



Trust, regulation, and market efficiency

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Abstract

Building from the interest-group theory of regulation, we posit that trust alters the payoff from regulatory rent-seeking relative to profit-seeking. Trust reduces the costs of productive economic exchange by lowering transaction costs, thus raising the cost of rent-seeking behavior. In addition, trust increases political accountability, discouraging politicians from creating regulatory rents. We therefore hypothesize that trust reduces the extent of business regulation while simultaneously facilitating market efficiency. To test that hypothesis, we construct an overall business regulation index measuring procedures, time, and cost along eight dimensions of doing business in a country. The empirical results reveal that trust negatively relates to business regulation but positively relates to market efficiency. Interaction and split-sample results further indicate that trust and business regulation are substitutes. Collectively, the findings reported herein suggest that business regulation itself is not the root cause of market inefficiency, but rather lack of trust is the dominant factor.

Keywords Trust · Business regulation · Market efficiency · Public choice theory

JEL Classification F2 · K2 · O17

1 Introduction

Gambetta (1988) defines trust as “the expectation that another person will perform actions that are beneficial, or at least not detrimental, to us regardless of our capacity to monitor those actions.” Trust represents reciprocal moral habits and obligations that reduce

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opportunistic behavior and the expectation of being cheated (Fukuyama, 1995). In the present paper, we focus on the role that trust plays in determining both business regulation and market efficiency. Specifically, we conjecture that trust alters the relative costs and benefits of regulatory rent-seeking versus wealth-creating profit-seeking.

The cost of burdensome business regulation is well documented. Djankov (2009), for example, finds that stricter entry regulation is associated with corruption, sluggish firm development, and larger shadow economies. Geginat and Ramalho (2018) show that utility regulation increases bribery and reduces electricity quality and firm performance. Similarly, labor regulation compromises market efficiency and performance (Botero et al., 2004).

Given existing knowledge, it is puzzling why business regulation is demanded, knowing that regulation impairs market efficiency. To explain that puzzle, we combine the role of trust with public choice theory of regulation. We present two mechanisms through which trust influences political opportunism in the context of regulation. First, lack of trust creates stronger incentives to engage in industry rent seeking (Stigler, 1971; Tullock, 1967) as opposed to engaging in profit-maximizing activities (Baumol, 1990; Coyne et al., 2010; Sobel, 2008). Second, trust fosters political accountability, discouraging politicians from creating regulatory rents in the first place.

The desire to maximize profit does not change across country borders. What does change are the formal and informal institutional constraints that influence the firms' incentives to pursue profit in the marketplace versus rents artificially created by governments (Furton & Martin, 2019). Trust reduces regulatory rent-seeking by raising the cost of such behavior (Tollison, 2012). Trust facilitates productive economic exchange by lowering monitoring and transaction costs, thereby lowering the costs of pursuing profits (Barney & Hansen, 1994; Bromiley & Cummings, 1989; Gur & Bjørnskov, 2017).

Lack of trust creates a ripe environment for regulatory capture by firms who lobby for rules that favor their private interests. Low-trust societies lack economic incentives discouraging such nonproductive activities, and in low-trust countries, economic exchange is more costly owing to a greater uncertainty and higher transaction costs.

Thus, trust alters the relative costs and benefits of regulatory rent seeking and profit seeking. As a result, in low-trust countries costly business regulations are adopted and markets are more inefficient than in high-trust countries. In high-trust countries firms find it more beneficial and easier to utilize resources for profit maximization instead of allocating resources to seek political favors.

Furthermore, lack of trust reduces political accountability, allowing politicians to exploit regulatory interventions creating and extracting rents for their own benefit. In high-trust countries, however, bureaucrats and politicians are less likely to be captured by special interest groups because of more active political participation and accountability from a broader citizenry.

We therefore argue that the root source of market inefficiency is not business regulation per se. Instead, distrust raises special-interest demands for regulation and lowers political accountability, simultaneously fostering inefficient market activity. Specifically, lack of trust is the catalyst for well-organized interest groups demanding regulation so as to capture the regulators. Regulators face less political accountability in a low-trust society and therefore are less concerned about political backlash if they supply rules and regulations that promote their own well-being.

We first demonstrate empirically that trust and business regulation are substitutes (i.e., negatively related). After documenting that inverse association, we investigate how both trust and regulation affect market efficiency. Since trust substitutes for business

regulation and business regulation leads to less economic productivity, we hypothesize that neglecting trust when studying the association between regulation and market activity misleadingly implies that regulation itself is the culprit. In addition, we argue that trust promotes market efficiency directly by reducing transaction costs, lowering informational asymmetries, strengthening private property rights, and increasing judicial quality (Bjørnskov, 2010; Cline & Williamson, 2020; Dincer & Uslander, 2010; Williamson & Kerekes, 2011).

We therefore anticipate that once trust is considered, the negative effects of regulation on market outcomes will be mitigated. If it is true that trust promotes market efficiency, then it is the lack of trust, not regulation per se, that is the source of market inefficiency. We report empirical evidence that generalized trust promotes market efficiency by offering an alternative to business regulation.

To capture the general regulatory business environment, we focus on eight regulatory barriers to starting and operating a business legally. Our findings indicate that in countries where citizens believe most people can be trusted, business regulation is significantly less stringent. Trust is negatively and significantly associated with all eight measures of regulation. For example, a one-standard-deviation increase in trust, the difference between the United States and Mexico, reduces overall business regulation by 12% of its standard deviation, which is roughly the difference between the United States and Belarus.

Next, we enter both generalized trust and the business regulation index in the same regressions to predict market efficiency. We rely on the size of the shadow economy and the ability to control corruption as proxies for efficient market outcomes (D'Hernoncourt & Méon, 2012; Hassan & Schneider, 2016; Kaufmann et al., 2019). Our results indicate that business regulation expands the size of the shadow economy and undermines corruption control, suggesting that business regulation impairs markets. However, once trust is entered along with business regulation, the negative impact of regulation on market efficiency is attenuated. As expected, trust has a positive and significant impact on market outcomes. That result is robust to instrumental variable (IV) estimations that rely on rainfall variation and historical prevalence of infectious diseases as instruments for generalized trust. Our findings suggest that the previously documented negative association between regulation and market efficiency is explained by the omission of trust.

To better understand the association between trust, business regulation, and market efficiency, we introduce an interaction term between trust and regulation. The estimated marginal effects indicate that trust leads to better market outcomes in countries with low levels of regulation. In addition, after splitting our sample into low and high regulatory countries, the results are consistent. Combined with earlier estimations, the evidence suggests that trust promotes market efficiency in countries adopting fewer business regulations. Thus, trust can substitute for formal business regulation.

Our research adds to the literature documenting the negative association between trust and regulation. Our paper, however, differs from prior work in several aspects. First, drawing from public choice literature, we extend the theoretical arguments to include an interest-group theory of regulation. Lack of trust increases the costs of engaging in productive economic activity relative to rent seeking for regulatory protections. Second, we expand the debate to explore empirically how trust impacts overall business regulation and market efficiency across countries. Lack of trust explains why countries adopt costly regulations *and* have inefficient market outcomes. Furthermore, our paper is the first to investigate whether trust and regulation are substitutes or complements in determining market efficiency.

2 Theoretical framework

Regulation carries significant costs for taxpayers, including the misallocation of resources, waste of resources to influence the regulatory process, and bureaucratic costs of regulatory agencies (Shughart & Thomas, 2015). Given those costs, why do countries adopt business regulation, and how does trust affect such adoption?

Prior literature on trust and regulation relies on a modified public interest theory of regulation (Aghion et al., 2010; Pinotti, 2008, 2012). From that perspective, private market exchange is hindered because markets are filled with asymmetric information and moral hazard. Thus, the demand for government intervention primarily is driven by market failure concerns. Both Pinotti (2008, 2012) and Aghion et al. (2010) develop theoretical models and provide empirical evidence illustrating that lack of trust increases the public's demand for regulation. Trust, however, can mitigate adverse selection and moral hazard problems in markets. If individuals view most people as trustworthy and do not expect to be cheated, they will not desire costly government regulation.

In low-trust societies, however, market participants do not view others as trustworthy and fear being cheated. They therefore seek government intervention as protection, even if such protection imposes costs on both parties to exchange. Fear of being cheated and market failure outweigh the expected costs of intervention, strengthening the demand for business regulation. If one party to a transaction perceives that the other cannot be trusted, government intervention is required as a device deterring opportunistic behavior, even if the screening device creates other inefficiencies (Bjørnskov, 2009; Zak & Knack, 2001). In other words, fear of being cheated and the potential of market failure owing to lack of trust outweigh the expected costs of intervention (Acemoglu & Verdier, 2000), thus increasing the demand for regulation.

The main issue with the public interest line of reasoning is that it is incomplete. Trust influences the public's demand for regulation by affecting the likelihood of market failure; however, the standard model assumes that economic actors' main concerns are market failures even when they also are aware of the adverse effects imposed on them by business regulation (Djankov et al., 2002; Sylvester et al., 2009; Tullock, 1967). As such, market participants are incentivized to form special interest groups actively seeking and designing rules that favor the narrow interests of the industry at the expense of the public (Leeson et al., 2020; Stigler, 1971).

From the public choice perspective, government intervention and regulation are sought by well-organized interest groups aiming to undermine competition and maintain market power. Regulatory agencies become captured by the very firms they seek to regulate. Business regulation triggers wasteful rent-seeking and benefits the owners of the regulated business entities at the expense of their customers (Shughart & Thomas, 2015).

To reconcile the trust-regulation public interest argument with interest-group public choice theory, we conjecture that trust alters the costs of regulatory rent seeking relative to profit seeking in the market. In high-trust societies, individuals can rely on trust to coordinate productive economic exchange (Ahern et al., 2015; Guiso et al., 2008, 2009). For example, Bjørnskov (2012) and Bjørnskov and Méon (2013) evaluate channels through which trust potentially can reduce transaction costs, thus contributing to economic growth. In a high-trust environment, the returns to utilizing resources for wealth-maximizing activity increase and the benefit of using resources to rent seek declines. It is more costly in a high-trust country to allocate resources on attempting to capture regulators instead of pursuing profits in the marketplace.

In low-trust societies, however, economic exchange is more costly owing to more uncertainty and increased transaction costs. Thus, individuals may find it more profitable to turn to unproductive entrepreneurial activities such as forming special interest groups to lobby for market restrictions. For example, regulation limits competition and benefits incumbent producers, leading to market power and profits that benefit narrow industry interests rather than consumers (Coyne et al., 2010).

Second, from the perspective of supply, politicians exploit regulation to both create and extract rents in the forms of campaign contributions, votes, and bribes. Regulation is pursued for the direct benefit of politicians and bureaucrats (McChesney, 1987; Shleifer & Vishny, 2002; Yandle, 1983). Knack (2002) argues that trust improves the quality of governance by broadening political accountability. Political accountability is reinforced by making government responsive to citizens at large rather than to narrow special interest groups. Relatedly, Jottier and Heyndels (2012) and Boix and Posner (1998) conjecture that trust strengthens political accountability by encouraging voters to keep politicians in line with voters' interests by punishing them at the ballot box. Bjørnskov and Svendsen (2013) argue that one function of trust is that it reduces bureaucratic corruption. Such studies echo Putnam's (1993) seminal work documenting that social capital, i.e., social trust, increases civic engagement, which in turn leads to more efficient and less corrupt governments. We extend those arguments to postulate that trust promotes less public regulation.

Following those lines of public choice reasoning, we hypothesize that trust is negatively associated with regulation but positively correlated with market efficiency. We therefore argue that the documented adverse effects of business regulation on market efficiency is explained by trust.

Apart from affecting market efficiency directly, it also is possible that trust and business regulation interact. The previous literature documents that trust and formal institutions can serve as both complements and substitutes in explaining economic outcomes (Chung & Kwon, 2021). Research supporting the complementary view suggests that regulation can work only in the context of mutual trust. North (1990) emphasizes that formal rules can reinforce and strengthen the effectiveness of informal constraints. Carlin et al. (2009) indicate that trust and regulation can complement one another if formal rules facilitate the development of trust.

On the other hand, trust and regulation can work as substitutes. By reducing the risk of opportunistic behavior, trust can be less costly than formal regulation and, hence, weaken the demand for regulation (Mellewig et al., 2007; Prakash & Gugerty, 2010). People in trusting societies value their reputations and do not want top-down control. Thus, the existence of trust makes detailed regulation unnecessary or superfluous. A large body of empirical work supports that claim. Knack and Keefer (1997) illustrate that trusting societies are less dependent on formal institutions to enforce agreements, yet contracts nonetheless are enforced. Similarly, Cline and Williamson (2020) argue that trust promotes efficient contracting by reducing burdensome regulations and providing an alternative to formal contract enforcement. When formal regulation is absent, market participants access private dispute-resolution mechanisms and rely on trust to conduct business (Leeson, 2007a, 2007b, 2008, 2009, 2013; Mayer, 2008).

Thus, we hypothesize that trust substitutes for formal business regulation. In trusting countries, market participants do not need government regulators to handle their business affairs or ensure market efficiency.

3 Data

This section describes the main variables utilized in the empirical analysis. Appendix 1 provides a detailed description of all data sources. We collect trust data at the country level from three survey instruments that ask the question: do you believe most people can be trusted? First, we collect observations from the Integrated Values Surveys (IVS), which combines time-series data from the European Values Study (EVS) and the World Values Survey (WVS), spanning the years from 1981 to 2021. Both the EVS and WVS are surveys repeated over time in up to 115 countries. The EVS comprises five survey waves; the WVS has conducted seven such waves. Generalized trust has been included as a question since the first wave was administered in 1981 and is asked on subsequent surveys.

The second survey database is Afrobarometer, which has conducted public attitude surveys in African countries since 1999. The generalized trust question is included for survey waves in 1999, 2005, and 2011. The third database is Latinobarómetro, which conducted annual surveys from 1995 to 2018 (1999, 2012, 2014 are excluded) in Latin American countries. Generalized trust is included as a question for surveys conducted in every year except 1995. Providing external validation for a survey-based trust measure, Johnson and Mislin (2012) find that the WVS trust measure is strongly correlated with an experimentally derived measure of trust.

Generalized trust is measured as the percentage of respondents who agree that most people can be trusted, a commonly utilized measure of trust (Berggren et al., 2008; Cline & Williamson, 2016, 2020). To compile the data, we average across every survey and year for each country when available. Not only does averaging maximize the number of observations, but it also minimizes biases from any one survey or database. For ease of interpretation, we standardize the trust measure (setting the mean equal to zero, with a standard deviation of 1), with a higher score representing more generalized trust in a country.

To measure a country's overall business regulatory environment, we collect observations on eight unique regulations covering different aspects of doing business. Within each regulatory category, the cost, time, and procedures required to be in compliance are measured. Four regulations represent initial steps to start a business legally, including opening a new commercial enterprise, registering property, obtaining construction permits, and obtaining a permanent electricity connection. Four other regulatory categories cover the rules for business operations. They include trading across borders, enforcing contracts, resolving debt obligations, and paying taxes.

The procedures, time, and costs of running a business vary across countries. For example, it takes only one step and one day to register property in Georgia, but it takes 513 days in Kiribati. To construct a building in South Korea only 27.5 days are needed to acquire the necessary documents, compared to Cambodia where 652 days are required. In Hong Kong, three tax payments are due annually, consuming 35 h and 22% of profits in complying with tax laws. In contrast, Venezuela demands 99 tax payments every year, consuming up to 970 h and 73% of profits.

To construct an aggregate regulation index for each respective regulation category, principal component analysis (PCA) is utilized to extract the first principal component of the explicit monetary and opportunity costs to operate a business legally. In total, eight regulatory indices are created, relying on the number of procedures, the amount of time, and the direct cost regulatory compliance. Enforcing contracts, trading across borders, and resolving debt payments do not contain observations on the number of procedures; thus, only cost and time are measured. For each index, the first principal component's eigenvalue is

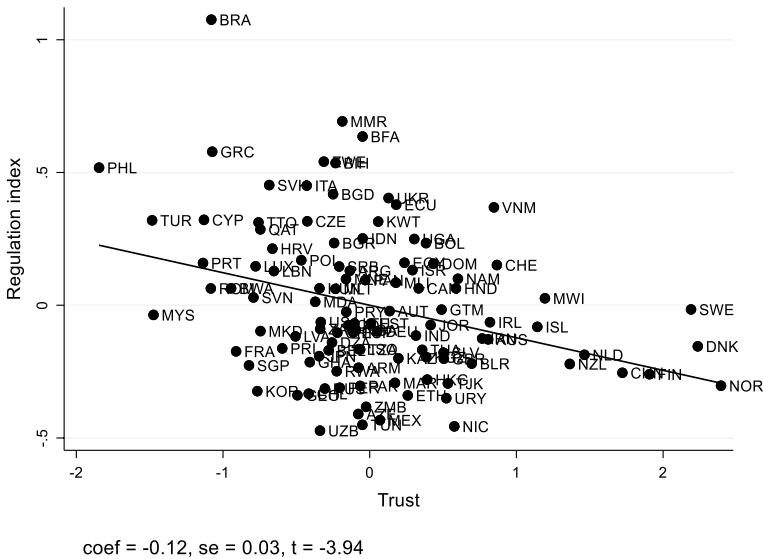


Fig. 1 Trust and regulation across countries. This figure reports the relation between regulation index and trust. *Trust* and *Regulation index* have a negative and significant correlation of -0.12

greater than 1, suggesting that it is salient. Each index is standardized (mean equal to zero; standard deviation of 1), with higher scores representing heavier regulatory burdens.

Finally, we rely on PCA to extract the first principal component of an overall business regulation index to gauge common variation across the eight regulatory indices. We report the full eigenvalues of the PCA underlying the business regulation index in Appendix 2. For example, in Panel A, we summarize the eigenvalues of the eight calculated principal components and their proportional explanatory contributions. As reported, the first principal component's eigenvalue is 2.53, indicating that it is appropriate to retain it. The eigenvalues also indicate that the first principal component (PC1) explains about 32% of the standardized variation in our regulation index, the second principal component (PC2) explains another 16%, the third principal component (PC3), another 14%, and so on.¹ The business regulation index is also standardized, with larger values representing more business regulation.

Figure 1 illustrates the association between generalized trust and the business regulation index.² A negative relation between trust and regulation is evident. As trust increases in a country, overall business regulation declines.

Regarding market efficiency measures, we follow Djankov et al. (2002) and Hassan and Schneider (2016) to gauge the size of the unofficial economy, measured as a share of gross domestic product (GDP). The unofficial economy, or shadow economy, includes all market-based legal production of goods and services that deliberately are concealed from

¹ The loadings for each eigenvector are presented in Panel A, Appendix 2. The higher the loading, the larger the contribution to the variation in each principal component. The results reveal that the loadings on five of eight individual regulation indices examined approximately are the same, with Debt having the largest contribution (with a loading of 0.53) to the first principal component (PC1), followed by Business entry (0.45), Utility (0.43), Court (0.42), Tax (0.38), and so on.

² This scatterplot is based on the regression estimation presented in Table 2, Panel B, column (2).

public authorities, usually to avoid tax payments and social security contributions, stringent labor laws, or costly administrative procedures (Schneider et al., 2010). Since firms operating unofficially can avoid all regulations, a larger shadow economy undermines the argument that regulation protects market participants (Djankov et al., 2002). Furthermore, operating outside the legal system leads to inefficient, perhaps fraudulent market outcomes since business activity remains hidden from all legal authority.

The second proxy for market efficiency is the ability to control public corruption. Corruption control captures perceptions regarding the extent to which public power is exercised for private gain, including both petty and grand forms of corruption. It also includes government capture by elites and private interest groups. We collect observations on corruption control from the Worldwide Governance Indicators (Kaufmann et al., 2019) and average them from 2000 to 2019. Since corruption induces a misallocation of resources and expands the size of bureaucracy, it is a representation of market inefficiency (Acemoglu & Verdier, 2000).³

We expect that, when considered in isolation, business regulation relates positively to the size of the shadow economy and negatively to corruption control. We also anticipate that trust shrinks the size of the shadow economy, as first shown by D’Hernoncourt and Méon (2012), and strengthens corruption control. However, lack of trust may increase the demand for stricter business regulation. We therefore enter trust simultaneously with regulation, anticipating that the effect of regulation on market efficiency is mitigated once trust is in the model.

We enter a variety of control variables that are shown to affect the adoption of business regulation and market outcomes. Our baseline model specification includes English (common law) legal origin, log population, log GDP per capita, and regional controls.

Since a country’s legal origin affects its statutes, dispute resolution procedures, and market outcomes (La Porta et al., 2008), we enter a dummy indicating whether a country’s legal origin is English common law or not. Population and income are shown to impact a country’s regulatory structure and economic efficiency (Aghion et al., 2010; Pinotti, 2012); thus, we control for the logarithm of population and the logarithm of GDP per capita (PPP adjusted, constant international dollars). Both log population and log GDP per capita are collected from World Development Indicators (WDI) (2020). Both are averaged from 1981 to 2020 and standardized. We also control for a country’s geographical region since regional variation is correlated with a country’s legal structure and economic performance. The regional dummy variables reflect a country’s location in East Asia Pacific, Eastern and Central Europe, Middle East and North Africa, South Asia, sub-Saharan Africa, Latin America, or North America (WDI 2020).

In addition to the baseline explanatory variables, we enter a host of additional controls. Since the structure of a country’s economy can influence market efficiency we include the shares of manufacturing, resource rents, and international trade comprising a country’s GDP. The observations are collected from WDI (2020), averaged from 1981 to 2020, and standardized. Previous studies document that ethnic diversity predicts cross-country differences in public policies and institutional quality (Easterly & Levine, 1997). Alesina et al.

³ In a prior draft of the manuscript, we also entered rule of law from the Worldwide Governance Indicators as a measure of market efficiency. However, as pointed out by Langbein and Knack (2010), rule of law and corruption control measure the same broad concept. Given that correlation and the empirical evidence indicating that the results are qualitatively similar, we chose to drop rule of law as a measure of market efficiency to avoid redundancy.

(2003) find that ethnic, linguistic, and religious fractionalization explain institutional quality and economic productivity in a country. We include ethnic, linguistic, and religious fractionalization, which measures the probability that two randomly selected individuals from a country's population will belong to the same ethnic, linguistic, or religious group, respectively. The indices range from 0 to 1.

Prior literature documents a strong causal relation between religion and regulation (Guiso et al., 2003). La Porta et al. (1999) argue that countries with large Catholic or Muslim populations are associated with inferior governmental performance. We therefore enter the percentages of the population that are Catholic or Muslim (McCleary & Barro, 2006). Countries with a more educated citizenry tend to achieve higher levels of economic development. We include primary school enrollment in a country averaged from 1981 to 2019 as a proxy for education (WDI 2020).

Combining datasets results in a cross-section of up to 111 countries. Summary statistics are reported in Table 1. In our sample, Trinidad and Tobago and the Philippines are characterized by the least trust, while Norway, Denmark, and Sweden score the highest. Venezuela has the most stringent business regulations; Singapore and Norway have the lowest. Taiwan is home to the sample's largest shadow economy, whereas Switzerland's active shadow economy is the smallest. Denmark scores highest in corruption control; Myanmar scores lowest. English common law countries comprise 25% of the sample; income per capita ranges from \$1139 (Ethiopia) to \$97,395 (Luxembourg), with a mean of \$21,288.

4 Empirical results

4.1 Trust and business regulation

We begin our analysis by examining the association between trust and regulation. We estimate ordinary least squares (OLS) regressions in Table 2, regressing the eight individual business regulation indices on trust. The results are reported in Panel A. Panel B of Table 2 reports OLS estimates of trust using the overall business regulation index.⁴

The coefficients on trust are negatively and significantly associated with all eight individual regulations and the overall business regulation index at the 5% level or greater. Point estimates indicate that a one-standard-deviation increase in trust, the difference between the United States and Mexico, lowers business entry regulation by 34% of its standard deviation. Similarly, a one-standard-deviation increase in trust is associated with a 27% standard deviation reduction in the business regulation index, which is the difference between Canada and China.

As shown in column (2) of Panel B, after entering baseline controls, the coefficient on trust remains negative and significant. Point estimates indicate that a one-standard-deviation increase in trust leads to a 12% standard deviation decline in business regulation, which is the difference between the United States and Belarus.⁵

⁴ Appendix 3 reports estimates from regressing each individual regulation measure on trust for a total of 30 OLS regressions. The results support the findings of Table 2, wherein trust is negative and significantly associated with almost all measures of business regulation (trust is significant in 25 of the 30 specifications).

⁵ We replicate Table 2 on a sample of democratic countries. We define a country as democratic if its Polity2 score exceeds the full sample mean. We recreate each business regulation index from that subsample to avoid data biases that can result from reporting errors in autocratic countries. The principal component

Table 1 Summary statistics

	Observations	Mean	Standard deviation	Minimum	Maximum
Trust	111	-0.03	1.00	-1.62	3.21
<i>Regulation measures</i>					
Business entry	111	-0.16	0.98	-1.43	7.00
Register property	111	0.14	0.01	0.13	0.20
Construction	111	0.17	0.02	0.14	0.25
Utility	111	0.08	0.16	-0.01	1.03
Trade	111	0.05	0.17	-1.42	0.41
Court	111	-0.23	0.83	-1.54	2.93
Debt	111	-0.23	0.85	-1.71	2.07
Tax	111	0.07	0.10	-0.04	0.84
Regulation index	111	-0.06	0.48	-0.86	1.80
<i>Outcomes</i>					
Shadow economy	103	-0.14	1.04	-1.79	2.79
Corruption control	111	0.22	1.05	-1.25	2.40
<i>Controls</i>					
English legal origin	111	0.25	0.44	0.00	1.00
Log pop	110	0.56	0.65	-1.00	2.46
Log GDP pc	109	0.26	0.90	-1.82	1.93
Manufacturing (% GDP)	109	0.44	0.85	-1.50	4.27
Resource rents (% GDP)	110	-0.17	0.74	-0.67	3.77
Trade (% GDP)	108	-0.14	0.95	-1.24	4.75
Ethnic frac	110	0.39	0.24	0.00	0.93
Language frac	107	0.35	0.27	0.00	0.92
Religion frac	109	0.43	0.23	0.00	0.86
Catholic (% pop)	107	0.33	0.36	0.00	0.95
Muslim (% pop)	107	0.19	0.32	0.00	0.99
Education	108	0.09	0.68	-2.84	2.45
Economic freedom	109	0.25	0.77	-2.03	1.96
Economic growth	110	2.00	1.61	-0.86	9.78
<i>Instruments</i>					
Log rainfall	107	-0.18	0.44	-0.76	0.95
Disease prevalence	102	-0.01	0.64	-1.31	1.16

Detailed variable descriptions are provided in Appendix 1

In the remainder of the analyses, we report findings only for the overall regulation index since it captures the comprehensive business regulatory environment.

Footnote 5 (continued)

eigenvalues are presented in Appendix 2, Panel B. The results from the democracy subsample are presented in Appendix 4 and are consistent with the findings for the full country sample.

Table 2 Trust and regulation

		Panel A: Individual regulation measures								Panel B: Regulation index	
Dep. variable:		Business entry	Register property	Construction	Utility	Trade	Court	Debt	Tax	Regulation index	Regulation index
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(1)	(2)
Trust		-0.34*** (0.06)	-0.32*** (0.05)	-0.003*** (0.00)	-0.02** (0.01)	-0.01** (0.00)	-0.04*** (0.01)	-0.44*** (0.06)	-0.03** (0.01)	-0.27*** (0.03)	-0.12*** (0.03)
English legal origin											-0.03 (0.10)
Log pop											0.13** (0.06)
Log GDP pc											-0.15** (0.06)
Regional controls	No	No	No	No	No	No	No	No	No	No	Yes
Constant		-0.16* (0.09)	-0.24** (0.07)	0.14*** (0.00)	0.05** (0.02)	0.17*** (0.00)	0.08*** (0.01)	-0.24*** (0.07)	0.07*** (0.01)	-0.07* (0.04)	-0.30* (0.15)
# Observations		111	111	111	111	111	111	111	111	111	109
Adj. R ²		11%	14%	6%	1%	8%	6%	26%	8%	31%	60%

This table presents the results of OLS regressions with measures of business regulation as dependent variables and trust and other controls as independent variable. Detailed variable descriptions are provided in Appendix 1. Clustered standard errors are reported in parentheses. ***, **, and * denote significance at 1%, 5%, and 10%, respectively

Table 3 Trust, regulation, and outcomes: Baseline model

Dep. variable:	Shadow economy (1)	Corruption control (2)	Shadow economy (3)	Corruption control (4)
Trust			−0.19** (0.08)	0.31*** (0.06)
Regulation index	0.95*** (0.21)	−1.42*** (0.20)	−0.21 (0.26)	−0.30 (0.22)
English legal origin			0.32 (0.26)	0.03 (0.18)
Log pop			−0.03 (0.13)	−0.23** (0.12)
Log GDP pc			−0.98*** (0.12)	0.87*** (0.09)
Regional controls	No	No	Yes	Yes
Constant	−0.07 (0.10)	0.14* (0.07)	−0.38 (0.39)	0.36 (0.33)
# Observations	103	111	102	109
Adj. R^2	18%	41%	59%	76%

This table presents the results of OLS regressions with measures of economic outcomes as dependent variables and trust and regulation index as primary independent variables with other controls. Detailed variable descriptions are provided in Appendix 1. Clustered standard errors are reported in parentheses. ***, **, and * denote significance at 1%, 5%, and 10%, respectively

4.2 Trust, business regulation, and market outcomes

Given the negative association between trust and regulation shown in Table 2, we next explore the effects of both trust and regulation on market efficiency.

In the first two columns of Table 3, we report the univariate impact of the business regulation index on our two market efficiency measures. The results suggest that business regulation expands the size of the shadow economy and reduces corruption control for corruption significantly. Specifically, a one-standard-deviation increase in business regulation contributes to an almost one-standard-deviation increase in the shadow economy and a 1.4-standard-deviation decline in corruption control. The coefficient estimates are significant at the 1% level.

In columns (3) and (4), we model trust and the baseline control variables. As seen, trust positively influences both market outcome measures (shrinks the shadow economy and strengthens corruption control). Focusing on column (3), we observe that a one-standard-deviation increase in trust is associated with a 19% standard deviation drop in the size of the shadow economy. Both trust coefficients are significant at the 5% level or better.

Interestingly, after entering trust, the adverse effect of business regulation on both market efficiency measures disappears, indicating that lack of trust is an important determinant of unfavorable market outcomes.

4.3 Additional controls

In this section, we explore the possibility that the documented association between trust, business regulation, and market outcomes is biased because of unobserved variables. We enter additional controls described above but continue to control for English common law origins, log of population, log of GDP per capita, and regional indicators. The results are presented in Table 4.

In columns (1) and (2), we include the share of manufacturing, resource rents, and international trade comprising a country's GDP. The associations between trust, regulation, and

Table 4 Trust, regulation, and outcomes: Additional controls

Dep. variable:	Shadow economy (1)	Corruption control (2)	Shadow economy (3)	Corruption control (4)	Shadow economy (5)	Corruption control (6)	Shadow economy (7)	Corruption control (8)
Trust	-0.18** (0.09)	0.29*** (0.06)	-0.19** (0.08)	0.30*** (0.06)	-0.22** (0.08)	0.32*** (0.06)	-0.19** (0.08)	0.31*** (0.06)
Regulation index	-0.14 (0.28)	-0.33 (0.21)	-0.24 (0.27)	-0.22 (0.23)	-0.18 (0.26)	-0.33 (0.23)	-0.18 (0.29)	-0.29 (0.23)
English legal origin	0.49* (0.29)	-0.01 (0.19)	0.29 (0.27)	0.15 (0.17)	0.23 (0.27)	0.06 (0.19)	0.38 (0.28)	0.06 (0.20)
Log pop	-0.10 (0.14)	-0.19 (0.12)	-0.03 (0.12)	-0.24** (0.11)	-0.02 (0.13)	-0.25** (0.12)	0.01 (0.13)	-0.23* (0.12)
Log GDP pc	-1.01*** (0.13)	0.88*** (0.08)	-0.96*** (0.13)	0.85*** (0.09)	-0.92*** (0.13)	0.80*** (0.10)	-0.96*** (0.12)	0.87*** (0.10)
Regional controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Manufacturing (% GDP)	-0.01 (0.10)	-0.05 (0.06)						
Resource rents (% GDP)	0.11 (0.07)	-0.32*** (0.07)						
Trade (% GDP)	-0.03 (0.08)	-0.05 (0.06)						
Ethnic frac			-0.02 (0.53)	-0.62 (0.42)				
Language frac			0.43 (0.46)	-0.02 (0.39)				
Religion frac			-0.33 (0.41)	-0.31 (0.26)				
Catholic (% pop)					-0.40* (0.21)	0.31* (0.18)		
Muslim (% pop)					-0.03 (0.27)	-0.13 (0.24)		
Education							-0.24** (0.10)	-0.04 (0.10)
Constant	-0.37 (0.39)	0.41 (0.36)	-0.30 (0.43)	0.78** (0.34)	-0.20 (0.43)	0.33 (0.32)	-0.48 (0.41)	0.33 (0.35)
# Observations	99	106	99	104	100	105	100	107
Adj. R ²	60%	79%	59%	79%	59%	76%	60%	76%

This table presents the results of OLS tests of the association between trust and regulation on proxies for a healthy business environment. All variables are described in Appendix 1. Clustered standard errors are reported in parentheses. ***, **, and * denote significance at 1%, 5%, and 10%, respectively

market outcomes remain consistent. Next, we explore the possibility that our results are biased owing to the influence of social characteristics. We enter ethnic, linguistic, and religious fractionalization variables in columns (3) and (4). The coefficients on trust and regulation maintains signs and significance levels as in prior models. In columns (5) and (6), we consider the impact of religious affiliations by including percentages of the population that are Catholic or Muslim. After controlling for religion, our results are consistent. Last, we control for the impact of education on market outcomes, presented in columns (7) and (8). The inclusion of primary school enrollment does not alter our findings. We note that the regulation index is nonsignificant in all specifications.

4.4 IV estimation

The documented associations between trust, business regulation, and market efficiency may suffer from model misspecifications. One potential concern is that an unobserved factor may explain trust, the regulatory regime, and market outcomes, thus introducing endogeneity. Another bias comes from survey-based data on trust that may suffer measurement error. Reverse causality also could be a problem. We argue that causality flows from trust to regulation, but it likewise is plausible that burdensome regulation reduces trust. In addition, we argue that trust increases market efficiency, yet countries that maintain more efficient markets also are more likely to foster higher levels of trust (Choi & Storr, 2020).

We address those potential endogeneity concerns by running two-stage least squares regressions using instrumental variables. We enter two instruments that are used widely in the literature examining the relation between culture and regulation: historical rainfall patterns and historical prevalence of infectious diseases. Since it is unlikely that both rainfall variations and historical prevalence of infectious diseases determine contemporary business regulations and market efficiency directly but are closely related to cultural values, we enter both as proxies for exogenous variation in trust.

Davis (2016) develops a theoretical model of optimal socialization in which households adopt more collectivist attitudes to facilitate informal risk-sharing arrangements. Collectivist values create an in-group mentality, generating distrust toward outsiders. Such a value system increases the disutility of renegeing on a risk-sharing agreement, thus allowing individuals credibly to commit to income transfers meant to cope with adverse economic shocks. Preindustrial societies with more variable weather events faced greater uncertainty about harvest yields. To offset negative climate shocks, individuals pooled resources collectively manage to and hold larger food stocks. To avoid opportunism, those societies developed local trust networks; higher rainfall variation thus is associated with less generalized trust today.

Buggle and Durante (2021) argue that historical climate variation correlates with contemporary trust levels; Cline and Williamson (2016) rely on rainfall variation as an instrument for anonymous trust. We therefore expect and find a negative and significant correlation between rainfall variation and trust (-0.35).

Murray and Schaller (2010) argue that disease prevalence affects the costs and benefits associated with specific behaviors regarding attitudes toward traditionalism, individual autonomy, and self-reliance. Since cultural norms are responsive to those costs and benefits, disease prevalence is the cause, rather than the consequence, of contemporary cross-cultural differences. Specifically, in countries where infectious diseases are more prevalent, people tend to distrust strangers because they are perceived as unfamiliar, unclean, or unhealthy (Nikolaev & Salahodjaev, 2017; Thornhill & Fincher, 2014). Experimental

Table 5 Trust, regulation, and outcomes: IV estimation

Dep. variable:	Shadow economy	Corruption control	Panel B: Second-stage results	
	Trust	Trust	Shadow economy	Corruption control
	(1)	(2)	(1)	(2)
Log rainfall	−0.12 (0.23)	−0.16 (0.21)		
Disease prevalence	−0.68** (0.21)	−0.67** (0.20)		
Trust			−0.82** (0.32)	0.44* (0.24)
Regulation index	−0.76** (0.28)	−0.63** (0.24)	−0.85** (0.40)	−0.19 (0.28)
English legal origin	−0.51* (0.27)	−0.46* (0.24)	−0.01 (0.33)	0.05 (0.21)
Log pop	0.38** (0.14)	0.37** (0.13)	0.13 (0.15)	−0.31** (0.12)
Log GDP pc	0.31* (0.16)	0.35** (0.14)	−0.73** (0.23)	0.79*** (0.16)
Regional controls	Yes	Yes	Yes	Yes
Constant	0.48 (0.37)	0.44 (0.32)	−0.66* (0.40)	1.07*** (0.26)
# Observations	91	97	91	97
Adj. R^2	54%	55%	31%	76%
First stage F -statistic	6.16***	6.40***		
KP rank			9.24	9.59
KP rank p -value			0.01	0.01
Hansen J p -value			0.45	0.25

In this table, we instrument for *Trust* using *Log rainfall* and *Disease prevalence*. Panel A reports the first-stage regressions with *Trust* as the dependent variable. Panel B presents the second-stage results. Detailed variable descriptions are provided in Appendix 1. Clustered standard errors are reported in parentheses. ***, **, and * denote significance at 1%, 5%, and 10%, respectively

evidence supports the same argument, which suggests that individuals who perceive themselves to be at greater risk of exposure to infectious diseases are more likely to distrust outsiders (Navarrete & Fessler, 2006).

The argument linking disease prevalence and trust is that when contagious diseases are endemic, people rely on larger social units, such as government, as a defense mechanism or recovery device. Cultures in countries suffering from infectious diseases emphasize tradition, place stronger limits on individual behavior, and are less open to foreigners. Based on that logic, a negative relation between disease prevalence and trust in a country is expected. We rely on a nine-item index by Murray and Schaller (2010) as the proxy for historical disease prevalence. Disease prevalence and trust are correlated negatively and significantly (−0.51).

The IV regression results are reported in Table 5. Panel A provides the first-stage regression results. Both instruments carry their expected signs; disease prevalence is significant at the 5% level. A minor concern is that both F -statistics are less than 10; however, the coefficients of multiple determination are well above 0.20, minimizing concern of weak instrument bias.

Panel B of Table 5 presents the second-stage results. Both coefficients of the exogenous components of trust are significant. Furthermore, the coefficients (−0.82 and 0.44, respectively) exceed in magnitude those from OLS regressions (−0.19 and 0.31, respectively). Point estimates indicate that a one-standard-deviation increase in trust leads to a reduction in the size of the shadow economy by 82% of a standard deviation, which is more than four

times the magnitude suggested by the OLS estimation. We note that after controlling for endogeneity, regulation continues not to affect corruption control but may reduce the size of the shadow economy significantly.

All p -values from Hansen's J overidentification test are nonsignificant, suggesting that we cannot reject the null hypothesis of valid instruments, conditional on at least one instrument meeting that standard. In addition, both p -values for the Kleibergen–Paap (KP) rank statistic are less than 0.10, rejecting the null that the instruments are weak.

We address concerns regarding exclusion restrictions in Table 6. First, we consider the possibility that rainfall variation and disease prevalence do not affect market outcomes through the trust channel but through economic institutions and economic performance. For example, Nikolaev and Salahodjaev (2017) document that historical disease prevalence affects economic development by fostering the emergence of market-friendly economic institutions. Bennett and Nikolaev (2021) show that disease prevalence determines innovation by spurring the development of pro-market cultural values.

Thus, to minimize concerns that our instruments influence market efficiency directly through channels other than trust, we enter two additional explanatory variables: economic freedom and economic growth. To proxy for quality of economic institutions, we rely on an economic freedom index collected from Gwartney et al. (2020), averaged from 1980 to 2018. The results, presented in columns (1) and (2) of Table 6, are virtually unchanged. Trust is significant in both specifications.

Next, we enter economic growth measured as the annual percentage growth rate of GDP per capita (constant 2010 US dollars), averaged from 1981 to 2020 and collected from WDI (2020). Trust remains significant in both estimations after including economic growth, as reported in columns (3) and (4). Combined, the results in columns (1) through (4) alleviate concerns that our instruments affect market efficiency through economic institutions and outcomes.

In the next two columns, we examine whether our instruments influence market outcomes through social fractionalizations. Rainfall variation incentivizes societies to form small social groups to pool agricultural risks, and such groups can evolve along different ethnic, linguistic, and religious lines. The same logic applies to disease prevalence. After controlling for social fractionalizations, our results continue to hold, minimizing concern that the exclusion restriction is violated.

It is plausible that our instruments influence other cultural dimensions such as religion. Thus, we enter the percentages of population that are Catholic or Muslim in columns (9) and (10). The coefficients on trust remain significant. Last, we include a measure of educational attainment. When different social groups emerged in response to rainfall or disease variation, education within each group varied. The coefficients on trust remain significant after including education.

As reported, all p -values associated with the KP rank statistic are less than 0.10, rejecting the null that our instruments are weak. Additional evidence supporting the exclusion restriction can be found from the p -values of Hansen's J tests. All p -values are nonsignificant, suggesting that we cannot reject the null hypothesis that the instruments are valid, conditional on at least one of them meeting that standard. Our instruments are motivated by economically sound theoretical arguments, strengthening the case that our findings do not suffer from weak instrument bias; moreover, the exclusion restriction is satisfied.

The results from our IV regressions reinforce those from OLS estimations. That is, trust positively and significantly relates to market outcomes, but regulation no longer is detrimental to market efficiency. The larger coefficients on trust from the IV regressions imply that OLS estimations may underestimate the degree of impact of trust on market efficiency.

Table 6 Trust, regulation, and outcomes: IV estimations and additional controls

Dep. vari- able:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Shadow economy	Corruption control	Shadow economy	Corruption control	Shadow economy	Corruption control	Shadow economy	Corruption control	Shadow economy	Corruption control	Shadow economy	Corruption control
Trust	-0.81** (0.31)	0.45** (0.20)	-0.88** (0.33)	0.45* (0.24)	-0.85** (0.33)	0.55** (0.21)	-0.79** (0.30)	0.56** (0.22)	-0.81** (0.30)	0.41* (0.23)	-0.82** (0.31)	0.45* (0.25)
Regulation index	-0.93** (0.39)	0.11 (0.26)	-0.90** (0.41)	-0.18 (0.27)	-0.77** (0.38)	-0.14 (0.24)	-0.86** (0.39)	-0.01 (0.27)	-0.70** (0.35)	-0.27 (0.26)	-0.84** (0.43)	-0.17 (0.29)
English legal origin	0.01 (0.32)	0.08 (0.18)	-0.05 (0.33)	0.06 (0.22)	0.17 (0.31)	0.12 (0.20)	-0.05 (0.31)	0.27 (0.21)	-0.15 (0.35)	0.09 (0.24)	0.03 (0.33)	0.08 (0.24)
Log pop	0.07 (0.16)	-0.17 (0.10)	0.10 (0.16)	-0.30** (0.12)	-0.18 (0.17)	-0.22* (0.12)	0.11 (0.15)	-0.33** (0.12)	0.13 (0.15)	-0.30** (0.12)	0.18 (0.16)	-0.31** (0.12)
Log GDP pc	-0.65** (0.24)	0.57*** (0.16)	-0.78** (0.24)	0.81*** (0.16)	-0.67** (0.27)	0.67*** (0.17)	-0.73** (0.23)	0.72*** (0.16)	-0.68** (0.23)	0.76*** (0.17)	-0.69** (0.24)	0.78*** (0.17)
Regional controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Economic freedom	-0.21 (0.19)	0.52*** (0.11)										
Economic growth			-0.09 (0.05)	0.02 (0.04)								
Manufacturing (% GDP)					0.09 (0.13)	-0.08 (0.07)						
Resource rents (% GDP)					0.11 (0.08)	-0.31*** (0.07)						
Trade (% GDP)					-0.26* (0.14)	0.03 (0.09)						
Ethnic frac							-0.05 (0.76)	-0.86** (0.42)				
Language frac							0.36 (0.66)	0.39 (0.37)				

Table 6 (continued)

Dep. variable:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Shadow economy	Corruption control	Shadow economy	Corruption control	Shadow economy	Corruption control	Shadow economy	Corruption control	Shadow economy	Corruption control	Shadow economy	Corruption control
Religion												
frac							-0.35 (0.47)	-0.29 (0.26)				
Catholic (% pop)									-0.87** (0.34)	0.37* (0.22)		
Muslim (% pop)									-0.54 (0.37)	0.05 (0.29)		
Education											-0.24** (0.12)	-0.01 (0.10)
Constant	-0.58 (0.38)	0.84*** (0.23)	-0.56 (0.40)	1.05*** (0.26)	-0.73* (0.39)	0.98*** (0.25)	-0.50 (0.51)	1.28*** (0.33)	-0.25 (0.44)	0.93** (0.30)	-0.76* (0.41)	1.04*** (0.29)
# Observations	91	95	91	97	88	94	89	94	91	96	89	95
Adj. R ²	32%	80%	28%	75%	31%	76%	32%	75%	36%	76%	31%	75%
KP rank	9.31	9.60	9.83	10.22	9.58	10.62	9.43	9.51	10.16	9.81	9.09	9.38
KP rank	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
<i>p</i> -value												
Hansen <i>J</i>	0.56	0.65	0.57	0.27	0.77	0.35	0.83	0.23	0.61	0.29	0.73	0.24
<i>p</i> -value												

Table 7 Interaction effects

Dep. variable:	Panel A: OLS estimations		Panel B: IV estimations	
	Shadow economy	Corruption control	Shadow economy	Corruption control
	(1)	(2)	(1)	(2)
Trust	−0.30** (0.13)	0.13 (0.08)	−0.75* (0.45)	0.04 (0.38)
Regulation index	−0.34 (0.29)	−0.53** (0.20)	−0.86 (0.55)	−0.70 (0.44)
Trust*Regulation index	−0.24 (0.16)	−0.40** (0.12)	−0.50 (0.50)	−0.72* (0.38)
English legal origin	0.29 (0.27)	−0.04 (0.18)	0.12 (0.33)	−0.08 (0.24)
Log pop	−0.00 (0.12)	−0.20* (0.11)	0.11 (0.16)	−0.22* (0.12)
Log GDP pc	−1.01*** (0.12)	0.83*** (0.08)	−0.96*** (0.17)	0.75*** (0.11)
Regional controls	Yes	Yes	Yes	Yes
Constant	−1.29** (0.47)	0.89*** (0.23)	−1.03** (0.38)	0.75** (0.24)
# Observations	102	109	91	97
Adj. R^2	60%	78%	48%	77%
KP rank			7.88	6.20
KP rank p -value			0.04	0.10
Hansen J p -value			0.04	0.78

This table reports OLS and IV results of the interaction effects between trust and regulation index. Detailed variable descriptions are provided in Appendix 1. Clustered standard errors are reported in parentheses. ***, **, and * denote significance at 1%, 5%, and 10%, respectively

4.5 Interaction effect of trust and regulation

Until now, we have provided substantial evidence that trust promotes market efficiency directly and that the negative impact of regulation on market efficiency is attenuated when trust is considered. However, as hypothesized above, it is plausible that trust and regulation work interdependently as either complements or substitutes.

In Table 7 we explore that potential association by examining interaction effects between trust and business regulation. The OLS and IV results are reported in Panels A and B, respectively. Trust is instrumented by log rainfall variation and historical disease prevalence; the trust-regulation index interaction is instrumented by interacting the log rainfall variation-regulation index and historical disease prevalence-regulation index. OLS and IV regressions reveal that the interaction effect is negative and significant for the corruption control estimations but nonsignificant in the shadow economy specifications; however, trust is significant in those estimations, indicating that trust retains a direct effect on the shadow economy.

To gain additional insights, we plot the marginal effects of trust for each specification with 95% confidence intervals. For both shadow economy estimations (Fig. 2a and c) trust significantly reduces the size of the shadow economy at low levels of regulation. For example, based on the IV estimation, a one-standard-deviation increase in trust in the least regulated country, Singapore, shrinks the size of the shadow economy by 32% of a standard deviation. However, as regulation expands, trust becomes nonsignificant.

As shown in Fig. 2b and d, in countries with less business regulation, trust strengthens corruption control significantly. Take column (2) in Panel B, for example. A one-standard-deviation increase in trust strengthens corruption control by more than 50% of a standard deviation in low regulation countries. The marginal effect becomes nonsignificant as

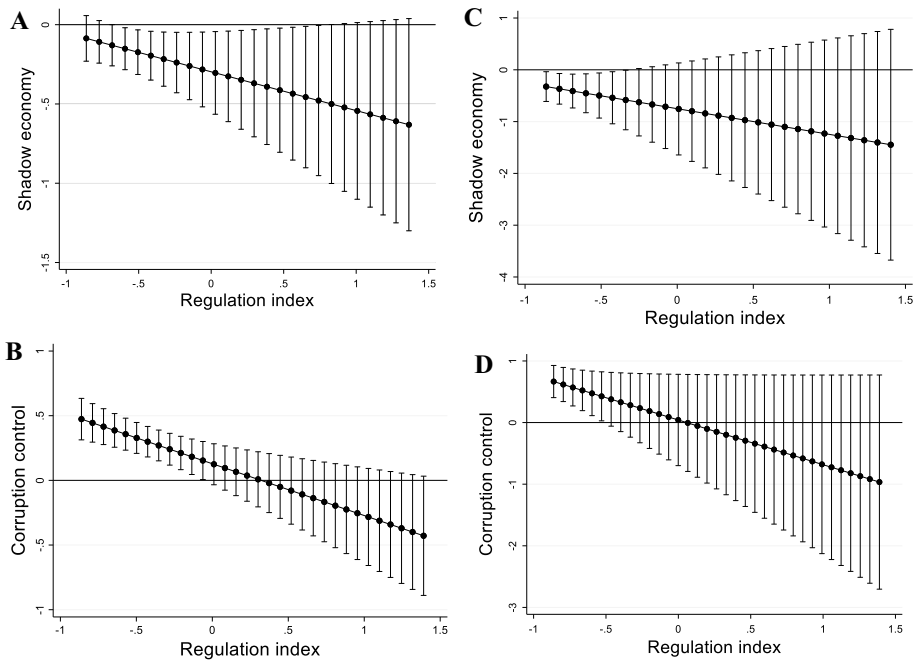


Fig. 2 Marginal effects of trust at different levels of regulation. Based on estimations presented in Table 7. Marginal plots shown with 95% confidence intervals. **a** Marginal effects of trust on shadow economy, OLS estimation. **b** Marginal effects of trust on corruption control, OLS estimation. **c** Marginal effects of trust on shadow economy, IV estimation. **d** Marginal effects of trust on corruption control, IV estimation

regulation expands. The interaction results suggest that as business regulation increases from its minimum to maximum level, the positive impact of trust on market efficiency disappears. Combined, the results in Table 7 suggest that trust works best in countries where business regulation is comparatively lax. Therefore, trust can substitute for a lack of formal rules, providing an alternative to business regulation.

To provide additional evidence, we split the sample into low regulation and high regulation countries based on the mean of the business regulation index.⁶ According to both OLS and IV estimations, trust shrinks the size of the shadow economy significantly and strengthens corruption control in low regulation countries. For instance, a one-standard-deviation increase in trust leads to a 41% standard-deviation reduction in the shadow economy and a 54% standard-deviation increase in corruption control. None of the trust coefficients are significant in highly regulated countries, indicating that the impact of trust in those countries is weak.

⁶ The results are not tabulated to save space but are available upon request.

5 Conclusion

Business regulation is sought by well-organized interest groups to capture abnormal profits by undermining competitive market forces. Politicians also exploit regulatory regimes to extract rents and line their own pockets. We expand the interest-group theory of regulation by arguing that generalized trust alters the relative payoffs of rent-seeking for industry-specific regulations and profit-maximizing wealth creation. Politicians also face more political accountability in high-trust countries and therefore are less likely to use regulation to extract rents for fear of being voted out of office. As a result, lack of trust not only allows for the adoption of burdensome business regulation, but it also explains market inefficiency.

We document empirically that trust reduces the demand for stringent business regulation, and that it promotes market efficiency directly. When trust is entered along with indices of regulation, regulation no longer leads to adverse market outcomes. That finding suggests that regulation is not the root cause of market inefficiency. It is instead the lack of trust. Furthermore, interactions and split sample results indicate that trust is a substitute for, not a complement to, business regulation. In countries where business regulation is relatively lax, trust facilitates market efficiency.

Our study has relevant policy implications. We view our work as suggesting that trust may constrain economic and political actors, including special interest groups and policymakers. That implication aligns with public choice arguments wherein policymakers are motivated mainly by reelection goals and not vague conceptions of the public's interest. Thus, in high trust societies where individuals do not desire market intervention, policymakers have less room to cater to special interest groups by increasing the regulatory burden. Not only do our results suggest that trust ties the hands of policymakers in terms of what types of regulations can be pursued, but that it is beneficial for economic development.

Appendix 1

See Table 8.

Table 8 Data description

Variable	Description	Source
Trust	Percentage of respondents answering "yes" most people can be trusted. Averaged over three databases: Integrated Values Survey, Afrobarometer, and Latinobarómetro, 1981–2020. Data is standardized	Haerpfer et al. (2021); Afrobarometer Data (1999, 2005, 2011); Latinobarómetro Data (1996–2018)
<i>Regulation measures</i>		
Business entry	Standardized index created by extracting the first principal component of procedures, time, and cost to open a new business. Averaged from 2016 to 2020	Doing Business (2020)
Register property	Standardized index created by extracting the first principal component of procedures, time, and cost to register property. Averaged from 2016 to 2020	Doing Business (2020)
Construction	Standardized index created by extracting the first principal component of procedures, time, and cost to build a warehouse. Averaged from 2016 to 2020	Doing Business (2020)
Utility	Standardized index created by extracting the first principal component of procedures, time, and cost to obtain a permanent electricity connection for a new warehouse. Averaged from 2016 to 2020	Doing Business (2020)
Trade	Standardized index created by extracting the first principal component of time (in hours) and cost of document and border compliance to import and export goods. Averaged from 2016 to 2020	Doing Business (2020)
Court	Standardized index created by extracting the first principal component of time and cost to enforce a contract in a court. Averaged from 2016 to 2020	Doing Business (2020)
Debt	Standardized index created by extracting the first principal component of time and cost of insolvency proceedings involving domestic legal entities. Averaged from 2016 to 2020	Doing Business (2020)
Tax	Standardized index created by extracting the first principal component of time and payments of the administrative burden of paying taxes and complying with post-filing procedures, and total tax contribution (% profit). Averaged from 2016 to 2020	Doing Business (2020)
Regulation index	Standardized index created by extracting the first principal component of the eight regulations measures to open and legally operate a business	Doing Business (2020)
<i>Outcomes</i>		
Shadow economy	Measures the size of the unofficial economy, or informal economy, as a percentage of GDP. Normalized with a mean of 0 and a standard deviation of 1	Hassan and Schneider (2016)

Table 8 (continued)

Variable	Description	Source
Corruption control	Corruption control captures perceptions to which public power is exercised for private gain, including both petty and grand forms of corruption. It also includes capture of the state by elites and private interests. Averaged from 1996 to 2019. Normalized with a mean of 0 and a standard deviation of 1	Kaufmann et al. (2019)
<i>Controls</i>		
English legal origin	Indicator variable equals one for a country with an English legal origin, and zero otherwise	La Porta et al. (2008)
Log pop	Log of total population. Averaged from 1981 to 2020. Data is standardized	WDI (2020)
Log GDP pc	Log GDP per capita, PPP, constant international \$. Averaged from 1981 to 2020. Data is standardized	WDI (2020)
Regional controls	Regional dummy variables reflecting a country's location in the following regions: East Asia Pacific, Eastern and Central Europe, Middle East and North Africa, South Asia, sub-Saharan Africa, Latin America, and North America	WDI (2020)
Manufacturing (% GDP)	The total output of the manufacturing sector in a country as a percentage of GDP. Averaged from 1981 to 2020	WDI (2020)
Resource rents (% GDP)	Share of the economy from natural resource rents. Averaged from 1981 to 2020	WDI (2020)
Trade (% GDP)	Trade is the sum of exports and imports of goods and services measured as a share of GDP. Averaged from 1981 to 2020	WDI (2020)
Ethnic frac	Measures the probability that two randomly selected individuals from a country's population will belong to the same ethnic group. Ranges from 0 to 1	Alesina et al. (2003)
Language frac	Language fractionalization. Measures the probability that two randomly selected individuals from a country's population will belong to the same language. Ranges from 0 to 1	Alesina et al. (2003)
Religion frac	Religious fractionalization. Measures the probability that two randomly selected individuals from a country's population will belong to the same religion. Ranges from 0 to 1	Alesina et al. (2003)
Catholic (% pop)	Share of population that is Catholic in 2000	McCleary and Barro (2006)
Muslim (% pop)	Share of population that is Muslim in 2000	McCleary and Barro (2006)
Education	Primary school enrollment (% gross). Averaged from 1981 to 2019	WDI (2020)

Table 8 (continued)

Variable	Description	Source
Economic freedom	Economic freedom index measures the level of economic freedom based on five broad categories: size of government, monetary policy and price stability, legal structure and security of private ownership, freedom to trade with foreigners, and regulation of credit, labor, and business. The index ranges from zero to ten, with ten representing a greater degree of freedom. Averaged 1980 to 2018	Gwartney et al. (2020)
Economic growth	Economic growth is measured as the annual percentage growth rate of GDP per capita (constant 2010 US dollars), averaged from 1981–2020	WDI (2020)
<i>Instruments</i>		
Log rainfall	Natural log of the coefficient of variation of intertemporal monthly rainfall levels over the period from 1900 to 2009	Davis (2016)
Disease prevalence	Historical presence of nine infectious diseases: leishmaniasis, schistosomiasis, trypanosomiasis, leprosy, malaria, typhus, filaria, dengue, and tuberculosis	Murray and Schaller (2010)

Appendix 2

See Table 9.

Table 9 Principal component analysis, eigenanalysis of the correlation matrix

	PC1	PC2	PC3	PC4	PC5	PC6	PC7	PC8
<i>Panel A: Regulation index</i>								
Eigenvalue	2.53	1.31	1.09	0.96	0.73	0.67	0.39	0.31
Proportion	0.32	0.16	0.14	0.12	0.09	0.08	0.05	0.04
Cumulative	0.32	0.48	0.62	0.74	0.83	0.91	0.96	1.00
<i>Eigenvectors</i>								
Business entry	0.45	-0.40	0.04	-0.23	0.01	0.27	0.41	0.58
Court	0.42	0.24	-0.15	0.17	-0.20	0.69	-0.44	-0.09
Register property	-0.08	-0.04	0.87	0.19	-0.29	0.22	0.18	-0.17
Trade	0.04	0.75	0.13	0.24	0.38	0.01	0.28	0.37
Construction	-0.02	-0.42	-0.15	0.84	0.28	0.06	0.09	-0.01
Utility	0.43	0.05	0.12	0.27	-0.42	-0.60	-0.31	0.30
Debt	0.53	0.13	-0.16	0.01	-0.07	-0.16	0.54	-0.60
Tax	0.38	-0.15	0.37	-0.18	0.69	-0.12	-0.38	-0.18
<i>Panel B: Regulation index, democracy sample</i>								
Eigenvalue	3.42	1.69	0.88	0.54	0.53	0.44	0.40	0.10
Proportion	0.43	0.21	0.11	0.07	0.07	0.05	0.05	0.01
Cumulative	0.43	0.64	0.75	0.82	0.88	0.94	0.99	1.00
<i>Eigenvectors</i>								
Business entry	0.48	-0.22	0.09	0.07	-0.14	-0.11	-0.36	0.74
Court	0.27	0.47	-0.22	-0.10	-0.72	0.26	0.25	0.02
Register property	0.26	0.33	0.69	-0.26	0.06	-0.45	0.25	-0.07
Trade	-0.31	0.53	-0.01	0.31	0.35	0.13	0.28	0.55
Construction	0.29	0.48	-0.20	-0.35	0.41	0.21	-0.54	-0.14
Utility	0.38	-0.30	-0.21	-0.38	0.37	0.27	0.59	0.13
Debt	0.38	0.12	-0.49	0.44	0.15	-0.58	0.14	-0.18
Tax	0.40	-0.03	0.37	0.60	0.11	0.51	0.01	-0.27

Appendix 3

See Table 10.

Appendix 4

See Table 11.

Table 10 Trust and regulation, individual regulation components

	Business entry regulation				Court regulation				Register property regulation			
	Procedures- men	Time-men	Cost-men	Procedures-women	Time-women	Cost-women	Time	Cost	Procedures	Time	Cost	Contribution
Trust	-1.26*** (0.23)	-5.46*** (1.54)	-8.16*** (1.86)	-1.27*** (0.23)	-5.47*** (1.54)	-8.16*** (1.86)	-3.99*** (1.07)	-83.43*** (19.77)	-1.08*** (0.17)	-8.75*** (2.38)	-0.39* (0.23)	
Constant	6.86*** (0.28)	18.91*** (2.29)	14.93*** (2.52)	6.91*** (0.29)	18.97*** (2.29)	14.93*** (2.52)	28.54*** (1.28)	612.21*** (25.94)	5.88*** (0.20)	35.25*** (3.53)	4.49*** (0.30)	
Adj. R ²	14%	4%	8%	14%	4%	8%	7%	8%	20%	4%	1%	
	Trade regulation—document compliance											
	Time-export				Time-import				Cost-import			
Trust	-5.04 (8.83)	-12.60* (7.15)	-11.20 (11.69)	-30.41** (12.68)	-3.58 (9.91)	-15.62 (11.19)	-52.60** (21.41)	-81.05*** (23.05)				
Constant	17.18 (14.85)	31.50** (11.71)	75.39*** (18.06)	95.50*** (21.03)	24.08 (16.58)	38.14** (17.83)	272.39*** (26.24)	286.77*** (26.46)				
Adj. R ²	-1%	0%	-1%	1%	-1%	0%	3%	7%				
	Construction regulation											
	Procedures				Time				Cost			
Trust	-1.27** (0.45)	-21.92** (7.12)	-1.23*** (0.34)	-0.31*** (0.10)	-7.96** (3.21)	-376.52*** (105.04)	-0.48*** (0.08)	-3.20*** (0.59)	-4.90*** (0.90)	-61.98** (24.15)	-0.37 (1.27)	
Constant	15.29*** (0.43)	162.82*** (7.21)	4.25*** (0.44)	4.97*** (0.13)	84.85*** (4.66)	643.37*** (131.08)	2.29*** (0.09)	13.72*** (0.67)	18.70*** (1.28)	241.76*** (19.54)	39.70*** (1.49)	
Adj. R ²	6%	7%	5%	4%	2%	6%	19%	16%	11%	7%	-1%	

This table presents the results of OLS regressions with individual measures of business regulation as dependent variables and trust as the independent variable. Detailed variable descriptions are provided in Appendix 1. All estimations have 111 observations. Clustered standard errors are reported in parentheses. ***, **, and * denote significance at 1%, 5%, and 10%, respectively

Table 11 Trust and regulation, democracy sample

		Panel A: Individual regulation measures								Panel B: Regulation index	
Dep. variable:		Business entry (1)	Register prop-erty (2)	Construction (3)	Utility (4)	Trade (5)	Court (6)	Debt (7)	Tax (8)	Regulation index (1)	Regulation index (2)
Trust		-0.32*** (0.08)	-0.29*** (0.06)	-0.002** (0.00)	-0.02 (0.08)	-0.39*** (0.06)	-0.24** (0.08)	-0.56*** (0.07)	-0.33** (0.10)	-0.47*** (0.07)	-0.21*** (0.05)
English legal origin											-0.04 (0.18)
Log pop											0.21** (0.10)
Log GDP pc											-0.36* (0.19)
Regional controls	No	No	No	No	No	No	No	No	No	No	Yes
Constant		0.06 (0.13)	-0.05 (0.08)	0.12*** (0.00)	-0.04 (0.14)	0.02 (0.11)	0.00 (0.13)	0.04 (0.10)	0.08 (0.13)	0.06 (0.12)	0.34* (0.18)
# Observations		65	65	65	65	65	65	65	65	65	64
Adj. R ²		10%	18%	7%	-2%	17%	5%	36%	11%	24%	65%

This table presents the results of OLS regressions with measures of business regulation as dependent variables and trust and other controls as independent variable from a sample of countries that are democratic, defined as having a Polity2 score higher than the full sample mean. Detailed variable descriptions are provided in Appendix 1. Clustered standard errors are reported in parentheses. ***, **, and * denote significance at 1%, 5%, and 10%, respectively

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References

- Acemoglu, D., & Verdier, T. (2000). The choice between market failures and corruption. *American Economic Review*, 90(1), 194–211.
- Afrobarometer Data. 1999, 2005, 2011. <http://www.afrobarometer.org>.
- Aghion, P., Algan, Y., Cahuc, P., & Shleifer, A. (2010). Regulation and distrust. *The Quarterly Journal of Economics*, 125, 1015–1049.
- Ahern, K. R., Daminelli, D., & Fracassi, C. (2015). Lost in translation? The effect of cultural values on mergers around the world. *Journal of Financial Economics*, 117(1), 165–189.
- Alesina, A., Devleeschauwer, A., Easterly, W., Kurlat, S., & Wacziarg, R. (2003). Fractionalization. *Journal of Economic Growth*, 8(2), 155–194.
- Barney, J. B., & Hansen, M. H. (1994). Trustworthiness as a source of competitive advantage. *Strategic Management Journal*, 15(S1), 175–190.
- Baumol, W. J. (1990). Entrepreneurship: Productive, unproductive, and destructive. *Journal of Political Economy*, 98(5), 893–921.
- Bennett, D. L., & Nikolaev, B. (2021). Historical disease prevalence, cultural values, and global innovation. *Entrepreneurship Theory and Practice*, 45(1), 145–174.
- Berggren, N., Elinder, M., & Jordahl, H. (2008). Trust and growth: A shaky relationship. *Empirical Economics*, 35(2), 251–274.
- Bjørnskov, C. (2009). Social trust and the growth of schooling. *Economics of Education Review*, 28(2), 249–257.
- Bjørnskov, C. (2010). How does social trust lead to better governance? An attempt to separate electoral and bureaucratic mechanisms. *Public Choice*, 144(1–2), 323–346.
- Bjørnskov, C. (2012). How does social trust affect economic growth? *Southern Economic Journal*, 78(4), 1346–1368.
- Bjørnskov, C., & Méon, P. G. (2013). Is trust the missing root of institutions, education, and development? *Public Choice*, 157(3–4), 641–669.
- Bjørnskov, C., & Svendsen, G. T. (2013). Does social trust determine the size of the welfare state? Evidence Using Historical Identification. *Public Choice*, 157(1), 269–286.
- Boix, C., & Posner, D. N. (1998). Social capital: Explaining its origins and effects on government performance. *British Journal of Political Science*, 28(4), 686–693.
- Botero, J. C., Djankov, S., Porta, R. L., Lopez-de-Silanes, F., & Shleifer, A. (2004). The regulation of labor. *The Quarterly Journal of Economics*, 119(4), 1339–1382.
- Bromiley, P., & Cummings, L. L. (1989). Transactions costs in organizations with trust (No. 128). Strategic Management Research Center, University of Minnesota.
- Bugge, J. C., & Durante, R. (2021). Climate risk, cooperation and the co-evolution of culture and institutions. *The Economic Journal*, 131(637), 1947–1987.
- Carlin, B. I., Dorobantu, F., & Viswanathan, S. (2009). Public trust, the law, and financial investment. *Journal of Financial Economics*, 92(3), 321–341.
- Choi, G. S., & Storr, V. H. (2020). Market interactions, trust and reciprocity. *PLoS ONE*, 15(5), e0232704.
- Chung, K. H., & Kwon, H. Y. (2021). Trust and the protection of property rights: Evidence from global regions. *Public Choice*, 189(3), 493–513.
- Cline, B. N., & Williamson, C. R. (2016). Trust and the regulation of corporate self-dealing. *Journal of Corporate Finance*, 41, 572–590.
- Cline, B. N., & Williamson, C. R. (2020). Trust, regulation, and contracting institutions. *European Financial Management*, 26(4), 859–895.
- Coyne, C. J., Sobel, R. S., & Dove, J. A. (2010). The non-productive entrepreneurial process. *The Review of Austrian Economics*, 23(4), 333–346.
- Davis, L. (2016). Individual responsibility and economic development: Evidence from rainfall data. *Kyklos*, 69(3), 426–470.
- Dincer, O. C., & Uslaner, E. M. (2010). Trust and growth. *Public Choice*, 142(1–2), 59–67.

- D'Hernoncourt, J., & Méon, P. G. (2012). The not so dark side of trust: Does trust increase the size of the shadow economy? *Journal of Economic Behavior & Organization*, 81(1), 97–121.
- Djankov, S. (2009). The regulation of entry: A survey. *The World Bank Research Observer*, 24(2), 183–203.
- Djankov, S., La Porta, R., Lopez-de-Silanes, F., & Shleifer, A. (2002). The regulation of entry. *The Quarterly Journal of Economics*, 117(1), 1–37.
- Easterly, W., & Levine, R. (1997). Africa's growth tragedy: Policies and ethnic divisions. *The Quarterly Journal of Economics*, 112(4), 1203–1250.
- Fukuyama, F. (1995). *Trust: The social virtues and the creation of prosperity* (Vol. 99). Free press.
- Furton, G., & Martin, A. (2019). Beyond market failure and government failure. *Public Choice*, 178(1), 197–216.
- Gambetta, D. (1988). *Trust: Making and breaking cooperative relations*. Basil Blackwell.
- Geginat, C., & Ramalho, R. (2018). Electricity connections and firm performance in 183 countries. *Energy Economics*, 76(C), 344–366.
- Guiso, L., Sapienza, P., & Zingales, L. (2003). People's opium? Religion and economic attitudes. *Journal of Monetary Economics*, 50(1), 225–282.
- Guiso, L., Sapienza, P., & Zingales, L. (2008). Trusting the stock market. *The Journal of Finance*, 63(6), 2557–2600.
- Guiso, L., Sapienza, P., & Zingales, L. (2009). Cultural biases in economic exchange? *The Quarterly Journal of Economics*, 124(3), 1095–1131.
- Gur, N., & Bjørnskov, C. (2017). Trust and delegation: Theory and evidence. *Journal of Comparative Economics*, 45(3), 644–657.
- Gwartney, J., Lawson R., Hall J., & Murphy R. (2020). Economic Freedom Dataset, published in Economic Freedom of the World: 2020 Annual Report. Fraser Institute.
- Haerpfher, C., Inglehart, R., Moreno, A., Welzel, C., Kizilova, K., Diez-Medrano J., Lagos M., Norris P., Ponarin E. & Puranen B. (2021). World Values Survey Time-Series (1981–2020) Cross-National Dataset. Madrid, Spain & Vienna, Austria: JD Systems Institute & WVSA Secretariat. Data File Version 2.0.0.
- Hassan, M., & Schneider, F. (2016). Size and development of the shadow economies of 157 countries worldwide: Updated and new measures from 1999 to 2013. IZA Discussion Papers.
- Johnson, N. D., & Mislin, A. (2012). How much should we trust the World Values Survey trust question? *Economics Letters*, 116(2), 210–212.
- Jottier, D., & Heyndels, B. (2012). Does social capital increase political accountability? An empirical test for Flemish municipalities. *Public Choice*, 150(3), 731–744.
- Kaufmann, D., Kraay, A., & Mastruzzi, M. (2019). *Worldwide governance indicators*. World Bank.
- Knack, S. (2002). Social capital and the quality of government: Evidence from the US states. *American Journal of Political Science*, 46(4), 772–785.
- Knack, S., & Keefer, P. (1997). Does social capital have an economic payoff? A cross-country investigation. *The Quarterly Journal of Economics*, 112(4), 1251–1288.
- La Porta, R., Lopez-de-Silanes, F., & Shleifer, A. (2008). The economic consequences of legal origins. *Journal of Economic Literature*, 46(2), 285–332.
- La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. (1999). The quality of government. *The Journal of Law, Economics, and Organization*, 15(1), 222–279.
- Langbein, L., & Knack, S. (2010). The worldwide governance indicators: Six, one, or none? *The Journal of Development Studies*, 46(2), 350–370.
- Latinobarometro Data. 1996–2018. <https://www.latinobarometro.org>
- Leeson, P. T. (2007a). An-arrgh-chy: The law and economics of pirate organization. *Journal of Political Economy*, 115(6), 1049–1094.
- Leeson, P. T. (2007b). Trading with bandits. *Journal of Law and Economics*, 50(2), 303–321.
- Leeson, P. T. (2008). Social distance and self-enforcing exchange. *Journal of Legal Studies*, 37(1), 161–188.
- Leeson, P. T. (2009). The laws of lawlessness. *Journal of Legal Studies*, 38(2), 471–503.
- Leeson, P. T. (2013). Gypsy law. *Public Choice*, 155(3–4), 273–292.
- Leeson, P. T., King, M. S., & Fegley, T. J. (2020). Regulating quack medicine. *Public Choice*, 182(3), 273–286.
- Mayer, C. (2008). Trust in financial markets. *European Financial Management*, 14(4), 617–632.
- McChesney, F. S. (1987). Rent extraction and rent creation in the economic theory of regulation. *The Journal of Legal Studies*, 16(1), 101–118.
- McCleary, R. M., & Barro, R. J. (2006). Religion and economy. *Journal of Economic Perspectives*, 20(2), 49–72.
- Mellewigt, T., Madhok, A., & Weibel, A. (2007). Trust and formal contracts in interorganizational relationships—Substitutes and complements. *Managerial and Decision Economics*, 28(8), 833–847.

- Murray, D. R., & Schaller, M. (2010). Historical prevalence of infectious diseases within 230 geopolitical regions: A tool for investigating origins of culture. *Journal of Cross-Cultural Psychology*, 41(1), 99–108.
- Navarrete, C. D., & Fessler, D. M. (2006). Disease avoidance and ethnocentrism: The effects of disease vulnerability and disgust sensitivity on intergroup attitudes. *Evolution and Human Behavior*, 27(4), 270–282.
- Nikolaev, B., & Salahodjaev, R. (2017). Historical prevalence of infectious diseases, cultural values, and the origins of economic institutions. *Kyklos*, 70(1), 97–128.
- North, D. C. (1990). *Institutions, institutional change and economic performance*. Cambridge University Press.
- Pinotti, P. (2008). Trust, honesty and regulations. *MPRA Paper*, 7740.
- Pinotti, P. (2012). Trust, regulation and market failures. *Review of Economics and Statistics*, 94(3), 650–658.
- Prakash, A., & Gugerty, M. K. (2010). Trust but verify? Voluntary regulation programs in the nonprofit sector. *Regulation & Governance*, 4(1), 22–47.
- Putnam, R. (1993). *Making democracy work. Civic traditions in modern Italy*. Princeton University Press.
- Schneider, F., Buehn, A., & Montenegro, C. E. (2010). New estimates for the shadow economies all over the world. *International Economic Journal*, 24(4), 443–461.
- Shleifer, A., & Vishny, R.W. (2002). *The grabbing hand: Government pathologies and their cures*. Harvard University Press.
- Shughart, W. F., II & Thomas, D. W. (2015). Regulatory rent seeking. In R.D. Congleton and A.L. Hillman (eds.), *Companion to the Political Economy of Rent Seeking*. Cheltenham, UK and Northampton, MA, USA: Edward Elgar Publishing.
- Sobel, R. S. (2008). Testing Baumol: Institutional quality and the productivity of entrepreneurship. *Journal of Business Venturing*, 23(6), 641–655.
- Stigler, G. J. (1971). The theory of economic regulation. *The Bell Journal of Economics and Management Science*, 3–21.
- Sylvester, D. J., Abbott, K. W., & Marchant, G. E. (2009). Not again! Public perception, regulation, and nanotechnology. *Regulation & Governance*, 3(2), 165–185.
- Thornhill, R., & Fincher, C. L. (2014). The parasite-stress theory of sociality, the behavioral immune system, and human social and cognitive uniqueness. *Evolutionary Behavioral Sciences*, 8(4), 257.
- Tollison, R. D. (2012). The economic theory of rent seeking. *Public Choice*, 152(1), 73–82.
- Tullock, G. (1967). The welfare costs of tariffs, monopolies, and theft. *Economic Inquiry*, 5(3), 224–232.
- Williamson, C. R., & Kerekes, C. B. (2011). Securing private property: Formal versus informal institutions. *Journal of Law and Economics*, 54(3), 537–572.
- World Bank. (2020). *World development indicators*. Washington, D.C.: World Bank.
- Yandle, B. (1983). Bootleggers and Baptists: The education of a regulatory economist. *Regulation*, 7, 12.
- Zak, P. J., & Knack, S. (2001). Trust and growth. *The Economic Journal*, 111(470), 295–321.

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