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ORIGINAL PAPER

Corruption, institutions and regulation

Michael Breen · Robert Gillanders

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Abstract We analyze the effects of corruption and institutional quality on the quality of business regulation. Our key findings indicate that corruption negatively affects the quality of regulation and that general institutional quality is insignificant once corruption is controlled for. These findings hold over a number of specifications which include additional exogenous historical and geographic controls. The findings imply that policy makers can focus on curbing corruption to improve regulation, over wider institutional reform.

Keywords Regulation · Economic policy · Institutional quality · Corruption

1 Introduction

The extent of regulation differs dramatically across countries. In some parts of the world, starting a business and paying taxes are costly and time-consuming exercises that make it difficult for societies to operate efficiently. In other parts, efficient business regulations contribute to economic development and prosperity. Efficient regulation of the business environment should result in fewer bureaucratic procedures or less "red tape". Consequently, well regulated business environments will impose fewer transaction costs on individuals and firms, allowing them to operate more efficiently. It is not only the quantity of red tape that matters, the quality of existing regulation can help to attract investment, as investors often use information on the state of the business environment to judge the expected risk and returns from investment.[1]

[1] For a recent survey of the literature on the effects of business environments on development see Xu (2010).

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There is a substantial debate in economics on the appropriate extent to which government should intervene to regulate economic activity. The consensus among most economists is that governments should regulate to address market failures. However, differences persist over the extent to which market failures are a problem, with many economists arguing that excessive regulation strangles economic development. While the debate over the appropriate extent of regulation is ongoing, several authors have theorised that the key determinants of existing poor regulation and misgovernance, include corruption and poor institutions (Banerjee 1997; Guriev 2004).

We contribute to this literature by examining empirically the deep determinants of the quality of regulation.[2] This is important because the quality of regulation varies significantly across countries. For example, Chad received the lowest position (183) on the World Bank's global index, the ease of doing business. It is very difficult for companies to operate in Chad's regulatory environment: it takes at least 66 days and 11 separate procedures to start a new business. Paying taxes is also very challenging: it takes at least 92 working days to prepare, file, and pay tax. By contrast, in Singapore—which received the highest score on the index in 2012—it takes only three separate procedures and 3 days to start a business. The tax system is also effective—it takes only 10 working days to prepare, file, and pay tax.

While the gap between the top and the bottom of the index is large, there is also interesting variation within the OECD. Among this group of countries New Zealand received the top rank in 2012 followed closely by the United States.[3] Greece was the lowest-ranked OECD member on the index, followed by Italy. Their poor performance within the OECD translates into average performance globally: Italy is ranked at 87 and Greece is ranked at 100 on the global index. In fact, many developing and emerging economies across world have more effective business regulations than Greece and Italy. Clearly, the differences in countries' positions on the index cannot be explained by national income alone. We argue that it is necessary to view a country's existing stock of regulation as a product of its (relatively) recent history of institutional quality and corruption. Our primary objective is to untangle the effects of each of the respective determinants of regulation. The results from our analysis indicate that the level of corruption is the most important determinant of the quality of the business environment, trumping the quality of institutions and a range of other indicators.

The paper proceeds as follows. We first examine the relationship between regulations, institutions, and corruption, discussing how both corruption and institutional quality could explain variation in regulatory outcomes. We then present our methods, data and results. The final section concludes with a discussion of our findings and their relevance.

[2] This is similar in spirit to recent work on the determinants of economic growth and development, such as Hall and Jones (1999), Acemoglu et al. (2001), Rodrik et al. (2004) and Glaeser et al. (2004).

[3] In some previous years New Zealand has received the top overall score on the index.

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2 Motivation

Over the last few years a substantial research programme on the effects of business regulations has produced unambiguous findings by the standards of social science: the quality of regulation matters for a range of outcomes. Several authors have demonstrated the importance of good regulations for economic development and growth (Djankov et al. 2006; Gillanders and Whelan 2010), macroeconomic performance (Loayza et al. 2005), increased productivity and output (Barseghyan 2008; Aghion et al. 2009), entrepreneurism (Klapper et al. 2006), and trade (Freund and Bolaky 2008). Considering the far-reaching effect of business regulations on performance, it is important to investigate why some countries possess effective regulation while others are buried under excessive red tape. Among the works that have considered this question, Banerjee (1997) argues that agency problems within government can cause poor regulation and that such problems are compounded at low levels of development and bureaucratic quality.

In this section, we discuss the potential effects of both corruption and institutional quality on the quality of regulation in order to ground our empirical strategy in the existing theoretical literature. According to North (1990), institutions are "the rules of the game in a society". Corruption, on the other hand, is defined by the World Bank as "the abuse of public power for private benefit". In other words, corruption requires a criminal intent to subvert the rules of the game. From these simple definitions, it appears that institutions and corruption are distinct issues.[4] One is agent-centred and the other is based on the most enduring aspects of society. We recognise, however, that in some societies corruption has become so deeply embedded in social life that it can be viewed as a set of social norms that co-exist alongside formal institutions. Nevertheless, by definition, corruption is never a legitimate act, no matter how widely tolerated. Consequently, it is best viewed as a strategy rather than a set of rules. And, as North (1990, 5) argues, it is necessary to separate the rules of the game from players' strategies in order to conceptualize institutions.

2.1 Corruption and regulation

Corruption has been identified as a determinant of capital flows (Lambsdorff 2003), the effectiveness of the legal system (Herzfeld and Weiss 2003), and income inequality and poverty (Gupta et al. 2002). Apart from having a lasting and devastating effect on society, it can also undermine the quality of regulation through several channels. The first channel is when officials reduce the quality of regulation in order to increase the number of opportunities to receive bribes in the future.[5] It could be argued, however, that this channel is too indirect. An official acting like this might not eventually receive a bribe for reducing the quality of regulation, even if one was expected. In

[4] Although this simple definition is useful, there is an extensive literature on the problem of how to define corruption. For example see Bardhan (1997).

[5] Andvig and Moene (1990) present a model that illustrates the relationship between the frequency of corruption and its profitability.

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this way, a good deal of corruption could easily be conflated with a poor institutional environment, one which causes officials to reduce the quality of regulation through inefficiency or lack of resources. Nevertheless, an official who reduces the quality of regulation in anticipation of being offered a bribe still fits our definition of corruption.

There is also a second channel—one that doesn't overlap as much with the quality of institutions. It is relevant when an official reduces the quality of regulation after receiving a bribe. For example, a monopolist might bribe a government official to make it more difficult for its competitors to operate in the market. A monopolist or a cartel might also use corruption to prevent new competitors from emerging, by bribing officials to make it difficult for new firms to enter the market. Once a government official accepts a bribe and subsequently reduces the quality of regulation, the link between corruption and the quality of regulation is more apparent and overlaps less with the quality of institutions.

We recognise, however, that the question of how corruption affects regulation is not always so clear cut. Some authors have speculated that corruption could "grease the wheels" (Huntington 1968). Instead of harming economic activity, individuals and businesses are able to circumvent inefficient regulations through bribes, hastening the process of starting a business or registering property. Even historically, some industries have flourished amid widespread corruption. Recent empirical work is mixed regarding this hypothesis. Aidt (2009) finds that corruption does not grease the wheels. Rather, expensive red tape often exists precisely to extract rents. Furthermore, corruption's effects at the macroeconomic level cannot be gauged from isolated instances at the microeconomic level. Recent work by Guriev (2004) also supports this view. He finds that although some types of corruption can reduce regulation, making it easier for business to operate, the equilibrium level of regulation remains above the social optimum. On the other hand, Méon and Weill (2010) support the "grease the wheels" hypothesis, finding that corruption is less detrimental to efficiency in countries where institutions are less effective. Dreher and Gassebner (2011) also support this hypothesis, finding evidence that corruption facilitates firm entry in highly regulated economies.

While our work is complementary to this literature, we do not make any claims about the growth effects of corruption or regulation. A country might grow rapidly under poor regulations precisely because of corruption and our argument that corruption can reduce the quality of regulation would still hold. One relevant lesson from this literature, for our study at least, is that we cannot rule out the possibility that corruption sometimes improves regulation. However, we think it is unlikely because the cost of bribing officials to replace poor regulation with better regulation seems higher than using corrupt payments to degrade, preserve, or circumvent existing regulation. Corrupt officials will hold incentives to resist this as they will lose payments in the future if regulation improves.

2.2 Institutional quality and regulation

The impact of our second variable of interest—the quality of a country's institutions—is less controversial. Institutions have been identified as a leading determinant of

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economic development (North 1990; Rodrik et al. 2004).[6] Good institutions enforce contracts and protect citizens against expropriation. It is plausible that they should also provide a more stable business environment as regulations are more frequently and effectively enforced. As well as producing and enforcing regulations, institutions perform distributive, representative, and accountability functions. When performing these functions well, good institutions could foster more accountability among the government agencies that design and enforce regulations, resulting in more socially optimal business regulations. Furthermore, in the presence of good institutions, interest groups may find it more difficult to lobby for regulations (or deregulation) that benefits a narrow segment of society at the expense of the overall business environment.[7]

Good institutions could also be able to resist other processes that damage regulation like regulatory capture. Pioneered in Stigler (1971), this describes a type of government failure where special interest groups come to control the state institutions that design and enforce regulations. According to Laffont and Tirole (1991), interest groups can influence regulation through bribes or the offer of future employment to the officials and agents who enforce and design regulations. Furthermore, business interests can cultivate personal relationships with government officials and can withhold public criticism of their activities in exchange for favourable treatment (Laffont and Tirole 1991, 1091). Finally, good institutions may also be able to resist pressure from interest groups that lobby politicians and bureaucrats to compromise the quality of regulation through indirect transfers such as political campaign contributions (Austen-Smith 1987).

Several previous authors have investigated the effect of institutions on regulation and have proposed that corruption and regulation are jointly determined by the quality of institutions and that these factors in turn affect important economic outcomes like the level of a country's GDP. In this approach, which has been termed the "hierarchy of institutions hypothesis", corruption is viewed as an "intermediate product" influenced by institutions and influencing economic outcomes.[8] Aidt and Dutta (2008) present a theoretical model that formalises this logic. When examining the effect of corruption on growth, Aidt et al. (2008) find that the quality of political institutions plays an important role. Méndez and Sepúlveda (2006) find that corruption is beneficial for economic growth at low levels of incidence and detrimental at high levels of incidence. Our argument that corruption and institutional quality jointly determine the quality of regulation is not incompatible with some of these explanations. On the one hand, high levels of corruption could reduce the quality of regulation when officials change regulation in return for a corrupt payment or in anticipation of receiving a corrupt payment in the future. On the other hand, there are good reasons to believe that strong institutions improve the quality of regulation, both independently of corruption and potentially through their effect on corruption.

[6] There is still an ongoing debate over their significance in terms of growth and development, see Glaeser et al. (2004) and Gillanders and Whelan (2010).

[7] Djankov et al. (2002) find that countries with larger, less democratic, and more interventionist governments regulate business entry more heavily, supporting the view that the quality of institutions determine the level of regulation.

[8] See Persson (2004) and Eicher and Leukert (2009).

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In order to support this argument with evidence we must address an important issue: the high likelihood of reverse causality. Corruption is potentially a cause and effect of the quality of regulation. In fact, Tanzi (1998) and Mauro (1998) show that regulation and taxation systems strongly influence corruption, while Goel and Nelson (2010) find that the size and scope of government determines the level of corruption.[9] Therefore, demonstrating causality is challenging but necessary. We address this challenge by proposing instruments that allow us to sort out the respective determinants of regulation.

3 Econometric approach

The above arguments suggest that we wish to estimate models of the following form:

$$REG_i = \alpha + \beta_1 INST_i + \beta_2 CORR_i + \Gamma X_i + \epsilon_i \quad (1)$$

where REG_i is a measure of country i's regulatory quality, α is a constant, $INST_i$ is measure of country i's institutional quality, $CORR_i$ is a measure of country i's corruption, X_i contains exogenous controls and ϵ_i is an error term of the usual type.

There is a high likelihood of reverse causality in Eq. 1. Countries with better regulation may have closed the door on a lot of corruption. More business friendly economic policies may also have a direct or indirect effect on institutional quality through the creation of an efficient class of administrators or through a larger middle class, for example. Thus we utilise the following first stage regressions:

$$INST_i = \kappa + \Psi_1 DIST_i + \Psi_2 FRAC_i + \Psi_3 NSTAT_i + \Theta X_i + \mu_i \quad (2)$$

$$CORR_i = \eta + \Omega_1 DIST_i + \Omega_2 FRAC_i + \Omega_3 NSTAT_i + \Phi X_i + \nu_i \quad (3)$$

where $DIST_i$ is country i's distance from the equator, $FRAC_i$ is the degree of ethno-linguistic fractionalisation in country i and $NSTAT_i$ is an indicator for how "new" the state is.

Each of these should serve as a good instrument for both institutional quality and corruption in Eq. 1. Distance from the equator is commonly used as an instrument for institutional quality, the idea being that it is a good proxy for exposure to Western European influence.[10] Ethno-linguistic fractionalisation should influence both institutions and corruption through mechanisms such as the sense of nationhood and the prevalence of inter-group rivalry. Finally, the age of the state should influence institutional quality and corruption through many channels such as the time available to put

[9] Pellegrini and Gerlagh (2008) provide a comprehensive overview of the causes of corruption. Furthermore, Goel and Nelson (2011) find that greater educational attainment lowers corruption and judicial employment adds to corruption. And finally, Dincer et al. (2010) illustrate the negative relationship between corruption and the decentralization of the powers to tax and spend.

[10] For example Hall and Jones (1999) and Rodrik et al. (2004).

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formal rules of conduct in place and for the machinery of state to emerge.[11] We do not believe that these instruments will have any role to play in determining business policy outside of their impact on the endogenous variables in Eq. 1.[12]

4 Data

To measure business regulations we make use of data from the World Bank's *doing business* project. From its database we use a variable that captures the overall ease of doing business within a country—the ease of doing business rank. This rank was compiled from indicators that come from objective surveys which capture the difficulty that a hypothetical standardised company would face in starting a business, dealing with construction permits, paying taxes, employing workers, trading across borders, registering property, enforcing contracts, and obtaining credit.[13] The surveys also capture other aspects of the regulatory environment, namely the degree to which investors are protected and the recovery rate from business closure.

This variable covers a far greater range of economic activity than other proxies for economic policy such as openness to international trade. It also has the advantage over other policy variables in that governments have direct control over business regulation. Thus one could read our work more generally as examining the determinants of economic policy with business policies serving as a proxy for general economic policy. We use the most recent ranking which was created from data collected over the period 2008–2009.

Some of the weaknesses of the ease of doing business rank should be acknowledged here. First, the underlying survey more closely reflects operations in the economy's largest city, therefore; it may not be representative of regulation in other parts of a country. Second, the survey is biased towards limited liability companies and may not reflect the experience of other corporate entitles. Finally, the index tends to assume that firms have full information on regulation, which is not always the case. While few variables are free of measurement error, the World Bank's Independent Evaluation Group conducted a study of the doing business indicators and found that on the whole, the indicators were objective and reliable although some qualifications were identified. Given the breath and scope of the indicators, objective third party evaluations,

[11] Following Acemoglu et al. (2001) we also employed settler mortality as an additional instrument. This resulted in a much smaller sample of 57 countries. The instrument also performs poorly as it does not pass conventional tests of robustness; however, our core result remains unchanged.

[12] There is a clear difference between a state's institutional framework (the machinery of state) and it's policy outcomes (very loosely, an output of that machinery). While a state's age may affect the former, it is unlikely to affect the latter directly.

[13] Since we began this work, the ease of employing workers component has come under revision by the World Bank and is, for the moment, no longer included in their calculations for overall ease of doing business. We find no meaningful difference between our results which include this component and those which exclude it and so we opt to leave it in. The two rankings are correlated to the degree of 0.993. The main difference is that institutional quality is significant at the 10 % level in our many of our specifications when the ease of employing workers is excluded from the overall ranking and in one case (where we include legal origin controls) at 5 %. The World Bank's discussion of the need for revisions can be found at http://www.doingbusiness.org/methodology/employing-workers.

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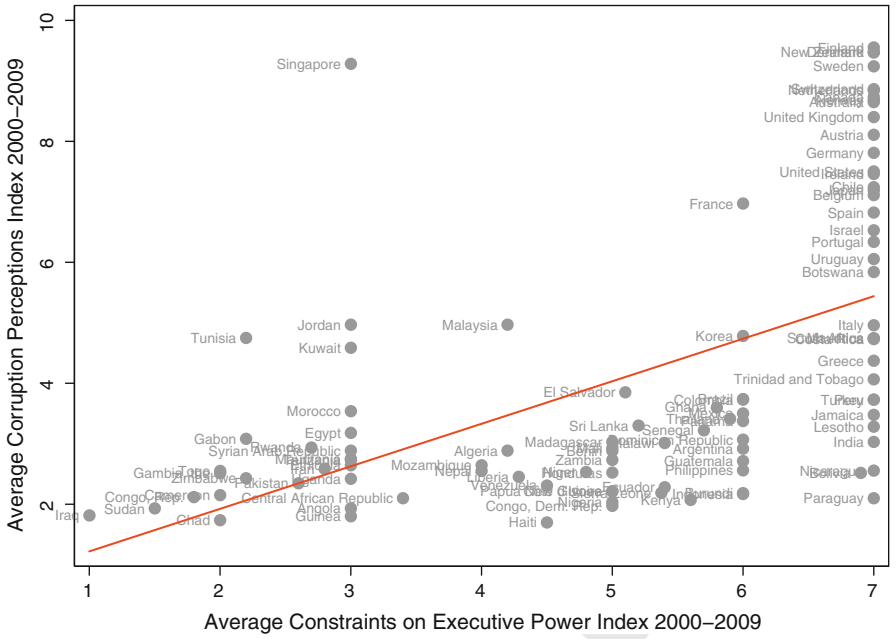

Fig. 1

and the lack of comprehensive cross-country measures of regulation, we believe that the doing business rank is the best available measure of regulation.

As a proxy for the quality of a country's institutions we use a variable measuring the constraints on executive power from the Polity IV dataset averaged over the period 2000–2009.

This variable measures "the extent of institutional constraints on the decision-making powers of the chief executive, whether an individual or a collective executive" (Marshall and Jaggers 2008). The variable captures the degree of checks and balances on a seven point scale from unlimited executive authority to executive parity of subordination. Glaeser et al. (2004) argue that this a better measure of the quality of a country's institutions than some other commonly used measures. Previous authors have employed variables that measure expropriation risk or the rule of law. According to Glaeser et al., executive constraints is less prone to measure outcomes (such as corruption).[14] Figure 1 shows that there is a relationship between the quality of business regulation and our preferred measure of institutional quality, though it is not a very strong one. It seems it is possible to have good institutions and a difficult business environment. As a robustness check, we employ the Rule of Law variable from the World Bank's Worldwide Governance Indicators (WGI) project as an alternative measure of institutional quality. All the WGI indicators we use take values between −2.5 and +2.5.

[14] Though they also show that it is not a perfect measure either.

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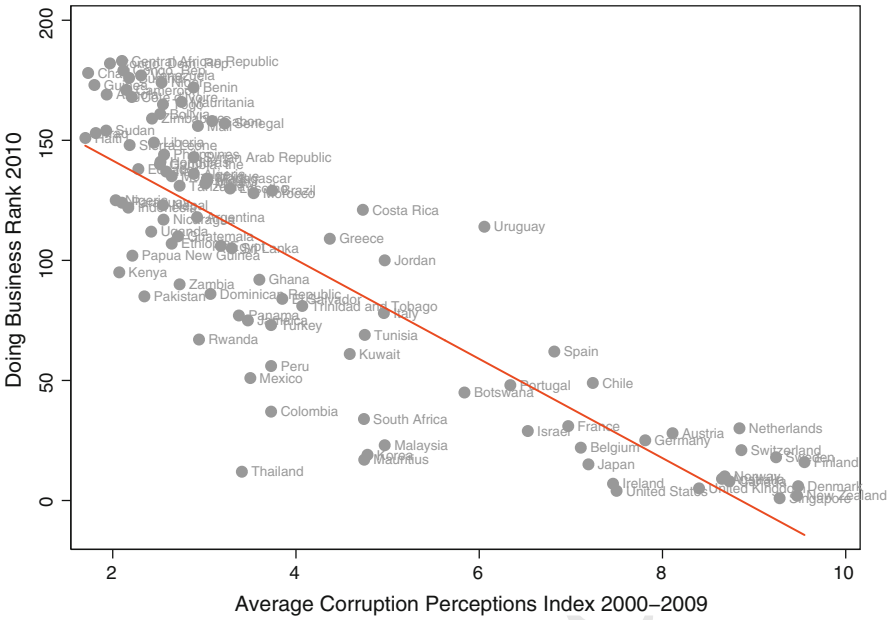

Fig. 2

For our measure of corruption we use Transparency International's corruption perceptions index. This index measures the "perceived level of public-sector corruption in 180 countries and territories around the world".[15] We again average this over the period 2000–2009. We employ the World Bank's WGI Control of Corruption variable as an alternative measure. It has been argued that the Corruption Perceptions Index and WGI Control of Corruption variables are the best measures of corruption currently available, outperforming expert opinion surveys (Razafindrakoto and Roubaud 2010). Nonetheless, it is important to acknowledge some of their limitations, namely the likely gap between perceptions of corruption and its objective reality. Figure 2 plots doing business rank against the Corruption Perceptions Index. We observe a more robust relationship than in Fig. 1. Countries with high levels of corruption (low scores) tend to have worse business policies.

We have already argued above that corruption and institutional quality are conceptually distinct. The econometric issue is whether the correlation between the two is too high. If so, this multicollinearity will mean that our regressions cannot isolate the effects that we are interested in. In practice, the correlation between our preferred measures is 0.55 and, as illustrated in Fig. 3, there are many countries with high levels of corruption and good institutions, though the reverse is not as common. Countries such as India, Italy, Paraguay and Singapore seem to provide us with sufficient variation. A promising avenue for further research would be to investigate the dynamics of the relationship between corruption, institutional quality and regulatory quality and

[15] http://www.transparency.org/policy_research/surveys_indices/cpi/2009.

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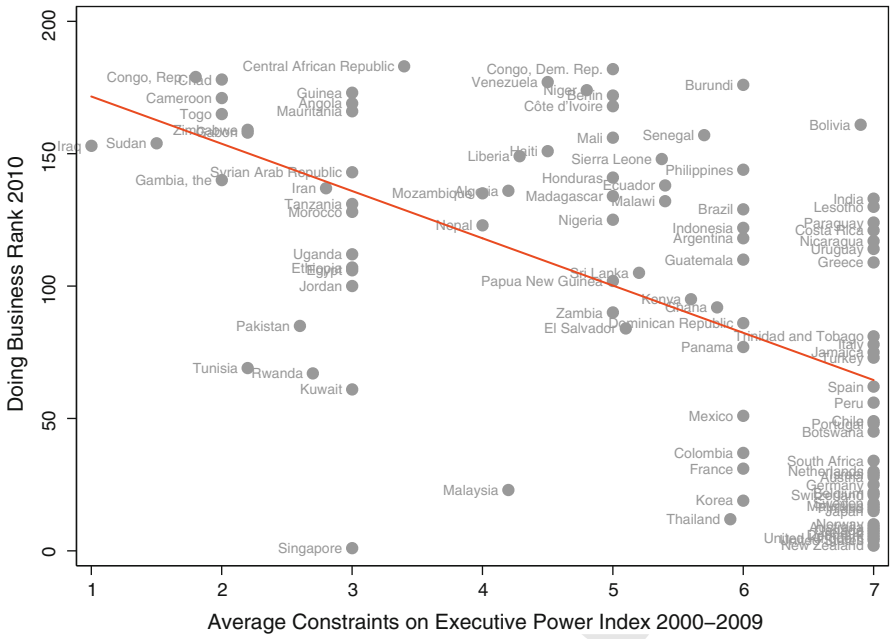

Fig. 3

why all three factors can occur in some situations and not others. When sufficient data are available on these concepts, it will be possible to utilize long t panel data methods to explore these relationships.

Our data covers 100 countries. Figures 1, 2 and 3 show that the 100 countries in our sample include both rich and poor countires from across the spectrum of institutional quality, prevalence of corruption, and ease of doing business. All additional variables are defined in Appendix A.

5 Determinants of ease of doing business

5.1 Main specifications

We begin with the simplest specification of our model which uses our preferred measures of institutions and corruption and no additional variables. Table 1 presents the results. The first three columns of Panel A are simple OLS estimates and are likely to be contaminated by endogeneity. Nevertheless, they do suggest that there is some relationship between our regressors and the ease of doing business. All coefficients are negatively signed as one would expect if better institutional and corruption scores lead to a better ranking. It is also worth noting that adding institutional quality to a regression that includes corruption (i.e. the move from Column 2 to 3) barely increases the R^2. This indicates that corruption may be a more important factor.

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Table 1 Key determinants of ease of doing business rank

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	OLS	OLS	IV	IV	IV
Panel A: main specifications						
Constant	189.481*** (13.012)	182.878*** (5.763)	199.124*** (8.063)	259.088*** (26.035)	182.780*** (8.124)	209.593*** (19.662)
Constraints on executive power	−17.852*** (2.408)		−4.747** (1.873)	−31.258*** (4.589)		−8.868 (6.276)
Corruption perceptions index		−20.652*** (0.987)	−18.637*** (1.237)		−20.629*** (1.554)	−16.015*** (3.733)
R^2	0.32	0.71	0.72			
Over-ID test P value				0.02	0.31	0.64
Dependent variable			Constraints on executive power			Corruption perceptions index
Panel B: first stage regressions						
Constant			5.653*** (0.402)			2.541*** (0.529)
Distance to equator			0.025*** (0.009)			0.093*** (0.012)
Ethno-linguistic fractionalisation			−0.004 (0.006)			−0.002 (0.006)
New state			−0.779*** (0.177)			−0.347** (0.167)
Adjusted R^2			0.33			0.55
F statistic			27.27			47.91

The dependent variable in Panel A is the ease of doing business rank 2010. In Panel A, columns (1), (2) and (3) contain OLS estimates and columns (4), (5) and (6) contain IV estimates. Robust standard errors in parentheses. $N = 100$

*, **and *** Significance at the 10, 5 and 1 % levels, respectively

Columns 4, 5 and 6 present our IV estimates. In most cases, our regressions pass the test of over-identifying restrictions—only when we exclude corruption in Column 4 do we see a significant test statistic. This indicates that some of the instruments may be operating on the ease of doing business outside of their effect on institutional quality. Given that we pass the test once we include corruption, we can take this as initial evidence that corruption plays a role in determining the ease of doing business.

We can see from Panel B that the first stage fits are good enough for us to dismiss concerns about weak instruments. These first stage regressions are interesting in their own right. As one would expect given the arguments underlying the use of distance from the equator as an instrument (and as others have found), countries with climes more suited to European colonies tend to have better institutions and lower levels of (perceived) corruption. Conversely, being a relatively new state has a deleterious impact on institutional quality and the prevalence of corruption. It is interesting that ethno-linguistic fractionalisation is insignificant in both first stage regressions—

Journal: 10101 Article No.: 0111 TYPESET DISK LE CP Disp.:2012/6/16 Pages: 23 Layout: Small-X

corruption does not seem to be more of a problem in more fragmented societies, nor does institutional quality seem to be lower.

The IV results follow a very similar pattern to that observed in the OLS results. Institutions play a significant role in determining the quality of business regulation when corruption is excluded. However, once corruption enters the specification, institutions are insignificant. This suggests that it is not the "rules of the game" that matter but the degree to which these rules are broken. The magnitude of the corruption coefficient tells us that each step on the Corruption Perceptions Index tends to be worth approximately sixteen places in the *doing business* rankings.[16]

This has a clear policy implication. If institutional quality in general is not a factor, then to reform the ease of doing business it is sufficient to tackle "cheaters" in a series of targeted reforms rather than the very difficult task of wholesale institutional reform. That is, it is possible to have a country with high values on the ease of doing business index and poor institutions as long as the degree to which the rules are broken is curbed.

Of course, we are not claiming that institutional quality is unimportant. Good institutions are probably desirable for their own sake. Also, institutional quality may play a role in reducing corruption levels. Indeed, as is illustrated in Fig. 3, there does appear to be some association between low corruption and good institutions. Previous empirical research has shown that variation in political institutions strongly influences the prevalence of corruption.[17] We will not pursue this any further here as it is an important question in its own right. Our results merely claim that once one controls for corruption levels, institutional quality is irrelevant with regards to the quality of regulation.[18]

5.2 Robustness

To see if this interesting result is robust to competing explanations and *omitted variables*, we must introduce some exogenous controls. Before we do so, it is prudent to examine whether our results are robust to alternative measures of institutional quality and corruption. This is particularly necessary with regards to institutions as Figs. 1 and 3 show that a large proportion of our sample (35 %) achieve a perfect constraints on executive power score.

Table 2 uses the World Bank's Rule of Law (RL) and Control of Corruption (CC) measures as alternatives to our preferred measures. Both variables take values between −2.5 and +2.5 and we use the 2008 data.[19] Columns 1 and 2 of Table 2 substitute these in one at a time while Column 3 uses both simultaneously. Using RL as an alternative

[16] The size of the estimated coefficients on corruption are very similar in our OLS and 2SLS estimates which suggests that reverse causality is not a major concern in terms of corruption and regulation. This lends some support to the OLS results of Aghion et al. (2010), though they examine the impact of *distrust* on regulatory outcomes as opposed to perceived corruption.

[17] For example Lederman et al. (2005) and Treisman (2000).

[18] Including a corruption*institutions interaction term yields no evidence that the impact of corruption is curbed (or indeed increased) in good institutional settings.

[19] Similar results are obtained using the average over the 2000s.

Journal: 10101 Article No.: 0111 TYPESET DISK LE CP Disp.:2012/6/16 Pages: 23 Layout: Small-X

Table 2 Robustness I: alternative measures of institutions and corruption

	(1)	(2)	(3)
Constant	283.448*** (107.049)	138.685*** (33.800)	99.401*** (4.548)
Rule of law	50.504 (53.919)		46.217 (47.983)
Constraints on executive power		−8.172 (6.558)	
Control of corruption		−35.353*** (8.284)	−90.165* (47.046)
Corruption perceptions index	−43.734* (24.532)		
Over-ID test P value	0.41	0.69	0.55

The dependent variable is the ease of doing business rank 2010. Estimation carried out using IV. Robust standard errors in parentheses. $N = 100$. The first stage F statistics for constraints on executive power, Corruption perceptions index, rule of law and control of corruption are 27.27, 47.91, 53.47 and 47.91, respectively

*, **and *** Significance at the 10, 5 and 1 % levels, respectively

measure of institutional quality reduces the significance of the corruption coefficient to the 10 % level.

This drop in significance may be due to the fact that RL contains information on perceptions of corruption.[20] Using CC does not change our result or even the significance level. Finally, using both simultaneously reduces the significance of our main result to the 10 % level. This drop in significance when using RL aside, these regressions suggest that our results are not overly dependent on the particular measure used.[21]

There is also an issue as to whether the raw ease of doing business *Rank* is an acceptable left hand side econometric variable. Using a ranking means that the difference between 20th and 30th place has the same meaning as the difference between 150th and 160th. This need not be the case. Were we using a ranking as an explanatory variable, we could allow for non-linearities by including $rank^2$ and $rank^3$ terms.

To address this issue, we conduct an additional robustness check by taking the averages over the individual rankings to obtain what we call the ease of doing business *Score*. The difference between this and the ranking is that we don't rank the values after averaging over the categories. Thus, the difference between 20th and 30th in the rankings in terms of the score they are allocated can be different from the difference in the scores of the 150th and 160th ranked countries. The score takes values between 5.2 and 157.7 with a mean of 93.8.

Table 3 examines whether this modification to the doing business variable changes our key results. Columns 1, 2 and 3 show results that are very close to those in Table 1. The only change is that institutional quality is significant at the 10 % level, even when

[20] Part of the definition of RL is "capturing perceptions of the extent to which agents have confidence in and abide by the rules of society." See Kaufmann et al. (2009) for a full definition and details.

[21] The result also holds at 1 % if we use the Polity IV measure of democracy as our measure of institutional quality and at 10 % if we use Freedom House's Civil Liberties Index. Results available on request.

Journal: 10101 Article No.: 0111 TYPESET DISK LE CP Disp.:2012/6/16 Pages: 23 Layout: Small-X

Table 3 Robustness II: alternative measure of ease of doing business

	(1)	(2)	(3)	(4)	(5)	(6)
Constant	204.417*** (18.757)	151.871*** (5.583)	172.075*** (12.678)	231.445*** (70.193)	125.790*** (20.809)	95.879*** (3.124)
Constraints on executive power	−21.312*** (3.317)		−6.681* (3.807)		−6.237 (4.002)	
Corruption perceptions index		−13.941*** (1.130)	−10.465*** (2.343)	−32.205** (16.046)		
Rule of law				39.921 (35.260)		36.227 (30.953)
Control of corruption					−23.086*** (5.198)	−65.859** (30.424)
Over-ID test P value	0.03	0.17	0.73	0.43	0.79	0.60

The dependent variable is the ease of doing business score 2010. Estimation carried out using IV. Robust standard errors in parentheses. $N = 100$. The first stage F Statistics for constraints on executive power, corruption perceptions index, rule of law and control of corruption are 27.27, 47.91, 53.47 and 47.91, respectively

*, **and *** Significance at the 10, 5 and 1 % levels, respectively

corruption is included. The remaining columns use our alternative measures of institutional quality and corruption and once again our core result emerges.[22]

So far we have considered only two potential explanations of a good business environment. To have confidence in the results above we must of course allow other potential determining factors to enter the specification. Table 4 adds additional exogenous controls to our core specification. The first, and most obvious, alternative we consider is a country's level of economic development. Richer countries may be able to afford systems of regulation unavailable to poorer countries. However, it likely that contemporaneous, and even more recent, levels of wealth will be partly determined by the ease of doing business. To minimise the likelihood of endogeneity, we use 1970 levels of GDP per capita as our measure of economic development. With notable exceptions, prosperity today is highly correlated with prosperity in the not too distant past. If we accept this argument, Column 1 shows that (historically) richer countries do not have a statistically different quality of business regulation and that our key corruption result holds.

Another plausible determinant of the quality of regulation is the origin of a country's legal tradition. Previous empirical research has established a strong association between different legal traditions and a broad range of regulatory outcomes, including the protection of investors (La Porta et al. 1997, 1998), the burden of entry regulations (Djankov et al. 2002), and the regulation of labour markets (Botero et al. 2004). Dummy variables for French and British legal origin are included in Column 2. Both of these variables are insignificant (though of expected sign) and the corruption variable maintains its significance. In Column 3, we examine whether a socialist history plays any role and find that it does not.

[22] Though once again we see a drop in significance which is likely due to the presence of information on corruption in the Rule of Law variable.

Journal: 10101 Article No.: 0111 TYPESET DISK LE CP Disp.:2012/6/16 Pages: 23 Layout: Small-X

Table 4 Robustness III: additional controls

	(1)	(2)	(3)	(4)	(5)
Constant	242.184*** (51.159)	225.163*** (22.996)	206.625*** (22.124)	218.623*** (29.280)	173.083*** (32.474)
Constraints on executive power	−7.310 (5.647)	−12.638* (6.767)	−8.429 (6.597)	−9.179 (5.951)	−3.167 (6.697)
Corruption perceptions index	−14.410*** (5.212)	−14.721*** (4.797)	−16.067*** (3.753)	−15.371*** (3.495)	−16.602*** (5.230)
Log of 1970 GDP per capita	−5.756 (7.418)				
French legal origin		5.736 (14.856)			
British legal origin		−14.919 (13.746)			
Socialist history			9.034 (10.972)		
Log of area				6.683*** (2.066)	
Log of population				−9.655*** (3.374)	
Western Europe dummy					8.762 (17.302)
Sub-Saharan Africa dummy					22.084** (10.978)
Over-ID test P value	0.65	0.24	0.63	0.80	0.86
First stage F statistic on					
Constraints on executive power	21.37	23.36	27.50	17.66	25.97
Corruption perceptions index	45.69	76.86	42.77	49.38	53.07

The dependent variable is the ease of doing business rank 2010. Estimation carried out using IV. Robust standard errors in parentheses. $N = 100$
*, **and *** Significance at the 10, 5 and 1 % levels, respectively

The remaining columns examine whether geography has any role to play. Column 4 includes the logs of both population and area. Both are highly significant though our main result continues to hold. Larger countries tend to have less business friendly policies. This suggests that it is more difficult to keep watch over a large area and perhaps some of the difficulty is passed onto firms. Larger populations seem to be good for business friendly regulation, perhaps because of economies of scale in regulatory technology. Column 5 is an attempt to allow for "neighbourhood" effects by including dummies for Western Europe and Sub-Saharan Africa. There seems to be no advantage to being surrounded by relatively affluent neighbours, but there is a penalty to being surrounded by relatively poor ones. Once again our main result holds.

5.3 Sample splits

The previous section gives us confidence that, in general, corruption is the key determinant of good business regulation. In this section we extend the analysis by considering

Journal: 10101 Article No.: 0111 TYPESET DISK LE CP Disp.:2012/6/16 Pages: 23 Layout: Small-X

whether the effects are different in groups of countries defined by three fundamental characteristics: the level of economic development, the type of regime and the stability and level of violence in the state. While we could include these as additional regressors, we would require additional instruments to do so. Although splitting the sample is sub-optimal (especially in a macro exercise where samples are small to begin with), we believe that the previous section has demonstrated the robustness of our main finding. This extension is therefore justifiable, though the results should be taken as indicative rather than conclusive. This need for caution is underlined by the unsatisfactory first stage F statistics that we obtain for most of these regressions.

Columns 1 and 2 of Table 5 split the sample along the lines of economic development. The sample used in Column 1 is comprised of high income and upper-middle income countries, as defined by the World Bank, and Column 2 of the remainder. The impact of corruption on policy is roughly twice as big in poorer countries relative to richer countries. Bearing in mind the limitations of this approach, this reinforces the positive policy implication of our main findings: mitigating corruption can lead to big improvements in the quality of regulation even in the absence of institutional reform, *especially* in developing countries.

A similar result emerges in the case of democratic versus autocratic states as can be seen in columns 3 and 4. We use the Polity IV measure of regime type which takes values between −10 (fully autocratic) and +10 (fully democratic). We take a score of 0 as the minimum for entry to the democratic sample. Again we see a larger response to corruption in what to Western sensibilities would be the "bad" sample. Autocratic states tend towards less transparent government and political decision-making which leaves much more room for corruption. Furthermore, autocrats often lack the incentives to enforce anti-corruption laws, as these could undermine their ability to stay in power.

The final division is defined by the World Bank's WGI Political Stability, No Violence (PSNV) index. Like the other WGI variables we have used, this takes values from −2.5 to +2.5. We somewhat arbitrarily take a value of 0 for entry into the stable sample. The results are striking. In more stable countries it is corruption that emerges as the key determinant. However, in less stable environments it is institutional quality that wins out. This fits well with intuition: in unstable and more violent environments, improving the rules of the game becomes more important then stopping agents from breaking them. While striking, even more care must be taken in this instance than in the other splits. PSNV is arguably a measure of institutional quality itself and so the finding that better institutions matter more in a sample of countries with bad institutions is less than surprising. Nevertheless, it does suggest some role for targeted interventions if our policy prescription were to be followed by development agencies.

5.4 Disaggregated rankings

We have already noted that the *doing business* data is rich in quality but so far we have neglected its impressive depth. This depth allows us to test our key result in another way and also introduce a more nuanced hypothesis. Both theory and common sense

Journal: 10101 Article No.: 0111 TYPESET DISK LE CP Disp.:2012/6/16 Pages: 23 Layout: Small-X

Journal: 10101 Article No.: 0111 TYPESET DISK LE CP Disp.:2012/6/16 Pages: 23 Layout: Small-X

Table 5 Sample splits

	(1)	(2)	(3)	(4)	(5)	(6)
	High-middle income	Middle-low income	Democratic states	Autocratic states	Stable\peaceful	Unstable\violent
Constant	100.207* (58.451)	298.416*** (64.855)	188.049** (94.385)	336.945*** (100.630)	138.485*** (36.072)	258.200*** (32.170)
Constraints on executive power	9.797 (14.020)	−17.505* (9.535)	−3.996 (20.100)	−46.017 (47.0484)	9.055 (11.189)	−17.314** (7.974)
Corruption perceptions index	−18.166** (7.468)	−34.082** (15.456)	−17.390*** (6.008)	−27.453** (12.965)	−22.522*** (6.843)	−18.256* (9.974)
Over-ID test *P* value	0.84	0.70	0.61	0.70	0.50	0.97
First stage F statistic on						
Constraints on executive power	4.81	2.61	24.05	4.28	11.91	4.88
Corruption perceptions index	7.90	2.80	69.62	8.81	13.88	4.33
Observations	46	54	77	23	42	58

The dependent variable is the ease of doing business rank 2010. Estimation carried out using IV. Robust standard errors in parentheses
*, ** and *** Significance at the 10, 5 and 1 % levels, respectively

suggest that different aspects of regulation may have different determinants. Regulation in areas with greater potential for rent extraction by officials should be more driven by corruption, while those with lesser potential for rent extraction should be more driven by institutional quality.

Table 6 reports the results obtained from running a race between our key variables on each sub-rank. Corruption emerges as the significant determinant in six out of the ten cases, though only at the 10 % level in the case of ease of protecting investors. If we put starting and closing a business to one side for the moment, the remaining four reflect day to day (or at least recurring) elements of doing business. This reinforces our earlier claim and modifies it somewhat: no matter the rules of the game, *repeated* interactions between officials and their clients leads to worse regulation if corruption is prevalent. It is easy to imagine corrupt officials inventing new regulations to extract more bribes from businesses.

Starting and closing a business are one off events (in the life of a particular enterprise) where there is the potential to capture relatively large rents. It is easy to imagine an entrepreneur who is looking to start a business and make some money being prepared to grease the palm of a corrupt official who can stop or delay his investment. Likewise, owners and creditors of failed businesses are likely prepared to give away some of the value of the company's assets to expedite matters.

In three cases we find that institutional quality is the key determinant: ease of obtaining construction permits, ease of registering property and ease of getting credit. Interestingly, these three fit the bill of business regulation the least. Each is only tangentially related to the business environment, at least compared to the six where corruption is the key determinant. This further supports the idea that corruption requires frequent and repeated interaction with officials to become detrimental to regulatory quality. Otherwise, it is the general framework that is key.[23]

6 Conclusions

We have presented a wide range of evidence that the quality of business regulation is determined by the level of corruption. Our main finding is robust to additional exogenous historical and geographic controls and alternative measures of the main variables. We extended our analysis to consider whether the causal story differs according to key country-characteristics, namely the level of economic development, political regime, and the level of stability and violence. Again, we find that corruption determines the quality of regulation in all but the most volatile political environments. We also extended the analysis to encompass the disaggregated rankings of the doing business indicator. Here, our findings suggest that where there is more potential for rent extract, regulation is driven by corruption rather than institutional quality.

Taken together, our findings imply that a country can have "bad" institutions and a good business environment as long as societal actors follow the "rules of the game"

[23] In the case of ease of employing workers, neither institutions or corruption are significant. Our prior expectation was that institutions would be the key factor as employment is a private arrangement that for the most part does not require the attention of state agents. It may be that employment regulation is driven by the character of institutions ("socialist" or "capitalist") rather than by their quality.

Journal: 10101 Article No.: 0111 TYPESET DISK LE CP Disp.:2012/6/16 Pages: 23 Layout: Small-X

Journal: 10101 Article No.: 0111 TYPESET DISK LE CP Disp.: 2012/6/16 Pages: 23 Layout: Small-X

Table 6 Sub-rank results

Ease of:	Starting a business	Construction permits	Employing workers	Registering property	Getting credit	Protecting investors	Paying taxes	Foreign trade	Enforcing contracts	Closing a business
Constant	151.62*** (24.50)	205.98*** (28.50)	117.71*** (27.85)	206.49*** (28.98)	196.91*** (24.37)	118.97*** (30.77)	141.30*** (25.86)	186.32*** (22.82)	205.97*** (26.45)	172.76*** (22.46)
Constraints on executive power	1.67 (7.36)	−17.27** (8.12)	2.49 (7.97)	−19.86** (8.20)	−18.37*** (6.78)	1.71 (9.41)	5.34 (7.79)	−4.86 (6.85)	−10.79 (8.02)	−2.02 (6.68)
Corruption perceptions index	−15.01*** (4.46)	−4.30 (4.86)	−6.41 (4.99)	−2.28 (4.92)	−4.62 (4.04)	−10.00* (5.66)	−16.41*** (4.57)	−16.59*** (3.80)	−12.93*** (4.79)	−18.29*** (3.90)
Over-ID test	0.31	0.91	0.38	0.64	0.37	0.96	0.85	0.11	0.72	0.41

The dependent variable is the indicated *doing business* sub-rank in 2010. Estimation carried out using IV. Robust standard errors in parentheses. The first stage F statistics are 27.27 for constraints on executive power and 47.91 for the corruption perceptions index. $N = 100$

*, ** and *** Significance at the 10, 5 and 1 % levels, respectively

no matter how bad they are in general. This implies that "top down" institutional reform should not be considered a "magic bullet" solution for improving the business environment. It also suggests that as institutions develop, policy makers should not assume that the business environment will also improve. Rather, policy makers should focus specifically on measures that target corruption such as monetary incentives, the provision of information, and investment in technologies that increase the costs of corruption.[24] A prominent example of a successful "bottom up" approach to eradicating corruption comes from Uganda, where information on school capitation grants was disseminated through national newspapers successfully reducing the amount of public funds captured by local officials (Reinikka and Svensson 2005). This is just one example of a successful anti-corruption program targeted at education. Similar programs could in principle be designed to target the business environment.

A further lesson from our study is that policy makers should not assume that developing countries with weak institutional environments will always be cursed with poor business environments. Our findings suggest that progress is still possible even under weak institutions. While corruption is not easy to eradicate or even curb, it is certainly easier to address than wholesale institutional reform, as institutions are among the most durable and persistent features of any society. Another way of interpreting our findings depends on whether effective regulation is a good proxy for the quality of a country's overall economic policy. If one were to adopt this view, a positive message emerges: in the absence of widespread corruption, even poor and ineffective institutions can produce effective economic policy decisions. States and societies are not necessarily a hostage of their history or institutional structures, though geography does seem to play some role.

Appendix A: Data definitions and sources

Constraints on executive power is the Polity IV measure of constraints on executive power averaged over the period 2000–2009. The variable measures "the extent of institutional constraints on the decision-making powers of the chief executive, whether an individual or a collective executive" from one (no constraints) to seven. Source: Polity IV Dataset.

Control of corruption is defined as "capturing perceptions of 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" and is measured on the scale −2.5 to +2.5. We use the 2008 data. Source: Kaufmann et al. (2009).

Corruption perceptions index is defined by its creators as follows: "The Corruption Perceptions Index. measures the perceived level of public-sector corruption in 180 countries and territories around the world. The index is a 'survey of surveys', based

[24] Recent studies show that some of these alternative measures can be successful in reducing corruption. For example, a study by Goel et al. (2012) finds that internet use can act as a corruption deterrent by increasing corruption awareness. A broad review of anti-corruption policies by Abbink and Serra (2012) also finds support for the use of monetary incentives, penalties (and sometimes leniency, and transparency measures to reduce corruption).

Journal: 10101 Article No.: 0111 TYPESET DISK LE CP Disp.:2012/6/16 Pages: 23 Layout: Small-X

on 13 different expert and business surveys." It takes values from 1 to 10. We use the average over 2000–2009 Source: Transparency International.

Democracy \autocracy is measured using the Polity IV measure of regime type. Countries are rated from −10 (autocracy) to +10 (democracy). We use the 2008 data. Source: Polity IV Dataset.

Distance to equator is measured as abs(Latitude)/90. Source: Hall and Jones (1999).

Doing business rank is the rank a country has received for overall ease of doing business. This overall ranking is itself an average of 9 sub rankings. We use the data which was collected over the period June 2008 through May 2009. Source: World Bank *doing business* Dataset.

Ethno-linguistic fractionalisation measures the probability that two random people from a given country will not belong to the same ethno-linguistic group. The data were created in the early 1960s. Source: Miklukho-Maklai Ethnological Institute at the Department of Geodesy and Cartography of the State Geological Committee of the Soviet Union.

Legal origin X are dummies that take a value of 1 if the legal origin of the country is X. Source: Beck et al. (2003).

Log of area is the natural logarithm of area in square kilometers. Source: Gallup et al. (1999).

Log of population is the natural logarithm of population (in thousands) in 2007. Source: Heston et al. (2009).

Log of real GDP per capita 1970 Source: Heston et al. (2009).

New State is an indicator reflecting when the country in question became an independent entity. It takes a value of 0 if independent before 1914, 1 if between 1914 and 1945 and 2 if between 1946 and 1989. Source: Gallup et al. (1999).

Political stability and absence of violence is defined as "capturing perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism" and is measured on the scale −2.5 to +2.5. We use the 2008 data. Source: Kaufmann et al. (2009).

Rule of law is defined as "capturing perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence" and is measured on the scale −2.5 to +2.5. We use the 2008 data. Source: Kaufmann et al. (2009).

Socialist history is a dummy variable that takes a value of 1 if the country was under socialist rule for a considerable period of time from 1950 to 1995. Source: Gallup et al. (1999).

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