

# Trust and Regulation

## Addressing a Cultural Bias\*

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### Abstract

Cultural traits shape both the scope and the consequences of government intervention. Failing to account for cultural differences may therefore bias the estimated effects of regulation. This paper investigates the direction and the magnitude of this bias, from both a theoretical and an empirical point of view. It presents a simple model in which agents differ in terms of trust and civicness, and average trust predicts average civicness across countries. Production by the uncivic imposes negative externalities on the whole economy and burdensome entry regulations may lower these externalities at the cost of limiting economic activity by all agents. The model delivers two main predictions: within each country, preferences for regulations depend negatively on individual trust; across countries, civicness is inversely related to negative externalities, unofficial activity and government regulation, thus inducing a positive correlation between all these variables. Evidence from individual level and cross-country data is consistent with these implications of the model. In particular, it suggests that a large part of the previously estimated negative effects of regulation can be attributed to omitted variation in cultural traits.

**Keywords:** trust, regulations, market failures

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

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# 1 Introduction

Government intervention is often blamed for entailing large economic inefficiencies. In particular, burdensome regulation of economic activity may distort the efficient allocation of resources by driving individuals and firms out of the official markets and into the informal sector (Johnson et al., 1998; Friedman et al., 2000; Schneider and Enste, 2000; Djankov et al., 2002). Most importantly, regulation also seems ineffective in preventing or correcting market failures. Available empirical evidence suggests that, indeed, greater regulation is associated with *higher* negative externalities across countries (Djankov et al., 2002).

These findings are consistent with public choice theories that consider regulation a purely rent-seeking device benefiting a restricted group of insiders (bureaucrats, politicians and industry incumbents) at the expense of the other agents in the economy (Tullock, 1967; Stigler, 1971; Peltzman, 1976). On the other hand, while in every country the insiders represent only a small fraction of the population, a much larger share would support greater government intervention. Figure 1 shows that, in a large sample of countries, about half of the people believe that the government should actually *increase* control over firms. Most importantly, this fraction is much lower among bureaucrats and politicians, which is strongly at odds with rent-seeking models of regulation.<sup>1</sup>

This paper offers an alternative explanation that reconciles the existence of positive excess demand for government intervention by individuals at large within each country with the empirical relationship between regulations and market failures that is observed across countries. Such explanation hinges crucially on within- and between-country variation in two cultural traits, namely trust and civiness. In particular, the first contribution of this paper is to show that, within each economy, the individual demand for regulation depends negatively on trust toward others. This relationship has far-reaching implications for the empirical pattern of regulation and market failures across countries characterized by a different degree of (average) civiness. In particular, if (i) civiness is negatively related to the incidence of market failures and (ii) average trust predicts average civiness across countries, then omitted variation in civiness induces an upward bias in previous estimates of the effect of regulation on market failures. The second contribution of this paper is thus to address the importance of this bias by explicitly incorporating heterogeneity in trust and civiness into the analysis.

Preliminary evidence presented in the next section suggests that the bias induced by omitted variation in culture is significant. Using the same data of Djankov et al. (2002) I first show that, consistently with their univariate regressions, the intensity of regulation is strongly positively correlated with negative externalities and the size of the shadow economy. After controlling for differences in trust, however, regulation is *inversely* related to negative externalities (as proxied by water pollution) and it is *not* related

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<sup>1</sup>These results refer to a sample of 37,222 individuals from 32 countries interviewed during the period 1999-2002. The questionnaire and the data are described in detail in the next sections.

any more to unofficial activity.<sup>2</sup> These findings suggest that demand for government intervention by people at large, driven by market failures occurring in the first place, might explain much of the differences in regulation across countries. This view is in line with the public interest theory of regulation initiated by Pigou (1938), according to which government intervention provides a (second best) solution to market inefficiencies (see, more recently, Banerjee, 1997; Acemoglu and Verdier, 2000). As a matter of fact, all countries impose pervasive regulations in those sectors characterized to a greater extent by negative externalities, natural monopolies, incomplete information and moral hazard (e.g. public utilities, professional services and the health care sector).

Culture enters this framework by influencing both the risk of market failures and individual beliefs about such risks. With respect to the first issue, some cultural traits may prevent individuals from taking advantage of market imperfections at the expense of other agents even though it would be optimal to do so from an economic point of view. While this is a departure from the standard *homo economicus* assumption, it is a widely accepted one. In particular, both experimental and non-experimental evidence show that elements of the cultural sphere such as moral values, religious beliefs and social norms may induce individuals to privilege social outcomes over their own private economic interests. Cultural tendencies toward cooperation have been alternatively referred to in the economics literature as social capital (Knack and Keefer, 1997), generalized (as opposed to limited) morality (Tabellini, 2008b), trustworthiness (James, 2002) and, more recently, *civicness* (Algan and Cahuc, 2009; Aghion et al., 2009).<sup>3</sup>

It is even more uncontroversial in the literature that individual trust reflects, to some extent, other people's tendencies toward cooperation, possibly along with behavioral elements such as betrayal aversion (Barr, 2003; Bohnet and Zeckhauser, 2004; Bohnet et al., 2008; Fehr, 2008).<sup>4</sup> Therefore, less trustful agents would predict a greater propensity to take advantage of market failures by other individuals in the economy; if the demand for government regulation is motivated (at least in part) by concerns for market failures, these same agents should prefer more government intervention.

Section 3 frames this idea into a simple model with negative externalities of production and heterogeneity in individual values and beliefs. Specifically, some agents are civic and never exert externalities on the rest of the economy, while the uncivic do so whenever it is in their private economic interest. Regulation imposes an upfront (wasteful) cost on perspective entrants in the market, thus discouraging entry in the official sector, which in turn lowers the level of economic activity. Through this channel, regulation also lowers negative externalities, although it does so inefficiently for two main reasons. First, regulation imposes a burden on all agents, including the civic ones that would have not polluted

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<sup>2</sup>All data used in Djankov et al. (2002) have been kindly made available by Andrei Shleifer at <http://www.economics.harvard.edu/faculty/shleifer/files/registration<sub>new</sub>.dta>

<sup>3</sup>Incidentally, "civic traditions" was also the term used in the path-breaking work by Putnam (1993) on the effect of cooperation on economic outcomes.

<sup>4</sup>For a different view, see Glaeser et al. (2000), according to whom individual trust reflects one's own (rather than others') trustworthiness; see also Sapienza et al. (2007).

anyway. Second, individuals averted from the official market may still operate unofficially; in this case, however, they must limit their size, which in turn reduces the equilibrium level of negative externalities.

Trust is simply the subjective belief about the fraction of civic agents in the population. Therefore, the expected costs and benefits of regulation vary with trust, less trustful agents predicting more market failures absent regulation and thus demanding more of it. In Section 4 I test this empirical implication of the model on individual data from the World Values Survey. Individual-level estimates allow to control for country-specific factors by including country fixed effects, which considerably reduces the scope for omitted variable and endogeneity bias. Also, regressions interacting individual trust with country characteristics relate the trust-driven component of the individual demand for regulation to economic and institutional factors. Overall, I find that trust has a robust, negative effect on individual preferences for regulation, the more so in countries where market failures are more widespread and the bureaucracy is more efficient.

Finally, in Section 5 I examine the implications of these findings for the cross-country pattern of regulation and market failures. The main model implication in this respect is that lower civicness drives higher levels of negative externalities, unofficial activity and government regulation (through trust), thus inducing a positive (spurious) correlation between all these variables. To take this into account, I replicate the analysis of Djankov et al. (2002) on the effects of regulation controlling for omitted variation in culture in two different ways. First, I include average country trust along with regulation on the right hand side of the estimating equation. Then, since trust could itself be an endogenous variable in the regression, I address the same issue by excluding it from the specification and instrumenting regulation by country population. According to Demsetz (1967) and Mulligan and Shleifer (2005), in fact, the creation of new institutions (including government regulations) entails significant fixed costs and is therefore limited by the size of the market. Indeed, population turns out to be strongly correlated with the intensity of regulation across the countries in my sample. Most importantly, it is uncorrelated with average trust, so that differences in population allow to estimate the effects of regulation independently of variation in trust. The results obtained through these two alternative methods are remarkably similar and suggest that omitted variation in culture may induce a significant upward bias in previous estimates of the effect of regulation on negative externalities and unofficial activity.

There is a large body of research, initiated by Putnam (1993) and Fukuyama (1995), investigating the effect of cultural traits on economic activity (for a recent review, see Tabellini, 2008a). I contribute to this literature by studying a new channel through which trust and civicness improve aggregate performance, namely by lowering the demand for costly regulations. Indeed, Hochberg et al. (2009) and Zingales (2009) suggest that recent corporate scandals in the US and the global financial turmoil, provoked (among other things) by the opportunistic or illicit behavior of some agents in the market, resulted in a dramatic drop in trust, which in turn raised pressures to tighten regulation. This paper

offers a framework to better understand this mechanism.

Closely related to this paper, Aghion et al. (2008), Algan and Cahuc (2009) Aghion et al. (2009) also examine the relationship between civiness, trust and regulation. However, they do not consider the implications of this finding for previous evidence about the effects of government intervention. My contribution in this respect is to include market failures and unofficial activity (which may also depend on culture) into the analysis and show that previous estimates of the effects of regulation on such outcomes are upward biased by omitted variation in civiness and trust.

## 2 Data and preliminary evidence

This section introduces some of the measures of regulation and culture that will be used throughout the paper and reviews previous evidence on the relationship between regulations and market failures.

### 2.1 Regulation and market failures

Unbundling and measuring institutions is never an easy task. This is especially true for regulations, due to the extreme variability of formal and informal regulatory practices around the world. In an extremely influential paper, Djankov et al. (2002) proposed to measure entry regulations by the number of procedures required to start a new business. Such procedures include “obtaining all necessary licenses and permits and completing any required notifications, verifications or inscriptions with relevant authorities”; they range from opening a bank account to scheduling sanitary inspections to the production plants. Since its introduction, this indicator has been updated yearly on behalf of the World Bank’s Doing Business project.<sup>5</sup>

While any measure of regulation has its own shortcomings, the Doing Business indicator has the advantage of being available and roughly comparable for almost all countries in the world. Since its introduction, it has been extensively used to empirically evaluate the effects of regulations. In the same paper, in fact, Djankov et al. (2002) examine the correlation between regulation and indicators of market failure. Two such indicators are the level of water pollution, as measured by the emissions of kilograms of organic pollutant per day per worker, and the (estimated) size of the informal sector. The results are shown in the top graphs of Figure 2. Heavier regulations seem associated with worse outcomes in both respects, the relationship being particularly strong and statistically significant in the case of unofficial activity. Djankov et al. (2002) interpret these findings as evidence in favor of public choice theories of regulation.

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<sup>5</sup>Arrunada (2007) presents a critique of the Doing Business indicators, while Woodruff (2006) provides a more general discussion of the issues involved in the measurement of institutions.

## 2.2 Trust toward others

Cultural traits such as moral values, beliefs and social norms vary widely both within and across countries. The World Values Survey (WVS hereafter) represents a formidable attempt to provide an adequate account of such heterogeneity by the means of international questionnaires collecting detailed individual data along several dimensions (economic, social, cultural, etc.) for more than 200,000 people in 83 countries.<sup>6</sup> The results of this survey deliver, among other things, a measure of individual trust toward others. Question A165 of the survey asks: “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 if the answer was “Can’t be too careful in dealing with people”. This is by far the most widely adopted measure of trust existing in the literature; examples include Knack and Keefer (1997), Guiso et al. (2006), Tabellini (2005) and Aghion et al. (2009). Since all variables from Djankov et al. (2002) refer to the 1990s, I combined data from the second and third wave of the WVS (which span the periods 1990-1993 and 1994-1999, respectively) to obtain a cross-country measure of average trust.

It turns out that trust is negatively associated with entry regulations across countries; see Figure 3. If trust also reflects, negatively, the average propensity of (other) individuals in the economy to take advantage of market imperfections, then omitted variation in cultural values and beliefs could drive part of the (positive) correlation between regulations and market failures. Unfortunately, reliable measures of civicness, allowing to verify its relationship with average trust, are not easily comparable across countries. For instance, data on blood donations and voting turnout, which capture the propensity of individuals to privilege social over private interests, could depend on the development of the non-profit sector and on the electoral system, respectively, both of which may be also correlated with regulation. Still, these same measures are more easily comparable across regions within the same country. In particular, Guiso et al. (2004) have used blood donations and voting turnout at referenda to measure differences in social capital across Italian regions. Both measures are indeed positively and significantly correlated with average trust across regions (the correlation coefficient is 0.38 for blood donations and 0.48 for voting turnout) as well as strongly correlated with each other (correlation equal to 0.63). While it is not possible to conclude that such correlations are actually due to the fact that trust predicts civicness, this evidence suggests nevertheless that the two variables are strongly correlated. Therefore, partialing out the effect of trust on both regulations and market failures should control, at least in part, for omitted variation in civicness across countries. After doing this, heavier regulation is no longer associated with worse outcomes; see the bottom graphs in Figure 2. My interpretation of this finding is that culture is both an important determinant of regulation and a confounding factor in previous estimates of its

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<sup>6</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 therein for an exhaustive description of the survey.

effects. The model in the next section formalizes this intuition.

### 3 The model

#### 3.1 Preferences and technology

Consider an economy populated by a continuum of (ex-ante) identical agents, with total mass 1, living for two periods. In the first period, they decide by majority voting over the regulatory policy, namely the level  $R$  of red tape imposed on official economic activity; in the second period, agents learn their ability in dealing with bureaucracy and decide whether they want to enter the official or unofficial sector. In the former case, they produce  $\bar{y}$  and bear a bureaucratic cost  $\alpha R$ , where  $\alpha$  reflects their (inverse) ability in dealing with red tape; in particular, let  $\alpha$  be uniformly distributed, across individuals, over the unit interval. Alternatively, individuals may escape bureaucracy by hiding in the shadow economy; in this case, however, they must restrict the scale of production to  $\underline{y} < \bar{y}$  in order not to be detected by government officials.<sup>7</sup>

Production by each agent exerts a negative externality on the whole economy (e.g. pollution) unless (s)he affords an investment  $I < \underline{y}$  to prevent it; for instance,  $I$  could be the investment required to adopt a safer (but more expensive) technology. In particular, let the level of negative externalities in the economy, denoted by  $X$ , equal the total output produced by agents not investing in the safe technology.<sup>8</sup>

The private utility of each agent is

$$U = c - f(X), \tag{1}$$

where  $c$  is individual consumption, which depends on the entry and investment decisions, and  $f(X)$  are the costs of negative externalities present in the economy, with  $f(\cdot)$  increasing and convex.

#### 3.2 Civicness and trust

I now introduce the key ingredient of the model, namely heterogeneity in individual values and beliefs. Starting with the former, a fraction  $\tau$  of agents are *civic* and suffer psychological penalties for damaging other individuals.<sup>9</sup> In particular, such penalties are so high that civic agents always invest to prevent negative externalities, while the remaining part,  $1 - \tau$ , are *uncivic* and simply maximize their own private utility.

<sup>7</sup>The *size dualism* is a well-established theoretical and empirical result in the literature on unofficial activity (see, for instance, Rauch, 1991; Fortin et al., 1997; Amaral and Quintin, 2006; Antunes and Cavalcanti, 2007).

<sup>8</sup>A previous version of this paper, Pinotti (2008), explores the relationship between trust and regulation considering a different type of market failure, namely asymmetric information in product markets.

<sup>9</sup>This way of modeling civicness is adopted, for instance, by Frank (1987), Kandel and Lazear (1992) and Algan and Cahuc (2009).

Turning to beliefs, agents can not observe the exact proportion  $\tau$  of civic individuals in the economy but hold expectations about it, denoted by  $\hat{\tau}$ . Such expectations reflect both the true (unobserved)  $\tau$  and idiosyncratic prediction errors,

$$\hat{\tau} = \tau + \epsilon, \quad (2)$$

where  $\epsilon$  is randomly distributed across individuals. By the law of large numbers, the expected fraction of civic agents in the economy is also the subjective probability that each other individual is civic, so that  $\hat{\tau}$  may be also interpreted as *trust toward others*.

### 3.3 Equilibrium entry and externalities

I solve the model backward, starting from the entry and investment choices in period 2, which affect individual consumption in the following way:

	<i>invest</i>	<i>not invest</i>
<i>official sector</i>	$\bar{y} - \alpha R - I$	$\bar{y} - \alpha R$
<i>unofficial sector</i>	$\underline{y} - I$	$\underline{y}$

After learning their own  $\alpha$ , agents enter the official sector if and only if  $\bar{y} - \alpha R \geq \underline{y}$ , or

$$\alpha \leq \alpha^* = \frac{\Delta y}{R}, \quad (3)$$

with  $\Delta y = \bar{y} - \underline{y}$ . Therefore,  $\alpha^*$  and  $1 - \alpha^*$  are the fractions of agents entering the official and unofficial sector, respectively, so that total output in the economy is

$$Y = \alpha^* \bar{y} + (1 - \alpha^*) \underline{y}, \quad (4)$$

while the share produced in the unofficial sector is

$$S = \frac{(1 - \alpha^*) \underline{y}}{(1 - \alpha^*) \underline{y} + \alpha^* \bar{y}}. \quad (5)$$

Turning to investment, it always decreases private consumption and utility, so that the uncivic never prevent negative externalities (while the civic do by assumption). Therefore, the aggregate level of negative externalities is equal to

$$X = (1 - \tau) [\alpha^* \bar{y} + (1 - \alpha^*) \underline{y}]. \quad (6)$$

### 3.4 Regulatory policy

Assume that actual investment is unobservable (for instance, it could depend on effort); therefore, no policy aimed at reducing negative externalities may force individuals to invest  $I$ . On the other hand, compliance with the red tape and other bureaucratic requirements



is fully verifiable, so they can be used to drive prospective entrants from the official to the unofficial sector, thus lowering negative externalities through the reduction in the scale of production.

In period 1, before knowing his/her own  $\alpha$ , the expected utility of each agent, conditional on regulatory policy  $R$  and expectations  $\hat{\tau}$ , is

$$E(U) = \int_0^{\alpha^*} [\bar{y} - \alpha R] d\alpha - (1 - \alpha^*) \underline{y} - f((1 - \hat{\tau}) [\alpha^* \bar{y} + (1 - \alpha^*) \underline{y}]), \quad (7)$$

where  $\alpha^*$  depends on  $R$  according to (3). The level of regulation preferred by each agent solves the first order condition

$$\frac{1}{2} \left( \frac{\Delta y}{R} \right)^2 = f'(X(\hat{\tau})) (1 - \hat{\tau}) \left( \frac{\Delta y}{R} \right)^2, \quad (8)$$

which balances the marginal costs of regulation in terms of lower consumption (on the left hand side) against its marginal benefits in terms of lower negative externalities (on the right hand side). The relative size of the two will depend on the expected incidence of civicness in the population,  $\hat{\tau}$ . In particular, since  $f(\cdot)$  is convex and  $X(\hat{\tau})$  depends negatively on  $R$  and positively on  $\hat{\tau}$ , condition (8) implicitly defines the preferred policy as a negative function of individual trust,

$$R = R(\hat{\tau}), \quad \frac{\partial R}{\partial \hat{\tau}} < 0. \quad (9)$$

Therefore, the first implication of the model is that, at the individual level, preferences for regulation depend negatively on trust toward others.

Since individuals are ex-ante identical in terms of (inverse) ability  $\alpha$  and differ only with respect to  $\hat{\tau}$ , the median voter theorem implies that the regulatory policy chosen by majority voting is

$$R^* = R^*(\hat{\tau}^m) \quad (10)$$

where  $\hat{\tau}^m$  is the median level of trust in the population. The second prediction of the model is thus that trust and regulation are inversely related also across countries.

Finally, consider several economies like the one just described, differing only in the fraction  $\tau$  of civic agents. Lower civicness raises negative externalities, which in turn increases the demand for regulation; the latter prevents a greater share of the population from entering the official sector, thus alighting the size of the shadow economy and reducing the equilibrium level of negative externalities. Therefore, cultural traits determine both the demand for regulation and its outcomes, so that omitting trust and civicness may bias the estimated effects of regulation on externalities and unofficial activity. Section 5 provides some evidence to quantify this bias; before doing that, however, I empirically examine the predictions of the model for the individual-level demand for regulation.

## 4 Individual-level evidence

The simple model in the previous section implies that, at the individual level, preferences for regulation depend negatively on trust.

### 4.1 Estimating equation

The WVS provides a measure of preferences for regulation. Question E042 in section *Politics and Society* of WVS asks each individual whether “The state should give more freedom to firms” or rather “The state should control firms more effectively”. Such question was included in the survey sent to 32 European countries participating into the fourth wave of the survey (1999-2004), listed in Table 1. The answer takes on discrete values between 1 and 10, with higher values corresponding to higher demand for government intervention, and will serve as the dependent variable in the individual-level regressions.

Turning to the explanatory variable, I stick to the question on *trust toward others* (already presented in Section 2) from the same wave of the WVS. The right hand side of the equation also controls extensively for individual socio-demographic characteristics (age, gender, income, education, occupation, etc.) as well as for different dimensions of trust (toward political parties, the government, the judicial system, etc.), which are reported in the WVS data. Most importantly, exploiting variation across individuals within several countries allows to absorb country-specific factors, such as the severity of market failures and the quality of regulation, by simply including country fixed effects, which greatly reduce the scope for omitted variable bias and reverse causality.

Since the dependent variable is ordered and discrete, I adopt an ordered logit specification for the estimating equation. The main advantage of the logit model (relative, for instance, to the ordered probit) is that it provides an easy interpretation of the coefficients. In particular, the exponentiated coefficient equals the ratio of the odds of preferring a higher level of regulation,  $Prob(regulation > k)/Prob(regulation \leq k)$ , over the same odds when the explanatory variable is lower by one unit. This is a particularly useful property given that *trust* is a binary variable, so its exponentiated coefficient simply equals

$$\frac{Prob(regulation > k|trust = 1)/Prob(regulation \leq k|trust = 1)}{Prob(regulation > k|trust = 0)/Prob(regulation \leq k|trust = 0)},$$

namely the odds ratio of preferring more regulation of trustful relative to non-trustful individuals.<sup>10</sup>

Table 1 reports country averages for the main individual-level variables along with the sample size and total population of each country, which makes apparent the unbalanced

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<sup>10</sup>One complication arises because fixed effects are unattractive in non-linear models. The problem is that the estimator of each of these “incidental” parameters uses only information from the corresponding group so that, when group size is limited and small, the variance of the estimator (both of the intercepts and the slope) does not asymptotically 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, in this case I have thousands of (individual) observations available to estimate each (country) fixed effect, so that the relevant asymptotics allow for consistent estimation.

coverage of WVS across countries (coverage being relatively lower for larger countries). I thus weighted observations according to the product of national sampling weights (provided by the WVS) and country populations.<sup>11</sup>

## 4.2 Results

Tables 2 to 5 present the results of individual-level estimates. Both the simple and exponentiated coefficients (i.e. the odds ratios) are reported. The first column in Table 2 presents the results of the univariate regression pooling all individuals. The coefficient of *trust* is negative and very high in absolute value. Removing cross-country heterogeneity through the inclusion of country-specific fixed effects (column 2) halves the value of the coefficient, which however remains strongly statistically significant. According to this estimate, the odds of preferring more regulation are about 15 percentage points lower for trustful relative to non-trustful individuals. Due to the inclusion of country-specific intercepts, this difference may be interpreted as the excess demand for regulations by trustful individuals relative non-trustful ones, keeping constant the level and quality of actual regulation (as well as any other country-specific factor).

The remaining columns of the table control for some individual characteristics: age, gender, income and schooling. These variables will be also included in all subsequent tables. The main result is that those groups that are traditionally disadvantaged in economic markets (by gender, income and education) prefer higher levels of regulation. In one of the next tables I will also allow the slope coefficient to differ across these groups.

Before doing that, Table 3 investigates the robustness of the results to an additional set of control variables that are likely correlated with both trust and preferences for regulation. Column (1) starts with the labor market condition. It turns out that those unemployed are on average more in favor of regulation. The next column distinguishes between (potential) insiders and non-insiders of regulations. In line with the descriptive evidence in Figure 1, bureaucrats and politicians do *not* seem to be more attached to regulations relative to other agents, while entrepreneurs and other self-employed individuals are strongly against. In column (3) I include measures of trust toward those groups in charge of dictating and enforcing regulations, namely politicians and civil servants. I also include trust toward the judicial system, which may potentially substitute regulation in addressing some types of market failure (due, for instance, to asymmetric information and moral hazard). None of these variables, however, subtracts explanatory power from *trust*; indeed, they are not even significant in the regression, suggesting that the coefficient of main interest is not capturing the effect of other cultural traits possibly correlated with trust. This is also true when controlling for political ideology, even though in this case the coefficient of *partisan* is strongly statistically significant and it has the expected sign (individuals leaning toward right preferring less government intervention). The next column distinguishes individuals according to whether they profess a hierarchical religion or not, which however does not

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<sup>11</sup>All results presented below are unaffected when using unweighted observations.

seem to directly affect the demand for regulation. Overall, the coefficient of *trust* remains strongly statistically significant and extremely stable throughout all columns of Table 3; this conclusion holds true also in the last column, which includes all control variables in the same specification.

Table 4 shows how the slope (other than the intercept) of the regression changes with individual and country characteristics. The first two columns distinguish between non-insiders and insiders. It turns out that trust affects only the demand for regulation by the former group. The preferences of the insiders, indeed, could respond more to the private interests emphasized by the public choice literature. The next two columns distinguish individuals according to their educational attainment, the demand by less educated individuals being more responsive to trust. Actually, this segment of the population may be more vulnerable to some types of market failure (like, for instance, asymmetric information), so that the mechanism proposed in this paper may be more relevant for this category. Finally, the effect of trust does not significantly differ by individual income, age and gender.<sup>12</sup>

The last four columns start distinguishing the effect of trust according to country (rather than individual) characteristics. Intuitively, the effect of trust should be stronger in countries in which the costs of market externalities are higher relative to the benefits of economic activity. In particular, Djankov et al. (2002) suggest that “market failures are likely to be both more pervasive and severe in poor countries than in rich ones”. This may be due for instance, to the fact that less developed countries have backward and more polluting technologies. Therefore, in columns (5) and (6) I split my sample of European individuals between those living into Eastern and Western countries, and compare the effect of trust in the two areas. In line with the discussion above, the effect is stronger in the former group of countries; in particular, the ratio between the odds of demanding more regulation for an untrustful individual over those of a trustful one is twice as much in Eastern as in Western countries.

Yet, the quality of government intervention may also be worse in less developed countries (for instance, because of more widespread corruption), which in turn would discourage (untrustful) individuals from demanding more regulation. To disentangle the effect of economic development from that of institutional quality, the last two columns of the table present separate regressions for the subsamples of individuals living in Eastern and Western Germany, respectively. Even a decade after reunification the two areas had very different levels of economic development; on the other hand, they shared the same formal institutions, which allows to distinguish between the effect of economic and institutional factors. As expected, keeping institutional quality constant further increases the differential effect of trust in less developed regions.

The specification in Table 5 takes a more systematic approach by interacting individual trust with country characteristics possibly correlated with the risk and the severity of market failures and with the effectiveness and efficiency of regulatory responses. The first

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<sup>12</sup>These results are not reported for brevity but are available upon request.

country variable is the (log of) real GDP per capita in year 2000 (at constant 2005 PPP international dollars), which proxies for the level of economic development. Institutional characteristics are measured by indexes of corruption, regulatory quality and government effectiveness provided by the last release of the World Bank Governance Indicators (Kaufmann et al., 2008). All indexes are increasing in institutional quality and they have been rescaled to have zero mean and standard deviation equal to 1 (the same is true also for the index of economic development), so that the odds ratio of the interaction term may be read as the ratio between the odds of preferring more regulation for a trustful individual that lives in a country with a (one standard deviation) higher level of economic and/or institutional development, and the same odds for a trustful individual living in the average country.

The interaction of individual trust with economic development (column 1) is only weakly statistically significant, and the interactions with each of the institutional variables are not significant. This is due to the fact that the three institutional indexes are positively and strongly correlated with the level of economic development, as shown in Figure 3; at the same time, economic development and institutional quality affect the slope coefficient of trust in opposite directions.

In fact, interacting both economic and institutional factors with trust in the same specification raises both the magnitude and the statistical significance of their differential effects (columns 5 to 8). In particular, the effect of trust seems stronger in less developed countries and in countries with relatively less corrupt public officials, better regulatory quality and more efficient governments. Consistently with the previous comparison between Eastern and Western Europe, the effect of economic development dominates that of institutional quality, the coefficient of the former being twice as much high as that of the latter. This means that the greater risk and severity of market failure in less developed countries overcome the effect of the lower quality of government intervention in driving a higher demand for regulation by untrustful individuals in such countries.

## 5 Cross-country evidence

The results presented above suggest that, within each country, trust is a significant determinant of individual preferences for regulation. In this section I investigate to what extent such relationship carries over across countries, as well as its implications for the cross-country pattern of regulations, externalities and the size of unofficial activity.

### 5.1 Culture and regulation

At the aggregate, cross-country level, the first prediction of the model is that regulation depends, negatively, on (median) trust; differentiating equation (10),

$$dR^* = \frac{\partial R^*}{\partial \hat{\tau}^m} d\hat{\tau}^m + \nu, \quad (11)$$

where  $\nu$  summarizes the effect of other determinants of regulation. I examine the empirical validity of this prediction by estimating the coefficient  $\frac{\partial R^*}{\partial \tau^m}$  across countries. The dependent variable is the (log) number of procedures required to open a firm, from Djankov et al. (2002), while trust is measured by the country average of the WVS variable. The results of OLS estimates are presented in Table 7.

The first column shows the univariate regression of regulation on trust. A one percentage point increase in trust is associated on average with a 2 percent reduction in the number of procedures, this effect being very precisely estimated. Controlling for the level of economic development, as proxied by the log of GDP per capita in 1999, weakens only slightly the effect of trust (column 2).<sup>13</sup> In columns (3) and (4) I add, respectively, the log of total population in the same year and a dummy variable equal to 1 for countries of British legal origin. The inclusion of these variables in the specification is motivated by the fact that the creation of new institutions entails significant fixed costs and is therefore limited by the size of the market and the level of transaction costs (Demsetz, 1967). Mulligan and Shleifer (2005) provide evidence consistent with this theory for the specific case of regulatory institutions using population to measure the size of the market and British legal origin as a proxy for (higher) transaction costs.<sup>14</sup> In my sample too, regulations increase with population and are less pervasive in countries of British legal origin. Most importantly, country size provides a plausibly exogenous source of variation in regulation, which will prove extremely useful to investigate its effects across countries.<sup>15</sup>

Such results are consistent with the existence of a negative effect of trust on regulation. In principle, however, one can not rule out reverse causality. For instance, burdensome regulation could affect average civiness by increasing the incentives for predatory practices and corruption, which in turn would impact (negatively) on average trust. In general, culture could respond to the incentives provided by current institutional arrangements because of learning (Aghion et al., 2008), evolutionary forces (Hirshleifer, 1984; Frank, 1987) and intergenerational transmission of moral values (Bisin et al., 2004; Tabellini, 2008b); in particular, Aghion et al. (2009) focus explicitly on this (reverse causality) effect for the case of market regulation and civiness.

At the same time one should notice that, while the cross-country OLS results are unfit to address the direction of causality, they are consistent with the individual-level evidence presented in the previous section, which is less prone to reverse causality and omitted variable bias originating from institutional differences (the latter being absorbed by country-specific fixed effects). Most importantly, the key finding for all the results that follow is the existence of a strong, negative correlation between trust and regulation. For this reason, a conservative approach would be to interpret the estimated coefficients

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<sup>13</sup>The data for all control variables also come from Djankov et al. (2002).

<sup>14</sup>Their argument is that, historically, the cost of incremental regulations was lower in France than in England thanks to the pervasive administrative State introduced after the Revolution. As legal and regulatory frameworks have spread through conquest and colonization, so have the cost structures of incremental regulations.

<sup>15</sup>Including on the right-hand side measures of education, democracy and ethno-linguistic fractionalization does not significantly affect the results, in line with the findings of Aghion et al. (2009).

in table 7 in terms of partial correlations between trust and regulation (as opposed to causal effects), keeping constant other country characteristics possibly correlated with both variables.

## 5.2 The effects of regulation

Turning to examine the effects of regulation, the theoretical model predicts that civicness affects (negatively) the equilibrium level of externalities, both directly and indirectly through regulations; differentiating equation (6),

$$dX = \frac{\partial X}{\partial R^*} dR^* + \frac{\partial X}{\partial \tau} d\tau + \nu. \quad (12)$$

Table 8 presents the estimates of equation (12). The first column replicates the regression in Table 4 of Djankov et al. (2002). The dependent variable is the size of the unofficial sector (as a percentage of GDP) and the right hand side includes only the measure of entry regulation. The coefficient estimated by the univariate OLS regression,

$$\frac{\widetilde{\partial X}}{\partial R^*} = \frac{\sum dR^* dX}{\sum (dR^*)^2} \quad (13)$$

is positive, suggesting that externalities increase with regulation. While it is not statistically significant at conventional levels, the t-ratio is quite high (1.63) and very close to the 10% confidence threshold.<sup>16</sup>

If civicness is indeed correlated with regulation through trust, the estimated coefficient  $\frac{\widetilde{\partial X}}{\partial R^*}$  will be biased and inconsistent. In order to see that, substitute (12) and (11) into (13) to obtain

$$\frac{\widetilde{\partial X}}{\partial R^*} - \frac{\partial X}{\partial R^*} = \sum \frac{(\frac{\partial R^*}{\partial \hat{\tau}^m} d\hat{\tau}^m + \nu) (\frac{\partial X}{\partial \tau} d\tau + \nu)}{\sum (dR^*)^2}; \quad (14)$$

as trust  $d\hat{\tau}^m$  and civicness  $d\tau$  are likely correlated with each other (as predicted in my theoretical model by equation 2), the bias converges asymptotically to

$$BIAS = \frac{\partial X}{\partial \tau} \frac{\partial R}{\partial \tau} \frac{Cov(\hat{\tau}^m, \tau)}{Var(R)}. \quad (15)$$

One way to address the omitted variable bias would be to explicitly control for  $\tau$  on the right hand side of equation (12). However, as discussed in Section 2, reliable measures of civicness are not available across countries. On the other hand, notice that the bias is different from 0 only insofar as the covariance between trust and civicness is also different (i.e. greater) than 0; but whenever the latter is true, average trust provides a proxy for average civicness. In particular, the greater this covariance, the greater the bias and the better the extent to which trust approximates civicness.

Therefore, column (2) includes *TRUST* on the right hand side of the equation. After

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<sup>16</sup>In the original Djankov et al. (2002) paper, the coefficient is indicated as statistically significant at the 5% confidence level.

doing that, the coefficient of regulation becomes negative and strongly statistically significant. The comparison between columns (1) and (2) of Table 8 suggests that the univariate regression is upward biased by omitted variation in cultural traits. This is consistent with my theoretical framework, according to which both externalities and regulation depend negatively on civiness, which in turn entails the bias in (15) to be positive. One may wonder whether the difference between the two regressions lies in the sample, due to the fact that data on trust are missing for almost one third of the countries. However, this is not the case; re-estimating the univariate regression in column (1) on the reduced sample available in column (2) leads a point estimate very close to zero, non-statistically significant at conventional confidence levels.

Djankov et al. (2002) also present one further specification in which they include on the right-hand side the level of country development, as measured by the log of GDP per capita, arguing that this variable controls for the risk and severity of market failure. In column (4) I replicate this specification, thus dropping average trust. Once I do that, the coefficient of regulation is again very close to zero. When I plug back average trust into the equation (column 5), its coefficient is not statistically significant at the conventional 10 percent confidence level. Still, keeping average trust constant across countries is important for correctly evaluating the effects of regulation; in fact, the coefficient of *ENTRY* becomes negative and very statistically significant when moving from column (4) to column (5).

While indicative of a role for cultural traits in explaining the correlation between regulation and market outcomes, this evidence is prone to the likely endogeneity of all the right hand side variables, including trust. For this reason, in the last column I address the omitted variable bias in a different way, by excluding trust from the right hand side of the equation and using country population as an instrument for regulation. According to the results in Table 7 country size is a robust determinant of regulation; moreover, the correlation matrix in Table 6 excludes that trust varies significantly with population. Therefore, the population-driven component of regulation should be independent of trust and civiness. While the instrumental variable coefficient in column (6) is not very precisely estimated (also because of a somewhat weak fit in the first stage), it is nevertheless consistent with the OLS estimates in pointing at the existence of an upward bias in the univariate coefficient of regulation. Overall, the estimated coefficient of regulation drops from 0.013 to about -0.02 (statistically significant) when including trust in the OLS specification, to an even lower -0.067 (non-significant at conventional levels) when employing the instrumental variable correction. At a minimum, such findings suggest that the positive coefficient of regulation estimated by the OLS univariate regression is severely upward biased, while evidence about the existence of a negative effect of regulation (independently of variation in cultural traits) is more mixed. Both results are consistent with my theoretical framework, which predicts that, after controlling for differences in cultural traits, regulation should not be correlated any more with market failures.

This conclusion is reinforced in Table 9, which focuses on another outcome of regulation, namely the size of the shadow economy. Djankov et al. (2002) estimate a positive



(and strongly statistically significant) effect of entry regulations and interpret this as evidence against public interest theories of regulation. In this case too, however, their results are not not robust to controlling for omitted variation in cultural traits, the coefficient of regulation becoming non statistically significant (and very close to zero) after partialling out the effect of trust.

## 6 Conclusion

Regulation is often blamed for being both ineffective and inefficient; however, 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. In particular, stringent regulations may be enacted (at least in part) in response to market failure originating in (lack of) attitudes for cooperation. These attitudes may drive part of the correlation existing between the level of regulation and several economic outcomes, confounding inference about causality.

I addressed these issues by explicitly controlling for such omitted factors. Actually, controlling for trust leads to reconsider the effect of regulation on negative externalities and unofficial activity. Of course, these results do not exclude the possibility that regulation may be very inefficient. They suggest, however, that in order to make liberalization and deregulation politically appealing it might be necessary to foster and improve alternative institutions aimed at preventing and correcting market failures.

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## Appendix

### Individual-level variables:

*Dependent variable:* answer to the 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 the question “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.

*High/low income:* binary variables indicating the top and bottom category of a three-value index recoding household income on a country basis. Source: WVS, variable X047R.

*High/low schooling:* binary variables indicating the top and bottom category of a three-value index recoding individual education on a country basis. Source: WVS, variable X025R.

*Unemployment:* binary variable indicating whether the individual is unemployed. Source: WVS, variable X028.

*Self employment:* binary variable indicating whether the individual is self-employed. Source: WVS, variable X028.

*Manager:* binary variable indicating whether the individual is a manager. Source: WVS, variable X035 (2-digit profession classification).

*Burpol:* binary variable indicating whether the individual is a politician and/or a high-ranking public official. Source: WVS, variable X035 (2-digit profession classification).

*Trust parliament, civil servants, justice:* binary variables indicating whether the individual trusts each institution. Source: WVS, variables E075, E076, E085.

*Partisan:* 10-category index of individual political ideology, where 1 is extreme left and 10 is extreme right. Source: WVS, variable E033.

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

### Cross-country variables:

*ENTRY:* the number of different procedures that a start-up has to comply with in order to obtain legal status. Source: Djankov et al. (2002)

*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 (II and III waves), variable A165.

*Unofficial activity*: size of the informal economy as a percentage of GDP. Source: Djankov et al. (2002).

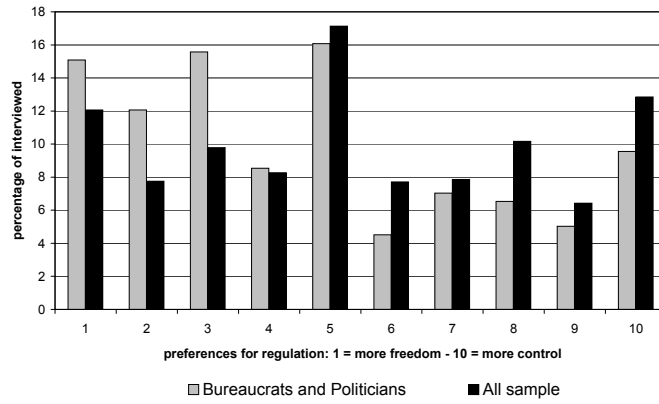
*Water pollution*: emissions of organic water pollutants (kilograms per day per worker) in 1998. Source: Djankov et al. (2002).

$\ln GDP$ : log of gross domestic product per capita in current US dollars in 1999. Source: Djankov et al. (2002)

$\ln POP$ : log of total country population in 1999. Source: Djankov et al. (2002)

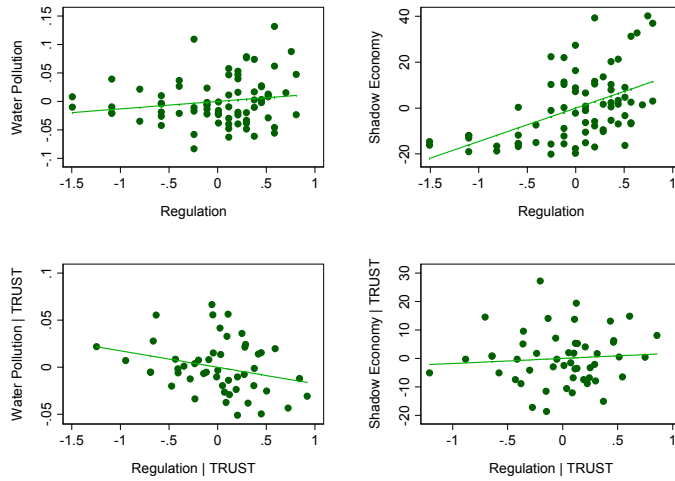
*UK LEGAL*: binary variable indicating British legal origin. Source: Djankov et al. (2002)

Figure 1: Opinions about regulation



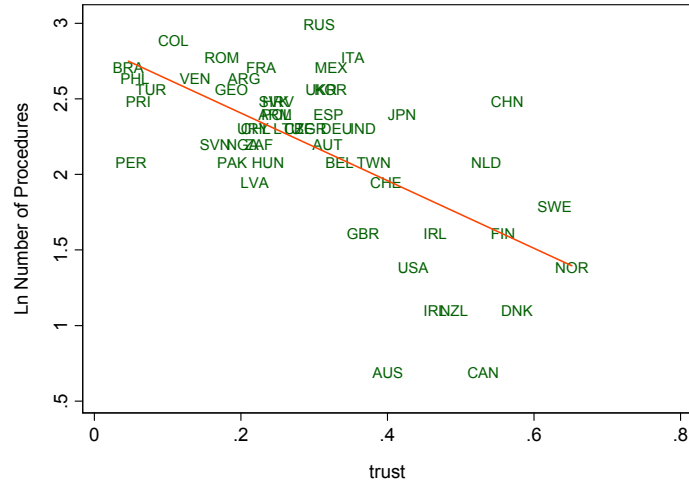
The histogram shows the distribution of answers to question E042 of the World Values Survey in 32 countries, distinguishing between two categories of individuals: bureaucrats and politicians versus other individuals. Answers take on discrete values between 1 and 10, where 1 means “State should give more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

Figure 2: Regulations and market failures



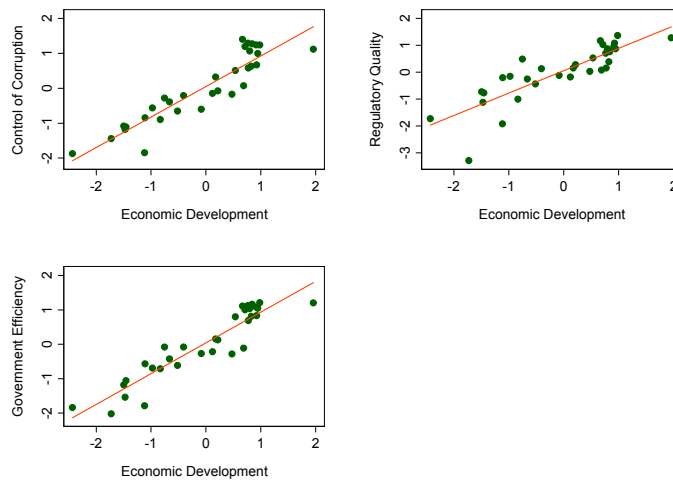
These graphs show the cross-country correlation between entry regulations and some types of market failure. The measure of entry regulations is the (log) number of procedures required to open a business; Shadow Economy is the (estimated) size of the informal sector; Water Pollution is emissions of organic water pollutant (kilograms per day per worker). All three measures come from Djankov et al. (2002). The two graphs on the bottom show the relationship between the residuals of a regression of each variable on average trust. Average country trust is the fraction of people interviewed by the World Values Survey in each country that declared that “most people can be trusted”.

Figure 3: Trust and regulation



This graph shows the cross-country relationship between trust and entry regulation. Average country trust is the fraction of people interviewed by the World Values Survey in each country that declared that “Most people can be trusted”. The measure of entry regulations is the (log) number of procedures required to open a business, from Djankov et al. (2002).

Figure 4: Economic development and the quality of regulations



This graph shows the cross country correlation between several measures of institutional quality. The index of economic development is the standardized logarithm of real GDP per capita in year 2000 (at constant 2005 PPP International Dollars). The indexes of Control of Corruption, Regulatory Quality and Government Efficiency are from Kaufmann et al. (2008).



Table 1: Individual-level data: sample and country averages

country	code	sample	obs.	population	regulation	trust	age	female	high income	low income	high school	low school	unempl.	insider	trust. partiam.	trust. civ. serv.	trust. judicial	partisan	hier
Austria	AUT	1523	1366	8,011,560	4.093	0.340	47	0.559	0.366	0.260	0.127	0.516	0.028	0.110	0.408	0.431	0.690	5.452	0.803
Belgium	BEL	1914	1769	10,252,000	5.605	0.291	47	0.529	0.377	0.268	0.338	0.217	0.092	0.144	0.389	0.467	0.361	5.211	0.586
Bulgaria	BGR	1002	875	8,060,000	5.342	0.270	48	0.565	0.390	0.316	0.297	0.216	0.134	0.087	0.282	0.234	0.264	5.922	0.689
Belarus	BLR	1002	832	10,005,000	4.869	0.415	43	0.537	0.207	0.338	0.155	0.238	0.061	0.067	0.357	0.220	0.460	5.628	0.500
Czech Republic	CZE	1911	1823	10,273,300	6.023	0.245	48	0.516	0.296	0.324	0.139	0.464	0.044	0.095	0.130	0.231	0.230	5.954	0.293
Germany	DEU	2045	1838	82,210,000	4.931	0.380	49	0.559	0.155	0.488	0.106	0.451	0.092	0.082	0.378	0.387	0.578	5.265	0.229
Denmark	DNK	1025	905	5,337,344	4.412	0.678	45	0.488	0.225	0.328	0.290	0.549	0.036	0.144	0.485	0.556	0.782	5.541	0.010
Spain	ESP	2417	1002	40,263,199	5.424	0.381	45	0.488	0.251	0.269	0.153	0.399	0.084	0.100	0.471	0.414	0.440	4.763	0.812
Estonia	EST	1007	893	1,369,512	6.065	0.235	45	0.534	0.416	0.224	0.190	0.281	0.077	0.121	0.272	0.410	0.334	5.935	0.103
Finland	FIN	1040	942	5,176,196	4.624	0.570	43	0.497	0.353	0.332	0.135	0.540	0.087	0.122	0.430	0.413	0.678	5.742	0.012
France	FRA	1617	1519	58,895,516	4.899	0.211	45	0.498	0.296	0.294	0.216	0.585	0.059	0.072	0.404	0.460	0.464	4.912	0.542
Great Britain	GBR	2005	1717	59,742,980	4.686	0.345	46	0.534	0.318	0.368	0.161	0.439	0.073	0.105	0.393	0.493	0.473	5.291	0.263
Greece	GRC	1142	948	10,917,500	5.717	0.238	36	0.574	0.315	0.323	0.473	0.097	0.040	0.132	0.251	0.152	0.435	5.267	0.959
Croatia	HRV	1004	940	4,502,500	5.047	0.203	39	0.577	0.417	0.157	0.218	0.144	0.102	0.045	0.205	0.318	0.315	5.079	0.847
Hungary	HUN	1003	910	10,210,971	6.633	0.229	46	0.512	0.389	0.195	0.116	0.577	0.071	0.072	0.317	0.493	0.434	5.043	0.380
Ireland	IRL	1014	923	3,805,399	4.983	0.368	47	0.533	0.367	0.303	0.204	0.499	0.044	0.155	0.331	0.627	0.554	5.668	0.891
Iceland	ISL	970	900	281,000	3.362	0.413	42	0.494	0.325	0.296	0.201	0.407	0.008	0.229	0.724	0.556	0.738	5.789	0.004
Italy	ITA	2002	1845	56,948,602	4.915	0.335	45	0.506	0.345	0.335	0.153	0.424	0.044	0.170	0.347	0.332	0.315	5.369	0.810
Lithuania	LTU	1020	884	3,499,527	4.498	0.260	43	0.495	0.509	0.206	0.275	0.132	0.150	0.050	0.105	0.206	0.169	5.491	0.781
Luxembourg	LUX	1211	1038	438,000	6.446	0.250	41	0.513	0.282	0.347	0.170	0.358	0.013	0.038	0.610	0.586	0.599	5.310	0.661
Latvia	LVA	1015	942	2,372,000	7.365	0.170	47	0.542	0.302	0.475	0.184	0.216	0.130	0.064	0.271	0.484	0.473	5.793	0.368
Malta	MLT	1004	980	390,000	4.995	0.208	46	0.514	0.344	0.327	0.105	0.296	0.043	0.091	0.528	0.487	0.452	5.811	0.977
Netherlands	NLD	1005	978	15,925,431	5.438	0.600	46	0.504	0.307	0.302	0.345	0.304	0.015	0.123	0.548	0.370	0.475	5.086	0.230
Polonia	POL	1098	1007	38,453,801	6.731	0.186	47	0.533	0.160	0.416	0.148	0.549	0.082	0.082	0.338	0.323	0.432	5.311	0.947
Portugal	PRT	1001	883	10,225,803	5.492	0.133	47	0.600	0.378	0.174	0.104	0.496	0.060	0.117	0.496	0.555	0.416	5.290	0.854
Romania	ROM	1148	1032	22,443,000	6.217	0.102	45	0.486	0.426	0.292	0.193	0.328	0.080	0.041	0.189	0.270	0.398	5.836	0.918
Russia	RUS	2504	2265	146,303,000	6.164	0.243	46	0.577	0.340	0.343	0.219	0.120	0.098	0.077	0.198	0.386	0.356	4.883	0.498
Slovak Republic	SVK	1334	1218	5,388,740	7.138	0.158	43	0.505	0.383	0.277	0.094	0.265	0.103	0.083	0.430	0.393	0.356	5.132	0.649
Slovenia	SVN	1008	926	1,989,000	5.545	0.215	43	0.529	0.276	0.390	0.152	0.261	0.085	0.057	0.249	0.249	0.433	4.987	0.689
Sweden	SWE	1018	948	8,869,000	3.901	0.668	44	0.499	0.297	0.372	0.305	0.222	0.049	0.023	0.506	0.486	0.609	5.395	0.026
Turkey	TUR	4609	1107	67,420,000	6.911	0.067	35	0.475	0.224	0.367	0.099	0.551	0.127	0.156	0.299	0.520	0.562	5.865	0.974
Ukraine	UKR	1196	1067	49,175,848	5.457	0.269	45	0.623	0.290	0.380	0.258	0.119	0.103	0.091	0.265	0.401	0.334	5.501	0.422

Notes: This table lists all countries for which individual-level data were available. It reports the size of the sample of individuals interviewed in each country during 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), total population and the country averages of all variables used in the individual-level analysis.

Table 2: Individual-level estimates (baseline)

	(1)	(2)	(3)	(4)	(5)
	<i>pooled</i>	<i>country FE</i>	<i>demo</i>	<i>income</i>	<i>school</i>
<i>trust</i>	-.349*** [0.705] (.028)	-.165*** [0.848] (.046)	-.154*** [0.857] (.046)	-.157*** [0.855] (.047)	-.130*** [0.878] (.045)
<i>age/100</i>			.876 [2.400] (.608)	1.831** [6.240] (.811)	1.911** [6.759] (.826)
$(age/100)^2$			-.024 [0.977] (.678)	-1.141 [0.319] (.993)	-1.338 [0.262] (.982)
<i>female</i>			.188*** [1.206] (.031)	.187*** [1.205] (.034)	.189*** [1.208] (.035)
<i>high income</i>				-.346*** [0.708] (.035)	-.297*** [0.743] (.034)
<i>low income</i>				.088 [1.092] (.060)	.059 [1.061] (.057)
<i>high schooling</i>					-.206*** [0.814] (.050)
<i>low schooling</i>					.124*** [1.132] (.045)
obs.	37222	37222	37078	31663	31489
country FE	NO	YES	YES	YES	YES
countries		32	32	32	32
log-L	-83648	-82317	-81830	-69661	-69216
log-L <sub>0</sub>	-83802	-83802	-83487	-71310	-70913
pseudo $R^2$	.002	.018	.02	.023	.024

*Notes:* This table presents estimates of the effect of trust on preferences for regulation at the individual level. The dependent variable is the 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 explanatory variable *trust* is the answer to question A165 in the WVS: “Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?”. It takes value 1 if the answer was “Most people can be trusted” and 0 otherwise. All other variables are described in the Appendix. The estimation method is the Maximum Likelihood ordered logit model. The log-likelihood at the last and first iteration are shown at the bottom of each column: the pseudo  $R^2$  equals 1 minus the ratio between the two. Odds ratios are presented in square brackets. Robust standard errors clustered by country are presented in parenthesis. Observations are weighted by the product of national sampling weights and country populations. \*, \*\* and \*\*\* denote coefficients significantly different from zero at the 90% confidence, 95% confidence and 99% confidence, respectively.

Table 3: Individual-level estimates (robustness)

	(1)	(2)	(3)	(4)	(5)	(6)
	<i>unempl</i>	<i>insiders</i>	<i>trust</i>	<i>partisan</i>	<i>religion</i>	<i>all</i>
<i>trust</i>	-.126*** [0.882] (.046)	-.141*** [0.869] (.046)	-.132*** [0.876] (.047)	-.124** [0.883] (.051)	-.130*** [0.878] (.045)	-.139** [0.870] (.057)
<i>unemployed</i>	.174* [1.190] (.094)					.116 [1.123] (.305)
<i>self employed</i>		-.479*** [0.620] (.088)				-.453*** [0.636] (.124)
<i>manager</i>		-.295* [0.745] (.176)				-.250 [0.779] (.181)
<i>burpol</i>		.278 [1.320] (.283)				.262 [1.300] (.266)
<i>trust parliament</i>			-.007 [0.993] (.057)			-.074 [0.929] (.067)
<i>trust civil servants</i>			-.002 [0.998] (.033)			.057** [1.059] (.028)
<i>trust justice</i>			-.035 [0.965] (.032)			-.020 [0.981] (.038)
<i>partisan</i>				-.141*** [0.868] (.025)		-.172*** [0.842] (.018)
<i>hierarchical</i>					.004 [1.004] (.057)	.047 [1.048] (.042)
obs.	31357	22875	29107	25862	31489	17748
countries	32	30	32	32	32	30
log-L	-68924	-50282	-64057	-56648	-69216	-38811
log-L <sub>0</sub>	-70616	-51534	-65602	-58409	-70913	-40101
pseudo $R^2$	.024	.024	.024	.03	.024	.032

*Notes:* This table presents estimates of the effect of trust on preferences for regulation at the individual level. The dependent variable is the 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 explanatory variable *trust* is the answer to question A165 in the WVS.: “Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?”. It takes value 1 if the answer was “Most people can be trusted” and 0 otherwise. All other variables are described in the Appendix. All regressions include also *age*, *age*<sup>2</sup>, *female*, *high income*, *low income*, *high schooling*, *low schooling* and country fixed effects. The estimation method is the Maximum Likelihood ordered logit model. The log-likelihood at the last and first iteration are shown at the bottom of each column: the pseudo  $R^2$  equals 1 minus the ratio between the two. Odds ratios are presented in square brackets. Robust standard errors clustered by country are presented in parenthesis. Observations are weighted by the product of national sampling weights and country populations. \*, \*\* and \*\*\* denote coefficients significantly different from zero at the 90% confidence, 95% confidence and 99% confidence, respectively.

Table 4: Individual-level estimates (sample splits)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	INSIDERS		SCHOOLING		COUNTRIES		GERMANY	
	<i>no</i>	<i>yes</i>	<i>low</i>	<i>high</i>	<i>Eastern</i>	<i>Western</i>	<i>Eastern</i>	<i>Western</i>
<i>trust</i>	-.132***	-.063	-.228***	.009	-.231**	-.085***	-.450***	-.098
	[0.877]	[0.939]	[0.796]	[1.009]	[0.794]	[0.919]	[0.637]	[0.907]
	(.043)	(.100)	(.077)	(.065)	(.112)	(.027)	(.159)	(.145)
obs.	28370	3013	11122	6185	12046	19443	695	715
countries	32	32	32	32	11	21		
log-L	-62398	-6433	-24189	-13681	-26041	-42801	-1569	-1549
log-L <sub>0</sub>	-63907	-6658	-24938	-13899	-26578	-43944	-1582	-1561
pseudo $R^2$	.024	.034	.03	.016	.02	.026	.008	.007

*Notes:* This table presents estimates of the effect of trust on preferences for regulation at the individual level. The dependent variable is the 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 explanatory variable *trust* is the answer to question A165 in the WVS.: “Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?”. It takes value 1 if the answer was “Most people can be trusted” and 0 otherwise. Different columns refer to different subsamples, indicated on top of each column. The category INSIDERS includes entrepreneurs, managers, bureaucrats and politicians; the categories for schooling refer to the binary variable classifications. All other variables are described in the Appendix. All regressions include also *age*, *age*<sup>2</sup>, *female*, *high income*, *low income*, *high schooling*, *low schooling* and country fixed effects. The estimation method is the Maximum Likelihood ordered logit model. The log-likelihood at the last and first iteration are shown at the bottom of each column: the pseudo  $R^2$  equals 1 minus the ratio between the two. Odds ratios are presented in square brackets. Robust standard errors clustered by country are presented in parenthesis. Observations are weighted by the product of national sampling weights and country populations. \*, \*\* and \*\*\* denote coefficients significantly different from zero at the 90% confidence, 95% confidence and 99% confidence, respectively.

Table 5: Individual-country interactions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>trust</i>	-.111** [0.895] (.046)	-.115*** [0.892] (.044)	-.114*** [0.892] (.038)	-.114*** [0.892] (.043)	-.120*** [0.887] (.030)	-.135*** [0.874] (.031)	-.125*** [0.883] (.028)
<i>trust</i> × <i>ECONDEV</i>	.115* [1.122] (.060)				.290*** [1.337] (.102)	.284*** [1.329] (.094)	.322*** [1.379] (.098)
<i>trust</i> × <i>CORRCTR</i>		.067 [1.069] (.059)			-.170** [0.843] (.073)		
<i>trust</i> × <i>REGQUAL</i>			.052 [1.054] (.054)			-.173*** [0.842] (.064)	
<i>trust</i> × <i>GOVEFF</i>				.065 [1.068] (.058)			-.203*** [0.816] (.072)
obs.	31489	31489	31489	31489	31489	31489	31489
countries	32	32	32	32	32	32	32
log-L	-69201	-69209	-69212	-69210	-69194	-69191	-69192
log-L <sub>0</sub>	-70913	-70913	-70913	-70913	-70913	-70913	-70913
pseudo <i>R</i> <sup>2</sup>	.024	.024	.024	.024	.024	.024	.024

*Notes:* This table presents estimates of the effect of trust on preferences for regulation at the individual level. The dependent variable is the 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 explanatory variable *trust* is the answer to question A165 in the WVS.: “Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?”. It takes value 1 if the answer was “Most people can be trusted” and 0 otherwise. The other variables are interactions of *trust* with country characteristics: *DEVEL* is the level of development, as measured by the (log of) GDP per capita at constant 2005 international dollars; *CORRCTR*, *REGQUAL* and *GOVEFF* are the World Bank Governance Indicators for the control of corruption, the regulatory quality and the government effectiveness. All country variables are standardized to have mean 0 and standard deviation equal to 1. All regressions include also *age*, *age*<sup>2</sup>, *female*, *high income*, *low income*, *high schooling*, *low schooling* and country fixed effects. The estimation method is the Maximum Likelihood ordered logit model. The log-likelihood at the last and first iteration are shown at the bottom of each column: the pseudo *R*<sup>2</sup> equals 1 minus the ratio between the two. Odds ratios are presented in square brackets. Robust standard errors clustered by country are presented in parenthesis. Observations are weighted by the product of national sampling weights and country populations. \*, \*\* and \*\*\* denote coefficients significantly different from zero at the 90% confidence, 95% confidence and 99% confidence, respectively.

Table 6: Correlation matrix and summary statistics

<i>Correlation matrix</i>							
	<i>ENTRY</i>	<i>TRUST</i>	<i>Unoff. Act.</i>	<i>Water. Poll.</i>	<i>ln GDP</i>	<i>ln POP</i>	<i>UK LEGAL</i>
<i>TRUST</i>	-0.632***						
<i>Unoff. Act.</i>	0.504***	-0.617***					
<i>Water. Poll.</i>	0.166	-0.143	0.540***				
<i>ln GDP</i>	-0.487***	0.526***	-0.733***	-0.482***			
<i>ln POP</i>	0.274**	-0.060	0.091	-0.123	-0.128		
<i>UK LEGAL</i>	-0.526***	0.234*	-0.212*	-0.036	-0.051	0.099	
<i>Summary statistics</i>							
obs.	86	52	74	77	86	198	86
mean	2.229	0.307	28.727	0.183	7.971	15.336	0.291
std. dev.	0.517	0.153	15.267	0.041	1.641	2.088	0.457
min.	0.693	0.046	8.600	0.100	5.247	10.652	0
max.	3.045	0.652	68.800	0.315	10.555	20.949	1

*Notes:* This table presents the correlation matrix of variables (top panel) and their summary statistics (bottom panel) across countries. \*, \*\* and \*\*\* denote correlation coefficients significantly different from zero at 90% confidence, 95% confidence and 99% confidence, respectively.

Table 7: Trust and regulation

	(1)	(2)	(3)	(4)
<i>TRUST</i>	-2.305*** (.423)	-1.896*** (.454)	-2.003*** (.395)	-1.324*** (.309)
<i>ln GDP</i>		-.087* (.050)	-.054 (.047)	-.080*** (.023)
<i>ln POP</i>			.089** (.036)	.131*** (.020)
<i>UK LEGAL</i>				-.825*** (.103)
obs	52	52	51	51
$R^2$	.4	.433	.488	.816
$F$	29.715	18.376	14.914	36.203

*Notes:* This table presents OLS estimates of the effect of trust on entry regulation across countries. The dependent variable is the (log of) number of procedures required to start a new business, from Djankov et al. (2002). The explanatory variable *TRUST* is the country average of the measure of trust in the WVS. *ln GDP* and *ln POP* are the (log of) country GDP per capita and population in 1999, and *UK LEGAL* is a dummy equal to one for British legal origin; all three variables are also from Djankov et al. (2002). Robust standard errors are presented (in parenthesis). \*, \*\* and \*\*\* denote coefficients significantly different from zero at 90% confidence, 95% confidence and 99% confidence, respectively.

Table 8: Regulation and negative externalities

	OLS (1)	OLS (2)	OLS (3)	OLS (4)	OLS (5)	TOLS (6)
<i>ENTRY</i>	.013 (.008)	-.018*** (.007)	-.006 (.006)	-.004 (.007)	-.021*** (.007)	-.067 (.042)
<i>TRUST</i>		-.066** (.026)			-.047 (.031)	
$\ln GDP$				-.013*** (.003)	-.006** (.003)	-.022*** (.008)
obs.	77	50	50	77	50	77
$R^2$	.028	.095	.015	.234	.156	.
$F$	2.667	4.408	1.074	12.409	4.588	6.381

FIRST STAGE REGRESSION FOR *ENTRY*

$\ln POP$	.090** (.038)
$\ln GDP$	-.127*** (.034)
$F$ (excl. instr.)	5.79

*Notes:* This table presents OLS and TOLS estimates of the effect of entry regulations on negative externalities across countries. The top and bottom panel report first and second stage results, respectively. The dependent variable are emissions of organic water pollutant (kilograms per day per worker) for 1998, from Djankov et al. (2002). The explanatory variable *ENTRY* is the (log of) number of procedures required to start a new business;  $\ln GDP$  and  $\ln POP$  are the (log of) country GDP per capita and population in 1999; all three variables are also from Djankov et al. (2002). *TRUST* is the country average of the measure of trust in the WVS. The first stage F statistic for the excluded instrument is reported at the bottom of each column. \*, \*\* and \*\*\* denote coefficients significantly different from zero at 90% confidence, 95% confidence and 99% confidence, respectively.

Table 9: Regulation and unofficial activity

	OLS (1)	OLS (2)	OLS (3)	OLS (4)	OLS (5)	TOLS (6)
<i>ENTRY</i>	14.522*** (2.454)	1.797 (2.591)	9.763*** (1.598)	5.328** (2.356)	-.114 (2.188)	-.821 (11.748)
<i>TRUST</i>		-44.208*** (12.546)			-17.177 (12.142)	
$\ln GDP$				-6.344*** (.999)	-5.859*** (1.147)	-7.368*** (2.272)
obs	74	51	51	74	51	73
$R^2$	.254	.385	.214	.563	.663	.526
$F$	35.02	22.293	37.309	45.391	31.59	31.618

FIRST STAGE REGRESSION FOR *ENTRY*

$\ln POP$	.092** (.040)
$\ln GDP$	-.160*** (.035)
$F$ (excl. instr.)	5.36

*Notes:* This table presents OLS and TOLS estimates of the effect of entry regulations on unofficial activity across countries. The top and bottom panel report first and second stage results, respectively. The dependent variable is the size of the shadow economy as a percentage of GDP, from Djankov et al. (2002). The explanatory variable *ENTRY* is the (log of) number of procedures required to start a new business;  $\ln GDP$  and  $\ln POP$  are the (log of) country GDP per capita and population in 1999; all three variables are also from Djankov et al. (2002). *TRUST* is the country average of the measure of trust in the WVS. The first stage F statistic for the excluded instrument is reported. \*, \*\* and \*\*\* denote coefficients significantly different from zero at 90% confidence, 95% confidence and 99% confidence, respectively.