cultural values and beliefs is even more apparent by looking at the determinants of the shadow economy. The univariate regression of *SHADOW* on *ENTRY* in column (4) is positive and very statistically significant (the t-ratio is above 10). The estimated effect is also sizable: one standard deviation increase in regulations is associated to a 5 percent increase of the size of the shadow economy, which corresponds approximately to half standard deviation of this variable. Once average trust (or, alternatively, honesty) is added to the regression, the estimated coefficient of regulations falls by half of its value and is not statistically significant anymore at the 1 percent confidence level. On the contrary, *TRUST* is strongly statistically significant and explains a large portion of variation in the dependent variable. In particular, a standard deviation increase in *TRUST* decreases the size of the unofficial sector (as a percentage of the total economy) by 6.5 points.

Finally, the results presented in column (6) control also for variation in income per capita to the regression. As a consequence, regulations do not seem related anymore to the level of unofficial activity. On the other hand, the coefficient of *TRUST* is only slightly affected and remains statistically significant at the 1 percent confidence level. Overall, these findings suggest that previous estimates of the effect of regulation may be confounded by omitted variation in average trust, which is negatively correlated with both regulation and the size of the shadow economy.

## 6 Conclusions

Regulation is often blamed for entailing large economic inefficiencies. On the other hand, people seem reluctant to abandon it. This paper offers a view that may potentially reconcile these two facts. The main insight is that, far from being exogenously determined, the actual level of regulation is an equilibrium outcome, which depends also on consumers' preferences. Particularly, stringent regulations may be enacted (at least in part) in response to widespread opportunistic practices in the economy. Then, these attitudes may drive part of the correlation existing between the intensity of regulation and several economic outcomes, confounding inference about causality.

I addressed these issues by explicitly controlling for such omitted factors. In partic-

ular, trust toward the others seems to be both a major determinant of preferences for regulation and a reliable measure (at the cross country level) of attitudes toward illegal activities. In fact, controlling for trust leads to reconsider the effect of regulation on outcomes such as the level of corruption and the size of the unofficial economy.

Of course, these results do not exclude the possibility that regulations may be a very inefficient solution to market failures such as asymmetric information and moral hazard. They suggest, however, that in order to make liberalization and deregulation politically appealing it might be necessary to foster and improve alternative institutions like, for instance, private litigation and collective class action.

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## Appendix

### Description of Variables

#### Individual-level variables:

*REGULATION*: answer to question ‘How would you place your views on this scale?’ 1 means you agree completely with the statement ‘The state should give more freedom to firms’; 10 means you agree completely with the statement ‘The state should control’;

and if your views fall somewhere in between, you can choose any number in between. Source WVS, variable E042.

*TRUST*: answer to question binary ‘Generally speaking, would you say that most people can be trusted?’. The variable takes value 1 if the individual answered ‘Most people can be trusted’, and 0 if the individual answered ‘Can’t be too careful in dealing with people’. Source: WVS, variable A165.

*ENTREPRENEUR*: binary variable equal to 1 if the individual is an entrepreneur or a manager. Source: EWVS, variable X036.

*INCOME*: three-value index recoding (on a country basis) household income, with higher values . Source: WVS, variable X047R.

*SCHOOLING*: three-value index recoding (on a country basis) educational level, with higher values corresponding to higher educational attainment. Source: WVS, variable X025R.

*HIER*: binary variable equal to 1 if the individual belongs to either Catholic, Jewish or Muslim religion. Source WVS, variable F025.

*BURPOL*: binary variable equal to 1 if the individual belongs to the category ‘legislator or senior officials’. Source WVS, variable X035.

### **Cross-country variables:**

*ENTRY*: The number of different procedures that a start-up has to comply with in order to obtain a legal status, as of 2005. Source: World Bank – Doing Business 2006.

*TRUST*: percentage of respondents who answer that ‘Most people can be trusted’ to the question ‘Generally speaking, would you say that most people can be trusted or that you can’t be too careful in dealing with people?’. Source: WVS, variable A165.

*GDP*: log of GDP per capita in year 2005, calculated at constant 2000 PPP international dollars. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. Source: World Bank Development Indicators.

*SHADOW*: Size of the informal economy as a percentage of GDP. Source: World Bank – Doing Business 2006.

*COST of ENTRY* : The cost of obtaining legal status to operate a firm as a share of per capita GDP, as of 2005. It includes all identifiable official expenses. Source: World

Bank – Doing Business 2006.

*CORRUPTION*: Corruption perception index for 2005. Corruption is defined broadly as ‘*the misuse of public power for private benefits, e.g., bribing of public officials, kick-backs in public procurement, or embezzlement of public funds*’. The index aggregates the corruption scores attributes to each country by several agencies. Source: Transparency International.

*HIER*: Percentage of people in the country professing either Catholic, Muslim or Jewish religion. Source: McCleary and Barro (2006).

## Sample

Countries included in the individual-level analysis and years in which the WVS interviews were conducted:

AUSTRIA [1999], BELARUS [2000], BELGIUM [1999], BULGARIA [1999], CROATIA [1999], CZECH REPUBLIC [1999], DENMARK [1999], ESTONIA [1999], FINLAND [2000], FRANCE [1999], GERMANY [1999], GREAT BRITAIN [1999], GREECE [1999], HUNGARY [1999], ICELAND [1999], IRELAND [1999], ITALY [1999], LATVIA [1999], LITHUANIA [1999], LUXEMBOURG [1999], MALTA [1999], NETHERLANDS [1999], NORTHERN IRELAND [1999], POLAND [1999], PORTUGAL [1999], ROMANIA [1999], RUSSIAN FEDERATION [1999], SLOVAKIA [1999], SLOVENIA [1999], SPAIN [1999], SWEDEN [1999], TURKEY [2001], UKRAINE [1999]

Countries included in the aggregate-level analysis:

ALBANIA, ALGERIA, ARGENTINA, ARMENIA, AUSTRALIA, AUSTRIA, AZERBAIJAN, BANGLADESH, BELARUS, BELGIUM, BOSNIA AND HERZEGOVINA, BRAZIL, BULGARIA, CANADA, CHILE, CHINA, COLOMBIA, CROATIA, CZECH REPUBLIC, DENMARK, DOMINICAN REPUBLIC, EGYPT, EL SALVADOR, ESTONIA, FINLAND, FRANCE, GEORGIA, GERMANY, GREECE, HUNGARY, ICELAND, INDIA, INDONESIA, IRAN, IRAQ, IRELAND, ISRAEL, ITALY, JAPAN, JORDAN, KOREA REP., KYRGYZ REPUBLIC, LATVIA, LITHUANIA, MACEDONIA, MEXICO, MOLDOVA, MOROCCO, NETHERLANDS, NEW ZEALAND, NIGERIA, NORWAY, PAKISTAN, PERU, PHILIPPINES, POLAND, PORTUGAL, PUERTO RICO, ROMANIA, RUSSIAN FEDERATION, SAUDI ARABIA, SINGAPORE, SLOVAK REPUBLIC, SLOVENIA, SOUTH AFRICA, SPAIN, SWEDEN, SWITZERLAND, TANZANIA, TURKEY, UGANDA, UKRAINE, UNITED KINGDOM, UNITED STATES, URUGUAY, VENEZUELA, VIETNAM, ZIMBABWE.

Figure 1: Regulatory reform in OECD countries

This figure plots three measures of regulation in year 2003 against their level in year 1998, for a sample of 19 OECD countries. All three indicators are from Conway, Janod and Nicoletti (2005) and they are increasing in the intensity of regulation.

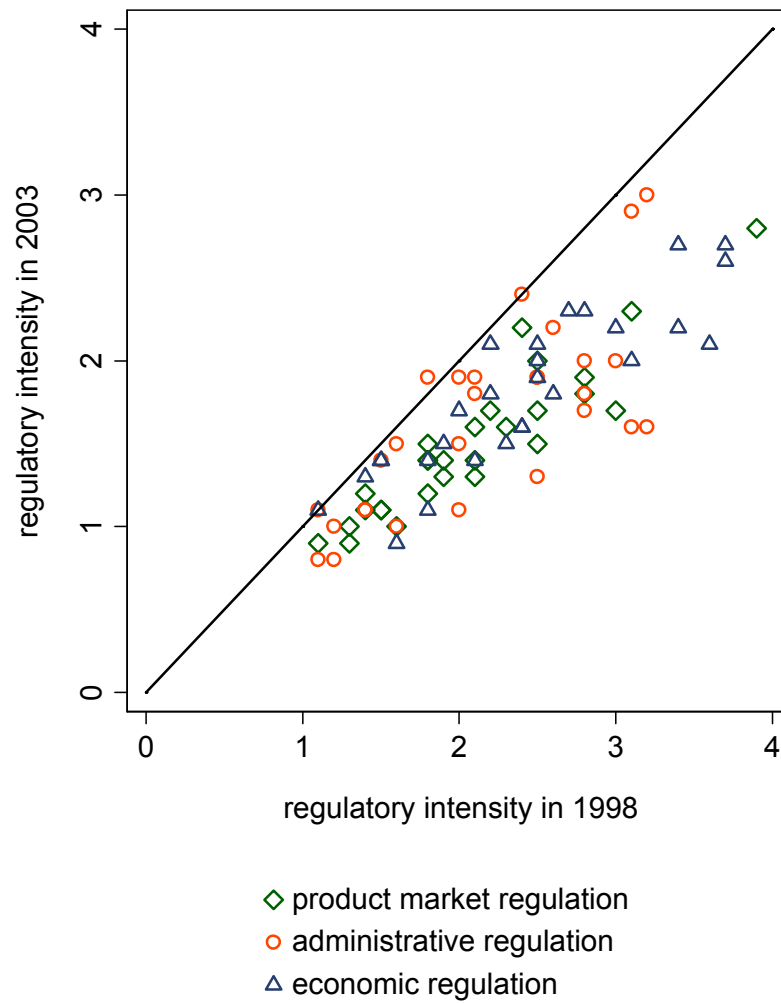


Figure 2: Opinions about regulation

The histogram shows the distribution of answers to question E042 of World Values Survey in 32 European countries, distinguishing between two categories of individuals: bureaucrats and politicians vs. other individuals. Answers take on discrete values between 1 and 10, where 1 means 'State should give more freedom to firms' and 10 means 'State should control firms more effectively'.

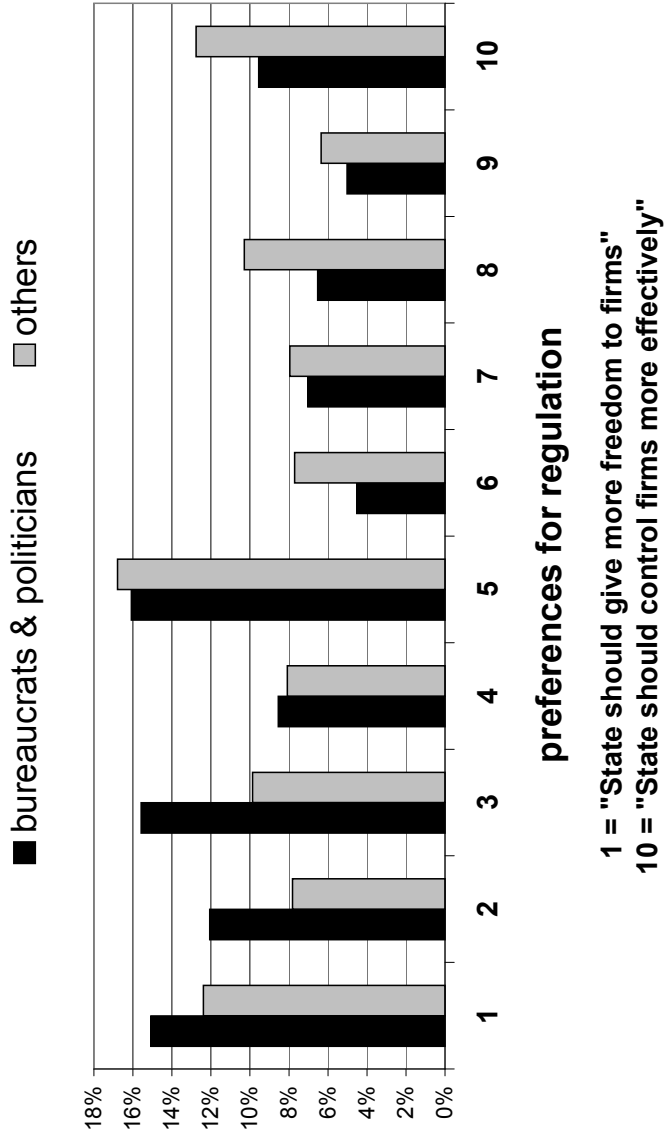


Figure 3: Regulation and production costs

This figure shows the effect of regulation on the equilibrium prices and quantities.  $P^*$  and  $Y^*$  are the equilibrium price and the quantity produced by each firm, respectively, when there is no regulation.  $P^{**}$  and  $Y^{**}$  are the corresponding levels after regulation is introduced.

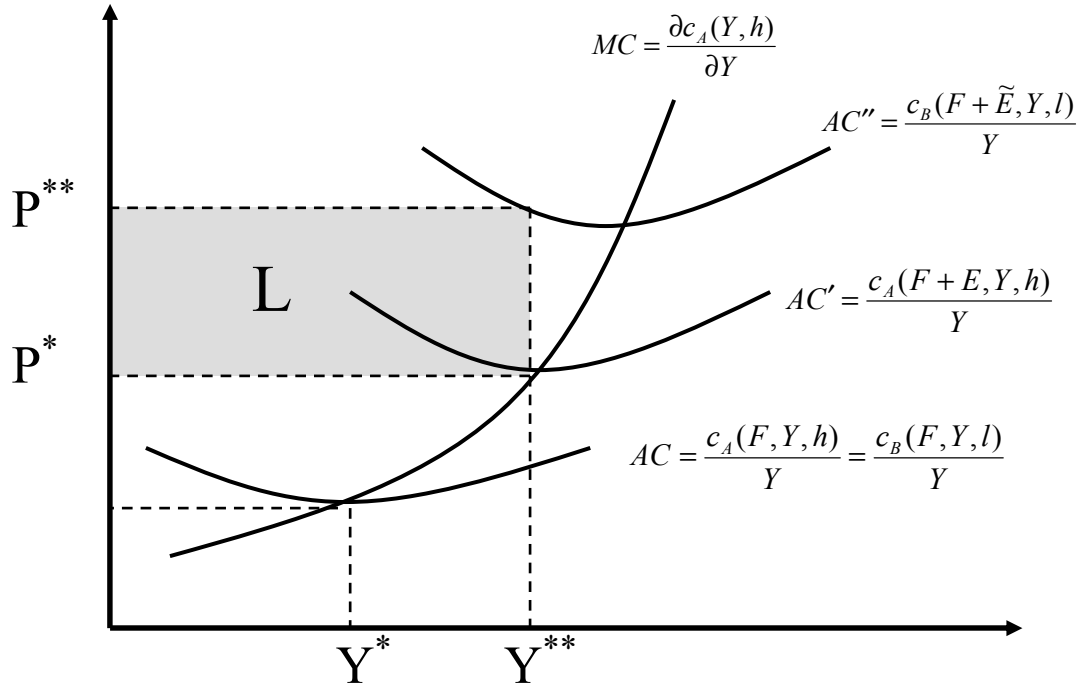


Figure 4: Trust and preferences for regulation

This figure shows the relationship between trust and (predicted) preferences for regulation within the group of consumers in my sample. The columns of the histogram are the average probabilities, estimated by the ordered probit model, that trustful ( $TRUST=1$ ) and non-trustful individuals ( $TRUST=0$ ) give each of the possible answers to question E042 of WVS. Answers take on discrete values between 1 and 10, where 1 means 'State should give more freedom to firms' and 10 means 'State should control firms more effectively'. Observations are weighted by the product of national sampling weights and country populations.

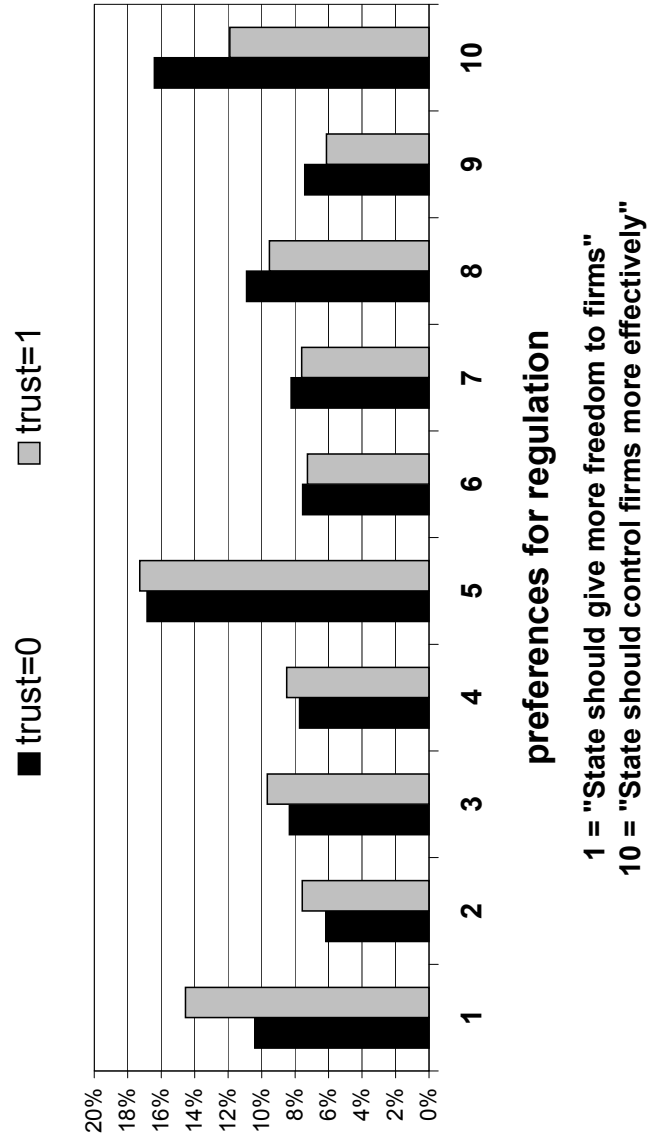


Table 1: Sample

country	code	sample	obs.	population
Austria	AUT	1523	1366	8,011,560
Belgium	BEL	1914	1769	10,252,000
Bulgaria	BGR	1002	875	8,060,000
Belarus	BLR	1002	832	10,005,000
Czech Republic	CZE	1911	1823	10,273,300
Germany	DEU	2045	1838	82,210,000
Denmark	DNK	1025	905	5,337,344
Spain	ESP	2417	1002	40,263,199
Estonia	EST	1007	893	1,369,512
Finland	FIN	1040	942	5,176,196
France	FRA	1617	1519	58,895,516
Great Britain	GBR	2005	1717	59,742,980
Greece	GRC	1142	948	10,917,500
Croatia	HRV	1004	940	4,502,500
Hungary	HUN	1003	910	10,210,971
Ireland	IRL	1014	923	3,805,399
Iceland	ISL	970	900	281,000
Italy	ITA	2002	1845	56,948,602
Lithuania	LTU	1020	884	3,499,527
Luxemburg	LUX	1211	1038	438,000
Latvia	LVA	1015	942	2,372,000
Malta	MLT	1004	980	390,000
Netherlands	NLD	1005	978	15,925,431
Polonia	POL	1098	1007	38,453,801
Portugal	PRT	1001	883	10,225,803
Romania	ROM	1148	1032	22,443,000
Russia	RUS	2504	2265	146,303,000
Slovak Republic	SVK	1334	1218	5,388,740
Slovenia	SVN	1008	926	1,989,000
Sweden	SWE	1018	948	8,869,000
Turkey	TUR	4609	1107	67,420,000
Ukraine	UKR	1196	1067	49,175,848
Total		45814	37222	759,155,750

*Notes:* This table lists all countries for which individual-level data were available. For each country, it reports the number of individuals interviewed by the the fourth wave of WVS, the number of non-missing observations (i.e. the number of individuals that answered both questions about trust and regulation) and total population



Table 3: Trust and Preferences for Regulation: Consumers

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>TRUST</i>	-0.206*** (0.017)	-0.108*** (0.018)	-0.102*** (0.018)	-0.085*** (0.020)	-0.077*** (0.023)	-0.083*** (0.024)	-0.077*** (0.023)
<i>AGE</i>			0.005*** (0.0005)	0.004*** (0.0006)	0.005*** (0.0007)	0.005*** (0.0007)	0.005*** (0.0007)
<i>FEMALE</i>			0.088*** (0.017)	0.090*** (0.018)	0.124*** (0.023)	0.138*** (0.023)	0.123*** (0.023)
<i>INCOME</i>				-0.090*** (0.013)	-0.060*** (0.015)	-0.065*** (0.016)	-0.059*** (0.015)
<i>SCHOOL</i>				-0.105*** (0.014)	-0.070*** (0.019)	-0.068*** (0.020)	-0.069*** (0.019)
<i>UNEMPL</i>					0.137* (0.071)	0.133* (0.073)	0.137* (0.071)
<i>BURPOL</i>						0.210 (0.160)	
<i>HIER</i>							0.016 (0.025)
country FE	NO	YES	YES	YES	YES	YES	YES
occupation FE	NO	NO	NO	NO	YES	YES	YES
obs.	34309	34309	34172	29118	21583	20161	21583
Chi-square	139.4	3051.9	3200.9	3108.7	2569.6	2281.8	2570.0

*Notes:* This table presents the results of estimates of the effect of trust on preferences for regulation at the individual level. The sample includes all individuals interviewed during the fourth wave of the WVS that are *not* classified as entrepreneurs or managers (the distinction is based on question X036 in WVS). The dependent variable is answer to question E042 in the WVS. It takes on discrete values from 1 to 10, where 1 means *State should give more freedom to firms* and 10 means *State should control firms more effectively*. The estimation method is the Maximum Likelihood ordered probit model. Robust standard errors are presented (in parenthesis). Observations are weighted by the product of national sampling weights and country populations. \*, \*\* and \*\*\* denote rejection of the null hypothesis of the coefficient being equal to 0 at 10%, 5% and 1% significance level, respectively.

Table 4: Trust and Preferences for Regulation: Producers

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>TRUST</i>	-0.201*** (0.059)	0.004 (0.062)	0.002 (0.063)	0.009 (0.069)	0.009 (0.069)	-0.009 (0.076)	0.006 (0.069)
<i>AGE</i>			0.006*** (0.002)	0.004* (0.002)	0.004* (0.002)	0.006** (0.003)	0.004* (0.002)
<i>FEMALE</i>			0.146** (0.065)	0.185** (0.072)	0.185** (0.072)	0.190** (0.079)	0.183** (0.073)
<i>INCOME</i>				-0.146*** (0.048)	-0.146*** (0.048)	-0.145*** (0.053)	-0.145*** (0.048)
<i>SCHOOL</i>				0.013 (0.051)	0.013 (0.051)	-0.050 (0.055)	0.017 (0.051)
<i>UNEMPL</i>					0.094 (0.360)	0.093 (0.380)	0.089 (0.358)
<i>BURPOL</i>						0.337 (0.238)	
<i>HIER</i>							0.084 (0.089)
country FE	NO	YES	YES	YES	YES	YES	YES
occupation FE	NO	NO	NO	NO	YES	YES	YES
obs.	2913	2913	2906	2371	2369	2046	2369
Chi-square	11.7	350.8	389.1	355.4	355.4	272.6	359.0

*Notes:* This table presents the results of estimates of the effect of trust on preferences for regulation at the individual level. The sample includes all individuals interviewed during the fourth wave of the WVS that are classified as entrepreneurs or managers (the distinction is based on question X036 in WVS). The dependent variable is answer to question E042 in the WVS. It takes on discrete values from 1 to 10, where 1 means *State should give more freedom to firms* and 10 means *State should control firms more effectively*. The estimation method is the Maximum Likelihood ordered probit model. Robust standard errors are presented (in parenthesis). Observations are weighted by the product of national sampling weights and country populations. \*, \*\* and \*\*\* denote rejection of the null hypothesis of the coefficient being equal to 0 at 10%, 5% and 1% significance level, respectively.

Table 5: Correlation matrix and summary statistics (across countries)

<i>Correlation matrix</i>					
	ENTRY	TRUST	GDP	POP	COMMON LAW
ENTRY					
TRUST	-0.467*				
GDP	-0.461*	0.439*			
POP	0.199*	0.074	-0.001		
COMMON LAW	-0.270*	0.019	-0.078	-0.106	
<i>Summary statistics</i>					
obs.	151	78	137	151	147
mean	2.179	0.272	8.512	16.071	0.286
std. dev.	0.432	0.144	1.167	1.717	0.453
max	2.944	0.648	10.530	20.978	1
min	0.693	0.028	6.370	9.903	0

*Notes:* This table presents the correlation matrix of variables (top panel) and their summary statistics (bottom panel) across countries. \* denotes rejection of the null hypothesis of the correlation coefficient is equal to 0 at 10% significance level

Table 6: Trust and regulations: cross country estimates

	(1)	(2)	(3)	(4)	(5)	(6)
<i>TRUST</i>	-1.616*** (0.387)	-1.146*** (0.38)	-1.159*** (0.341)	-2.980*** (0.830)	-2.481*** (0.893)	-2.020*** (0.757)
<i>GDP</i>		-0.196*** (0.05)	-0.190*** (0.044)		-0.107 (0.078)	-0.127* (0.073)
<i>POPULATION</i>			0.091*** (0.022)			0.103*** (0.024)
<i>COMMON LAW</i>			-.450*** (0.130)			-.424*** (0.144)
method	OLS	OLS	OLS	IV	IV	IV
obs.	78	76	76	76	75	75
R-squared	0.22	0.36	0.52			
F-stat.	17.40***	18.68***	17.35***	12.54***	19.40***	19.04***
first stage F-stat.				22.46***	19.93***	17.57***

*Notes:* The dependent variable is the (log of) number of procedures required to start a new business. The estimation method is Ordered Least Squares in columns (1) to (3) and Instrumental Variables in columns (4) to (6). In the Instrumental Variable regressions, the fraction of population professing either Catholic or Muslim religion is used as an instrument for *TRUST*. Robust standard errors are presented (in parenthesis). The first stage F-statistic refers to the null hypothesis that the coefficient of the first stage instrument excluded from the second stage is equal to 0. \*, \*\* and \*\*\* denote rejection of the null hypothesis of the coefficient being equal to 0 at 10%, 5% and 1% significance level, respectively.

Table 7: Trust and costs of regulation

	(1)	(2)	(3)	(4)
<i>TRUST</i>	-32.871 (25.378)	32.760 (22.278)	-2.148 (2.186)	3.392* (1.948)
<i>GDP</i>		-23.517*** (3.280)		-1.982*** (0.287)
obs.	77	75	77	75
R-squared	0.08	0.46	0.03	0.40
F-stat.	5.44**	31.63***	2.19	24.23***

*Notes:* The dependent variable is: in columns (1) and (2) the (log of) total cost of the procedures required to start a new business; in columns (3) and (4) it is the (log of) the average cost of each procedure required to start a new business. The estimation method is Ordered Least Squares. Robust standard errors are presented (in parenthesis). \*, \*\* and \*\*\* denote rejection of the null hypothesis of the coefficient being equal to 0 at 10%, 5% and 1% significance level, respectively.

Table 8: Honesty and trust across countries

<i>It is justifiable:</i>	correlation with <i>TRUST</i>	
	(1)	(2)
someone accepting a bribe in the course of their duties	-0.314*	-0.294*
claiming government benefits to which you are not entitled	-0.259*	-0.228*
cheating on taxes if you have a chance	-0.098	-0.195*
avoiding a fare on public transport	-0.298*	-0.328*
corruption perception index	-0.526*	-0.339*

*Notes:* This table presents the cross-country correlation between *TRUST* and measures of attitudes toward illegal activities. The latter are measured by answers to questions F114 to F117 of WVS. These consist of variables taking on discrete values between 1 and 10, where 1 means that the activity is ‘*Never justifiable*’ and 10 means that it is ‘*Always justifiable*’. Column (1) reports the simple correlation coefficient while column (2) reports the correlation coefficient between the residuals of the regression of each of the two variables on per capita GDP. \* denotes rejection of the null hypothesis of the correlation coefficient is equal to 0 at 10% significance level

Table 9: Trust and the effects of regulation

	(1)	(2)	(3)	(4)	(5)	(6)
	<i>CORRUPT</i>	<i>CORRUPT</i>	<i>CORRUPT</i>	<i>SHADOW</i>	<i>SHADOW</i>	<i>SHADOW</i>
<i>ENTRY</i>	3.502*** (0.286)	2.926*** (0.361)	1.700*** (0.306)	0.121*** (0.019)	0.060** (0.024)	-0.009 (0.024)
<i>TRUST</i>		-4.336*** (1.524)	-2.318** (1.092)		-0.447*** (0.097)	-0.341*** (0.096)
<i>GDP</i>			-1.420*** (0.197)			-0.082*** (0.013)
obs.	75	75	74	72	72	71
R-squared	0.502	0.552	0.775	0.184	0.343	0.583
F-stat.	150.25***	145.41***	91.54***	39.05***	25.97***	37.01***

*Notes:* The dependent variable is reported on top of each column. The estimation method is Ordered Least Squares. Robust standard errors are presented (in parenthesis). \*, \*\* and \*\*\* denote rejection of the null hypothesis of the coefficient being equal to 0 at 10%, 5% and 1% significance level, respectively.