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Do existing corruption levels matter in controlling corruption? Cross-country quantile regression estimates☆

Sherrilyn M. Billger, Rajeev K. Goel *

Department of Economics, Illinois State University, Normal, IL 61790-4200, USA

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ABSTRACT

We examine the determinants of corruption using recent cross-sectional data for nearly one hundred countries. While the causes of corruption have drawn economists' interest in recent years, our main contribution is to examine the corruption determinants throughout the conditional distribution of corruption across nations. Are there different causes of corruption in highly corrupt nations compared to the least corrupt countries? For instance, we examine whether greater democracy and more economic freedom consistently reduce corruption among the most and the least corrupt. Our results for the significant determinants support some findings in the literature, but also provide new conclusions. In many cases, quantile regression estimates are quite different from those from OLS regressions. Among the most corrupt nations, larger governments and greater economic freedom do not appear to reduce corruption, but greater democracy seems to alleviate it. Our results suggest that some current corruption control policies may be reconsidered, especially among the most corrupt and least corrupt nations.

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1. Introduction

Cross-country empirical studies of the causes and effects of corruption have proliferated in the last decade (see Lambsdorff, 2006) for an extensive survey of the relevant literature). These studies have used the widely available indices of corruption perceptions from a few sources.[1] Given this research, some consensus is slowly emerging, although a number of aspects remain unresolved. For instance, surveys of the literature are beginning to highlight the prominent determinants of corruption across a large group of measures used, but the role of some variables (e.g., government size) remains unclear (see, for example, Serra, 2006). Two key reasons for a lack of greater consensus are the inability to measure actual corrupt activity and the difficulty of quantifying the influence of institutions that might crucially impact corruption. Furthermore, corruption control is also an important issue from a policy perspective. National governments and international organizations are attempting to make the control of corruption an important part of their agenda by espousing policies at national and cross-national levels. However, the effectiveness of some of these policies is not yet completely clear.

This paper contributes to the literature on the determinants of corruption by focusing on the distribution of the dependent variable (i.e., the prevalence of corruption). It is likely that corrupt and "clean" nations respond differently to factors that spur corrupt activity. There may be subtle institutional differences between corrupt and clean countries that might affect corruption determinants and the governments' efficacy in combating corruption. Furthermore, it is possible that corruption feeds on itself. Goel and Nelson (2007) find evidence of contagion effects of corruption for the United States. If this is indeed the case, then corruption would tend to become more entrenched in already corrupt nations. This sets up an interesting question: Are there different causes of corruption in highly corrupt nations compared to the least corrupt countries? If the answer to this question is affirmative, the findings have significant implications both for the literature and for corruption control policy. The identification of some key causes of corruption would then be qualified in terms of their sensitivity to corruption levels. Corruption policy recommendations would also have to be qualified, moving away from blanket suggestions across all nations to instead focus on groups of nations with particular characteristics.

☆ We are grateful to Michael Nelson and view his contributions worthy of coauthorship, but his sense of propriety induces him to decline. Helpful comments by Dr. Lant Pritchett and an anonymous referee are also appreciated. Thus, we remain solely responsible for the remaining errors.

* Corresponding author.
E-mail addresses: smbillg@ilstu.edu (S.M. Billger), rkgoel@ilstu.edu (R.K. Goel).

[1] Two frequently used indices are from the Transparency International and the World Bank.

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To determine whether the existing level of corruption affects how the various causes of corruption come into play, we use quantile regression. This technique enables us to investigate whether the relationship between corruption and the explanatory variables differs throughout the distribution of the dependent variable (see Koenker and Hallock, 2001). Given both the inability of measuring the true level of corruption and also the substantial effort involved in creating another index of the perception of corruption (which might yet be no better than existing indices), two research avenues available in this area involve (a) examining additional determinants of corruption (see, for example, Treisman, 2000); and (b) employing alternate estimation techniques (see, for example, McAdam and Rummel, 2004). The present research focuses on the latter strategy. This focus enables us to capture some subtle differences in the determinants of corruption across corrupt and "clean" nations, adding to the extant body of knowledge in the area.

Our results regarding the significant determinants of corruption support some findings in the literature, while others reveal sensitivity to the distribution of the dependent (corruption) variable. In some cases, quantile regression results are quite different from ordinary least squares (OLS) results, suggesting that some of the corruption control policies based on OLS should be reconsidered, especially across the most corrupt and least corrupt nations. The findings are generally robust when alternate measures of corruption and economic freedom are employed. We turn next to a discussion of the model used, the data employed, and the estimation techniques.

2. The model, data, and estimation

The theoretical foundations for corruption studies draw from the larger literature on the determinants of criminal activity, where rational individuals (i.e., bribe givers and bribe takers) weigh the relative costs and benefits of engaging in criminal (corrupt) acts (see Becker, 1968). Potential benefits of corruption might include disproportionate favors that monopolist bureaucrats may be able to hand out (see Shleifer and Vishny, 1993) or they may involve cutting (speeding up) bureaucratic red tape (see Guriev, 2004). The differential levels of impatience (discount rates) across economic agents induce some to offer/accept bribes and dictate the size of bribes. Potential costs of engaging in corrupt activities include the costs of apprehension and punishment. The extant literature does, however, allow for the possibility that monitoring agencies might themselves be corrupt (see Banerjee, 1997).

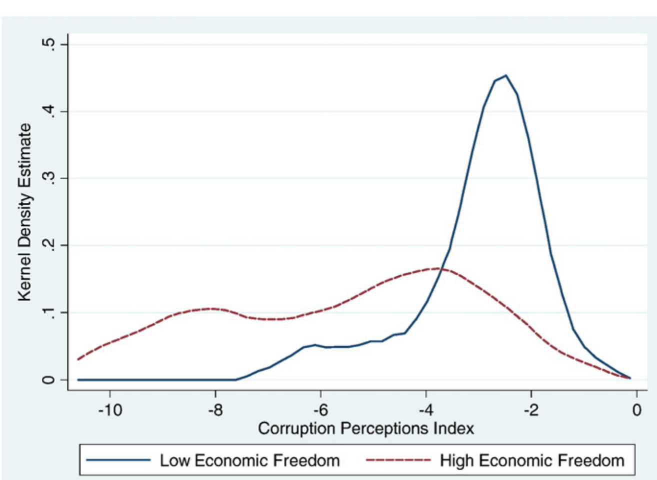

Fig. 1. The distribution of corruption conditional on economic freedom. *Notes:* Epanechnikov kernel density estimates are presented. Low and High Economic Freedoms denote lower or higher than the median, which is −2.76 in our sample.

In this paper we attempt to explain the determinants of corrupt activities using data from a cross-section of countries. Our dependent variable is the level of corruption in a country provided by the Transparency International's corruption perceptions index. This index is based on (averages of) surveys about perceptions of corruption in individual nations and has been widely used in cross-national studies of corruption. To study the determinants of corruption, we use five control variables: a country's level of prosperity, democracy, economic freedom, government size, and the degree of urbanization. These variables have been used separately and in conjunction in other studies of corrupt behavior (see Aidt, 2003; Bardhan, 1997; Jain, 2001; Lambsdorff, 2006; Treisman, 2000). However, the effects of some of the determinants remain unclear. For instance, it is not clear whether a larger government would reduce or enhance corruption. Formally, the estimated equation takes the following form

$$\text{Corruption}_i = f(\text{Economic prosperity}_i,\ \text{Democracy}_i,\ \text{Economic freedom}_i,\ \text{Government size}_i,\ \text{Urbanization}_i) \quad i = 1,\ldots,99. \tag{1}$$

Economic prosperity and democracy are "standard" determinants that are used in almost every study devoted to the causes of corruption. The other variables in Eq. (1) have also been used quite frequently in some studies (see Serra, 2006; Lambsdorff, 2006). Within the literature, greater economic prosperity is seen to lower corruption and this result seems quite robust across various samples and model specifications (see Serra, 2006). The logic is that discount rates of potential bribe takers and bribe givers are lower in wealthier nations, making them less eager to engage in corrupt practices. Wealth might also be a proxy for literacy and that too has a sobering effect on corruption. Both greater economic freedom and greater political freedom lower corruption (Chowdhury, 2004; Goel and Nelson, 2005). Greater economic freedom results from a free flow of market forces and fewer governmental controls, reducing opportunities for rent-seeking by government officials (Emerson, 2006; Shleifer and Vishny, 1993). Political competition is more successful and a free press is more likely to exist in nations with greater political freedom (see Kunicová, 2006). These forces tend to lower corruption as potential bribe takers fear being exposed by a free press.

A larger government contributes to bureaucracy and thus can increase corruption (Rose-Ackerman, 1999). On the other hand, a larger government might be associated with stronger checks and balances (i.e., better oversight) and in this case corruption might actually decrease with government size (La Porta et al., 1999). Other things being equal, the quality of governance may be better in less corrupt countries (see La Porta et al., 1999; May et al., 2002).[2]

The degree of urbanization in a nation is also likely to affect corruption. Greater concentration of the population in urban areas increases their discount rates, making them more eager to "jump the queue" via illegal (corrupt) means. There are also greater opportunities for interaction between potential bribe takers and bribe givers in urban areas, resulting in more corrupt deals. Conversely, a highly concentrated urban population might indicate a greater chance that someone is looking over the shoulder(s) of potential bribe takers and bribe givers, acting as a deterrent.[3]

Many previous studies of the determinants of corruption employ OLS estimation, therefore reporting parameter estimates at the

[2] We thank an insightful referee for pointing this out.
[3] On the other hand, the different measures of corruption might be relatively better equipped at registering corrupt practices in urban areas.

Table 1
Data definitions, summary statistics and data sources.

Variable	Definition (mean; SD)	Source
Corruption	Transparency International Corruption Index of "perceived corruption" in a country. Range: −10 (least corrupt) to 0 (most corrupt) (−4.516; 2.333)	www.transparency.org/surveys/index.html#cpi
Economic prosperity	GDP per capita (constant 1995 US$) (9231.44; 13,194.57)	World Development Indicators Online database, 2004
Democracy	Sum of the Freedom House Political Rights and Civil Liberties Indices used to measure the level of democracy. Rescaled to −14 (least democracy) to −2 (most democracy) (−6.017; 3.467)	www.freedomhouse.org/ ratings/index.htm
Economic freedom	Index of government intervention taking into account marginal income tax rates, the level and growth of government expenditures, state owned enterprises, inflation rate trends, degree of regulation on foreign investment, banking and finance regulation, and wage and price controls. Range: −5 (least economic freedom) to −1 (most economic freedom) (−2.765; 0.570)	Heritage Foundation
Government size	General government final consumption expenditure (% of GDP) (16.190; 5.737)	World Development Indicators Online database, 2004
Urbanization	Urban population (% of total) (59.988; 20.830)	World Development Indicators Online database, 2004

Notes: The data cover 99 countries in 2001–2003.

conditional mean of corruption. While mean effects are certainly important, we expand upon such findings using quantile regression. In addition, one of the underlying assumptions for OLS regression is that the error term—and the dependent variable—are normally distributed. To investigate whether this assumption is met, Fig. 1 displays kernel density estimates for the corruption perceptions index, separately by economic freedom below and above the median in our sample. Neither conditional distribution seems Gaussian. For high economic freedom, the distribution is bimodal, and low economic freedom yields an asymmetric density function skewed to the left.[4] While large samples alleviate these concerns somewhat, sample sizes within this literature suggest the distribution is a concern. OLS estimation can yield unreliable estimates, but quantile regression does not require a normally distributed error term.

Using this technique, we are able to carefully examine the determinants of corruption throughout the conditional distribution, with particular focus on the most and least corrupt nations—those that are arguably of the most interest. Quantile regression, developed in Koenker and Bassett (1978), yields parameter estimates at multiple points in the conditional distribution of the dependent variable.[5] A particular θth regression quantile is the solution to

$$\min_{\beta\in R^K}\left[\sum_{i\in\{i:y_i\geq x_i'\beta\}}\theta|y_i-x_i'\beta| + \sum_{i\in\{i:y_i<x_i'\beta\}}(1-\theta)|y_i-x_i'\beta|\right] \quad (2)$$

where $\theta\in(0,1)$. In contrast to OLS which minimizes the sum of squared residuals, here we minimize the weighted sum of absolute deviations, obtaining e.g., the 10th or 75th quantiles by appropriately weighting the residuals. The conditional quantile of y_i given x_i is

$$Q_y(\theta|x_i)=x_i'\beta_\theta \quad (3)$$

where unique slope parameters are estimated for each θ quantile of interest. This formulation is analogous to OLS, $E(y|x)=x'\beta$, though OLS slope parameters are estimated only at the mean of the conditional distribution of the dependent variable.[6] For the model in Eq. (3), the dependent variable y is the corruption perceptions index, and the vector x contains per capita GDP, democracy, economic freedom, urbanization, government consumption, and a constant term.

The data for this study include cross-sectional observations on 99 countries from 2001–2003. The dependent variable is the corruption perceptions index (CPI) produced by the Transparency International. This index provides a comparable set of data to measure corruption levels across counties.[7] Details about the variables, data sources, and summary statistics are provided in Table 1.

3. Results

The results are presented in Table 2 and Fig. 2, where we include both OLS and quantile regression estimates that were generated using STATA. OLS estimates provide a baseline of mean effects, and we compare these to estimates for separate quantiles in the conditional distribution of corruption. To interpret the signs of the coefficients, one should note that smaller values of the dependent variable denote less corruption (see Table 1).[8] In order to obtain heteroskedasticity-robust estimates, we report robust standard errors for OLS estimates and quantile regression results from 10,000 bootstrapping repetitions.

Results from a simple model with per capita GDP, democracy, and economic freedom are presented in Fig. 2. The effect of economic prosperity is consistent throughout the conditional distribution of corruption, so we do not report those estimates in this figure. On the other hand, the effect of democracy declines within higher levels of corruption. That is, democracy causes the most corrupt to be less so, thereby lessening the dispersion of corruption across nations. Fig. 2 also presents the effect of economic freedom on corruption. In this model we see that economic freedom leads to lower corruption, but the effect is strongest among the least corrupt nations. Since the parameter estimates increase

[4] Non-parametric examinations of the distribution of the corruption-perceptions index have found that it is not unimodal (see McAdam and Rummel, 2004).

[5] A helpful introduction to quantile regression appears in Koenker and Hallock (2001). Applications of this methodology are increasingly common, see for example: Hartog et al. (2001) and Görg and Strobl (2002).

[6] Note that quantile regressions include the entire sample, not separate subsamples obtained by truncating the dependent variable into different ranges.

[7] The corruption perceptions index technically measures the absence of corruption, with higher values denoting clean nations. Following the practice in many studies that use this index, we rescaled it so that larger values denote more corrupt nations. This transformation enables easier interpretations of results.

[8] One should bear in mind, however, that we are unable to distinguish between the qualitative natures of corruption. It is possible that the degree of petty versus grand corruption is different in the most corrupt nations than that in the least corrupt countries.

Table 2
Determinants of corruption: OLS versus quantile regressions.

	OLS	Q 0.1	Q 0.25	Q 0.5	Q 0.75	Q 0.9
Specification 1						
Economic prosperity	−0.0001***	−0.0002***	−0.0002***	−0.0001***	−0.0001***	−0.0001***
	(7.21)	(3.65)	(5.53)	(5.79)	(6.06)	(4.67)
Democracy	−0.041	−0.009	0.006	−0.017	−0.049	−0.034
	(1.10)	(0.12)	(0.13)	(0.30)	(1.00)	(0.48)
Economic freedom	−0.475**	−0.440	−0.580	−0.288	−0.297	−0.438
	(2.02)	(1.00)	(1.52)	(0.88)	(1.00)	(1.09)
Urbanization	−0.029***	−0.026**	−0.019	−0.023***	−0.025***	−0.028**
	(4.63)	(2.06)	(1.44)	(3.03)	(2.74)	(2.37)
F-statistic (*p*-value)[a]	66.90 (0.00)	35.85 (0.00)	46.66 (0.00)	22.74 (0.00)	32.37 (0.00)	30.45 (0.00)
Specification 2						
Economic prosperity	−0.0001***	−0.0002***	−0.0002***	−0.0001***	−0.0001***	−0.0001***
	(7.95)	(6.01)	(5.47)	(6.81)	(6.64)	(4.96)
Democracy	−0.088**	−0.007	−0.021	−0.106**	−0.086**	−0.193**
	(2.04)	(0.11)	(0.39)	(2.49)	(2.08)	(2.15)
Government size	−0.083***	−0.063**	−0.095***	−0.109***	−0.081**	−0.057
	(3.62)	(2.22)	(3.38)	(4.74)	(2.08)	(1.31)
F-statistic (*p*-value)[a]	96.64 (0.00)	18.55 (0.00)	35.25 (0.00)	76.82 (0.00)	39.67 (0.00)	40.81 (0.00)
Specification 3						
Economic prosperity	−0.0001***	−0.0001***	−0.0001***	−0.0001***	−0.0001***	−0.0001***
	(7.41)	(4.08)	(4.51)	(6.16)	(4.43)	(5.05)
Democracy	−0.075**	−0.024	−0.042	−0.106**	−0.084**	−0.072
	(2.02)	(0.38)	(0.77)	(2.06)	(2.29)	(0.94)
Government size	−0.060**	−0.076**	−0.072**	−0.086***	−0.043	0.050
	(2.44)	(2.36)	(2.15)	(2.84)	(1.03)	(1.18)
Urbanization	−0.027***	−0.030**	0.022**	−0.019**	−0.024**	−0.024*
	(3.78)	(2.43)	(2.49)	(2.42)	(2.16)	(1.91)
F-Statistic (*p*-value)[a]	88.20 (0.00)	34.45 (0.00)	34.72 (0.00)	60.67 (0.00)	29.09 (0.00)	39.30 (0.00)

Notes: Dependent variable is corruption perceptions index (*Corruption* in Table 1).
Regressions include 99 observations of country-level data.
Quantile regression results are based upon 10,000 bootstrapping repetitions.
Lower quantiles (e.g., Q 0.1) signify less corrupt nations.
All regressions include an intercept term but the results are not reported to conserve space.
Absolute *t*-statistics appear in parentheses. ***, **, and * denote significance at the 0.01, 0.05, and 0.10 levels.
[a] *F*-statistic and associated *p*-values are reported for the test of all slope parameters jointly equal to zero.

monotonically through the quantiles, economic freedom widens the distribution of corruption across countries. Put differently, economic freedom may explain why less corrupt countries are less corrupt, but it may exacerbate corruption issues in the most corrupt nations.

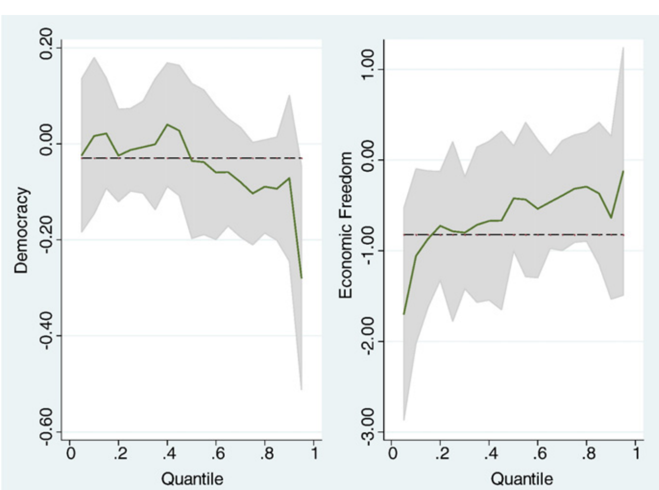

Fig. 2. Effects of democracy and economic Freedom: OLS versus quantile regressions. *Notes:* Results from a regression of corruption perceptions on per capita GDP, democracy, economic freedom, and a constant term. The dashed line represents the OLS parameter estimate. The dark shaded area represents the 95% confidence interval for the quantile regression parameter estimates.

Three different specifications of model (3) are presented in Table 2, with OLS results and quantile regression estimates for five separate quantiles. These models have consistently good fit; the hypothesis that slope parameters are jointly equal to zero is always rejected at the 1% level, as seen in the reported *F*-statistics.

In the OLS regressions, greater prosperity in a nation lowers corruption in all cases. This finding is consistent with numerous studies of the causes of corruption (see Serra, 2006). Furthermore, both greater economic freedom and greater political freedom reduce corrupt practices (see Goel and Nelson, 2005). A larger government seems more devoted to strengthening checks and balances as it lowers corruption.[9] More urbanized nations, other things being equal, are also associated with fewer corrupt practices, suggesting that either there is more effective government oversight in urban communities or potential bribe takers and bribe givers are somewhat deterred by peer pressure (the "demonstration effect") in urban areas.

Quantile regression results reveal that the effect of economic prosperity (per capita GDP) is consistent across specifications and across quantiles; greater prosperity leads to less corruption. Furthermore, the magnitude of the effect of economic prosperity is similar across different specifications.

The effect of democracy is nearly always negative, causing lower indexes; i.e., democracy is correlated with less corruption. However,

[9] Increased government size has been shown to *increase* corruption in some individual nations, notably the United States (Goel and Nelson, 1998).

the effect of democracy is not consistently significant. OLS estimates suggest democracy matters quite a bit in lowering corruption, but quantile regression results do not uniformly confirm that. Specifically, controlling for government consumption, democracy substantially lowers corruption, but only within the top-half of the conditional distribution (among the more/most corrupt). As democratic institutions take hold in the most corrupt nations, ceteris paribus, they experience a decrease in corruption.

Controlling for urbanization, the effect of economic freedom is always negative; within nations that are similarly urban, more freedom causes less corruption. This effect appears significant in OLS, but not throughout the quantiles presented.[10] Our finding that economic freedom is not consistently statistically significant across various quantiles calls into question the notion that removal of regulations and promotion of free trade would uniformly reduce corruption. This lack of consistency persists when an alternate measure of corruption is employed (Appendix B).

Greater urbanization lowers corruption, but not consistently throughout the conditional distribution. The effect seems bimodal, with more negative and more significant effects in the tails—among the most and least corrupt. Other things being the same, bribe takers and bribe givers seem somewhat deterred in nations with greater urban concentrations, either via increased government oversight or via the social stigma attached with corrupt acts.

Government consumption also reduces corruption perceptions, with the strongest effects at the median/mean of the conditional distribution. The effect of government size is insignificant in the uppermost quantile (see specifications 2 and 3 in Table 2), suggesting that within the most corrupt nations, increasing the size of the government does not reduce corruption. This is a new revelation to the literature: perhaps there is a minimum threshold level of government machinery required to effectively check corruption. The concluding section follows.

4. Concluding remarks

Numerous factors have been considered to assess the causes of corruption. The economics literature on corruption is slowly coming to agreement on some issues, although many issues remain unresolved. For instance, in her review of the extant literature, Serra (2006) identifies economic prosperity, democracy, and political stability among the important determinants of corrupt activity (also see Jain, 2001; Lambsdorff, 2006). However, the literature has not yet examined the role of the distribution of corruption across nations in explaining the causes of corruption, and we address this issue.

In particular, this paper uses recent cross-sectional data for about one hundred countries to examine the determinants of corruption. While the causes of corruption have drawn economists' interest in recent years, the main contribution of this work is to examine the sensitivity of the determinants to the conditional distribution of corruption across nations. Do the most and least corrupt nations respond similarly to factors that affect corruption? These findings have important implications for whether cross-national organizations should recommend blanket policies for corruption reduction.

Our OLS regression results support the findings in the literature regarding the significant determinants of corrupt activity. However, quantile regressions reveal the sensitivity of these determinants to the distribution of the corruption index.[11] Greater economic prosperity consistently reduced corruption in all cases, reinforcing the finding in almost every study of corruption determinants. The most significant revelation is with respect to economic freedom.[12] The effect of greater economic freedom, while significant in the OLS case, is not statistically significant in any of the quantiles, suggesting that dismantling government restrictions does not reduce corruption as much as previously thought.[13]

In other important differences, our results reveal that the most corrupt nations are less so as they become more democratic. However, among the most corrupt countries, increases in government size do not reduce corruption. This suggests that government machinery fights corruption after a minimum threshold or that larger governments are unable to check corruption in the most severe instances. Perhaps with widely prevalent corruption, the "demand pull" effect of favors induces more government officials to be corrupt, somewhat negating the enforcement efforts.

The results imply that economic development can have the useful byproduct of corruption reduction. As economic development leads to greater prosperity, corruption seems to fall, irrespective of the current level of corruption in a nation. While the literature has consistently demonstrated that greater prosperity results in lower corruption, our findings reveal that this finding is robust across the distribution of corruption.[14] Another key implication of our findings is that blanket corruption control policies are unlikely to succeed equally across countries with different corruption levels. For instance, greater democracy is likely more effective in the conditionally most corrupt nations, while a larger government has no clear benefit for those nations. To be effective, corruption control initiatives should be tailored differently across the most corrupt and least corrupt nations, especially with respect to the role of democracy and government size.

In closing, we suggest some directions for extending this line of research. One could obtain a better handle on the causes of corruption as better quantitative measures of some of the underlying institutional factors that affect corruption are developed. Furthermore, the issue of possible simultaneity between corruption and some of its determinants, while recognized in the literature, needs to be resolved.

[10] Perhaps outliers could explain why the mean effect (OLS) is significant, but the median effect ($q=0.5$) is not. Nevertheless, the extant literature has predominantly employed OLS estimation to estimate the causes of corruption.

[11] While this study focuses on the conditional distribution of the dependent variable, the effects of some of the covariates might also differ through their distributions. For instance, Graeff and Mehlkop (2003) find that the effect of economic freedom on corruption differs across rich and poor nations. Given the possible non-linearities between corruption and some of its causes, it is possible that the effect of economic freedom (and possibly other factors as well) differs across corrupt and clean countries.

[12] The effects of economic freedom and political freedom on corruption have been found to be significant in other cross-country studies of the determinants of corruption (see Chowdhury, 2004; Goel and Nelson, 2005; May et al., 2002). Appendix A Table A1 provides additional estimates of specification 1 using an index of regulatory quality from the World Bank to alternately measure economic freedom. Compared to the results reported in Table 2, here we see that regulatory quality exhibits a stronger effect in curbing corruption, particularly among the most corrupt nations.

[13] These findings should be interpreted noting that the dependent variable captures perceptions about corruption, not actual corruption. In addition, the corruption perceptions index is not available for all nations. To test the robustness of our findings, we provide estimates of specification 1 from Table 2 using an alternate index of corruption perceptions (or lack of corruption control) as reported by the World Bank. Appendix B Table B1 lists the corresponding results, and we see similar, but sometimes more significant, parameter estimates. For example, the negative effect of Economic Freedom persists throughout the lower half of the conditional distribution of corruption.

[14] It should be pointed out, however, that while we control for the distribution of the dependent variable (i.e., corruption), the distribution(s) of the independent variable(s) might have significant variation(s) that might crucially affect the results. Such an exercise is beyond the scope of the present study.

Appendix A. An alternate measure of economic freedom

This appendix examines the robustness of our findings to a change in the measure of economic freedom. To that effect, we replace Economic Freedom in Table 2 with an index of regulatory quality from the World Bank (for 2003). Regulatory Quality is defined as, "the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development", (http://siteresources.worldbank.org/INTWBIGOVANTCOR/Resources/1740479-1150402582357/2661829-1158008871017/booklet_decade_of_measuring_governance.pdf).

Table A1
Regulatory quality and corruption.

	OLS	Q 0.1	Q 0.25	Q 0.5	Q 0.75	Q 0.9
Dependent variable: corruption perceptions index						
Economic prosperity	−0.0001***	−0.0001***	−0.0001***	−0.0001***	−0.0001***	−0.0001***
	(5.21)	(3.35)	(2.94)	(3.86)	(3.70)	(4.43)
Democracy	0.086***	0.108	0.053***	0.132***	0.092*	0.065
	(3.15)	(1.40)	(1.13)	(3.31)	(1.94)	(1.20)
Regulatory quality	−1.370***	−0.927	−1.321***	−1.649***	−1.642***	−1.024***
	(4.62)	(1.55)	(2.67)	(5.00)	(5.12)	(3.62)
Urbanization	−0.016**	−0.013	−0.013	−0.009	−0.012	−0.016**
	(0.01)	(0.91)	(1.22)	(1.14)	(0.01)	(2.25)
F-statistic (*p*-value)[a]	102.77 (0.0)	31.49 (0.0)	66.33 (0.0)	66.66 (0.0)	63.4 (0.0)	35.76 (0.0)

Notes: Dependent variable is corruption perceptions index (*Corruption* in Table 1).
Regressions include 98 observations of country-level data.
Quantile regression results are based upon 10,000 bootstrapping repetitions.
Lower quantiles (e.g., Q 0.1) signify less corrupt nations.
All regressions include an intercept term but the results are not reported to conserve space.
Absolute *t*-statistics appear in parentheses. ***, **, and * denote significance at the 0.01, 0.05, and 0.10 levels.
[a] *F*-statistic and associated *p*-values are reported for the test of all slope parameters jointly equal to zero.
Note: The Regulatory Quality Index ranged from −2.5 to +2.5 with higher values signifying better regulatory quality (mean = 0.302; SD = 0.92).
Source of Regulatory Quality data: Kaufmann, D., A. Kraay and M. Mastruzzi, 2006, "Governance Matters V: Governance Indicators for 1996–2005", The World Bank, http://web.worldbank.org/WBSITE/EXTERNAL/WBI/EXTWBIGOVANTCOR/0,,contentMDK:21045419~menuPK:1976990~pagePK:64168445~piPK:64168309~theSitePK:1740530,00.html.

Appendix B. An alternate measure of corruption

Appendix B tests the sensitivity of our findings using an alternate measure of the dependent variable—the control of corruption index from the World Bank (for 2003). Corruption is defined as, "the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests", (http://siteresources.worldbank.org/INTWBIGOVANTCOR/Resources/1740479-1150402582357/2661829-1158008871017/booklet_decade_of_measuring_governance.pdf).

Table B1
Determinants of corruption.

	OLS	Q 0.1	Q 0.25	Q 0.5	Q 0.75	Q 0.9
Dependent variable: WB Corruption corruption index						
Economic prosperity	−0.00005***	−0.0001***	−0.0001***	−0.00004***	−0.0001***	−0.00003***
	(6.12)	(4.25)	(5.31)	(5.69)	(4.86)	(2.66)
Democracy	−0.048**	−0.043*	−0.029	−0.032	−0.059*	−0.067
	(2.57)	(1.71)	(1.49)	(0.94)	(1.94)	(1.52)
Economic freedom	−0.293***	−0.422**	−0.363**	−0.316*	−0.107	−0.225
	(2.77)	(2.25)	(2.10)	(1.96)	(0.68)	(1.36)
Urbanization	−0.011***	−0.012***	−0.009**	−0.012***	−0.010**	−0.007*
	(0.00)	(3.06)	(2.46)	(2.91)	(2.62)	(1.68)
F-statistic (*p*-value)[a]	90.54 (0.0)	56.75 (0.0)	60.03 (0.0)	44.68 (0.0)	33.41 (0.0)	16.13 (0.0)

Notes: Regressions include 98 observations of country-level data.
Quantile regression results are based upon 10,000 bootstrapping repetitions.
Lower quantiles (e.g., Q 0.1) signify less corrupt nations.
All regressions include an intercept term but the results are not reported to conserve space.
Absolute *t*-statistics appear in parentheses. ***, **, and * denote significance at the 0.01, 0.05, and 0.10 levels.
[a] *F*-statistic and associated *p*-values are reported for the test of all slope parameters jointly equal to zero.
Note: The WB Corruption Index was rescaled to be comparable to the index in Table 2. The rescaled WB corruption index ranged from 0 to −5 with larger values denoting more corruption (mean = −2.72; SD = 1.08).
Source of WB Corruption Index: Kaufmann, D., A. Kraay and M. Mastruzzi, 2006, "Governance Matters V: Governance Indicators for 1996–2005", The World Bank, http://web.worldbank.org/WBSITE/EXTERNAL/WBI/EXTWBIGOVANTCOR/0,,contentMDK:21045419~menuPK:1976990~pagePK:64168445~piPK:64168309~theSitePK:1740530,00.html.

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