Instability and the Incentives for Corruption*

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Abstract

We investigate the relationship between corruption and political stability, from both theoretical and empirical perspectives. We propose a model of incumbent behavior that features the interplay of two effects: A *horizon effect*, whereby greater instability leads the incumbent to embezzle more during his short window of opportunity; and a *demand effect*, by which the private sector is more willing to bribe stable incumbents. The horizon effect dominates at low levels of stability, since firms are unwilling to pay high bribes and unstable incumbents have strong incentives to embezzle, whereas the demand effect gains salience in more stable regimes. Together, these two effects generate a non-monotonic, U-shaped relationship between total corruption and stability. On the empirical side, we find a robust U-shaped pattern between country indices of corruption perception and various measures of incumbent stability, including historically-observed average tenures of chief executives and governing parties: Regimes that are very stable or very unstable display higher levels of corruption when compared to those in an intermediate range of stability. These results suggest that minimizing corruption may require an electoral system that features some reelection incentives, but with an eventual term limit.

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1 Introduction

This paper investigates how political stability affects the incentives of incumbents to engage in corrupt behavior. At a basic level, access to public office provides opportunities for extracting corruption rents, and the possibility of losing office naturally constrains an incumbent's window of opportunity for doing so. In addition, many lucrative projects that generate these rents, such as the exploitation of a natural resource or construction contracts, often take time to deliver their full monetary returns, and can be halted if the incumbent is removed or if the opposition has sufficient clout to block the project. One would thus expect that an incumbent's security of tenure and his ability to marshal support for his favored projects, both crucial components of political stability, should be key in determining his willingness and ability to extract these rents.[1] We tackle this relationship between incumbent stability and corruption from both theoretical and empirical perspectives.

As a conceptual starting point, it is important to recognize that the term "corruption" encompasses a wide range of related, but nevertheless distinct, ways in which public officials may improperly derive private gain, such as embezzling or misappropriating public funds, accepting kickbacks for favors or licenses, or engaging in nepotism.[2] A key insight of this paper is that political stability can have contrasting effects on different forms of corrupt activity.

On the one hand, a lower level of stability shortens the incumbent's effective decision-making horizon, which can lead to more corrupt behavior along the lines of Olson's (1991) "roving bandit". An incumbent who is very unstable would find it optimal to steal more today instead of letting the pool of resources accumulate into the future, given the uncertainty over whether he will still be in power tomorrow. We can thus expect corruption in the form of direct embezzlement – the diversion of public resources straight into one's pocket – to decrease as the incumbent's position becomes more stable. This *horizon effect* can be thought of as a "supply"-driven effect, as it has to do with the willingness of the public official to supply or divert resources towards corruption.[3]

On the other hand, other forms of corruption entail a long-term relationship between the incumbent and a third party, for example when a bribe is paid by a private firm for a resource concession that will take several years to exploit. In this situation, the private sector's willingness to pay bribes actually increases with political stability, as businesses will be more inclined to wheel-and-deal with an incumbent whose

[1] Note that we do not limit our concept of stability to the violent or unconstitutional removal of the incumbent, as is often the narrower use of the term "political instability".

[2] Nye (1967), Rose-Ackerman (1999), Svensson (2005), and Glaeser and Goldin (2006) among others have drawn similar distinctions on the different manifestations of corruption. Olken (2007) uncovers an interesting example of how incumbents appear to substitute between different forms of corruption. In a field experiment involving road-building projects in Indonesia, the use of an external audit led to a decrease in direct stealing of project funds, but resulted instead in an increase in nepotism in hiring decisions related to the projects.

[3] This horizon effect will be mitigated if there is a possibility that the incumbent can return to power some time after being ousted. Such a political return will presumably be likelier when there is more turnover and instability in the political environment. We have explored this possibility in an extension using an infinite-horizon Bellman approach, in which we find that this "resurrection" effect dampens the horizon effect, but does not reverse it.

position they assess to be more secure. Put otherwise, a stable regime is more conducive for an incumbent and the private sector to develop the connections through which the flow of bribes will run. We dub this effect the *demand effect*, since it is driven by the private sector's demand for corruption.[4]

This paper's first point is to develop a model that formalizes the interplay between these two effects. In our set-up, a self-interested incumbent makes an optimal allocation of public resources to two different forms of corrupt activity, namely direct "embezzlement" and third-party "licensing". (These labels serve as a shorthand for the multiple types of activities typically regarded as corruption, with the main distinction being that "licensing" involves an interaction with the private sector.) However, the incumbent's position is potentially unstable, in that there is some probability each period that he will be ousted or that his policies will be blocked.

We show that the two aforementioned effects combine to generate a non-monotonic relationship between total corruption and stability that approximates a *U-shape*. At low levels of stability, the horizon effect unambiguously prevails, and total corruption falls as the incumbent's stability improves. On the other hand, the demand effect dominates in more stable regimes, leading to a positive relationship between total corruption and stability over higher ranges of the latter. The underlying logic is intuitive: The private sector is reluctant to bribe an unstable incumbent, so direct stealing will be the main source of corruption revenues in highly unstable regimes. In the face of a small increase in stability over this low range, the private sector remains pensive about investing heavily in bribes, leaving the unstable incumbent with few opportunities to substitute from embezzlement into licensing. This marginal increase in stability therefore reduces total corruption because it lengthens the incumbent's expected horizon and directly decreases his incentive to embezzle. However, over higher ranges of stability, bribery becomes more enticing, and this opens the door for the demand effect, since the prospect of long-term deals raises the private sector's demand for corruption. Corruption thus increases with stability in relatively stable regimes, as long as the incumbent's ability to extract rents from the private sector is sufficiently high so as to make bribery an important source of corruption revenues.

The picture that emerges from our model is consistent with a lot of anecdotal evidence. On one end of the spectrum, countries such as Brazil (in the early 1990s) and Pakistan have grappled with a combination of low stability and high corruption. For example, Easterly (2003) surmises that"political instability has made Pakistan's successive governments more like Mancur Olson's (2000) 'roving bandit', who loots only for today" [p.464]. Conversely, autocratic regimes such as Mexico under the Institutional Revolutionary Party (PRI), Kenya under Daniel Arap Moi, and Indonesia under Suharto were stable for long periods, but saw extensive corruption as the ruling elite exercised a monopoly over rent-seeking activities. Last but not least, competitive democracies fall conveniently in the category of intermediate stability and lower levels

[4]The idea of modeling corruption as the outcome of demand and supply forces within an unofficial market is not new, with Shleifer and Vishny (1993) being a seminal piece. One contribution of our paper is to analyze how political stability interacts with these demand-supply effects to influence the level of corruption.

of corruption.[5] We discuss in detail how our theory is relevant for understanding individual countries' experiences with corruption with a pair of case studies, for Brazil and Mexico. These countries provide sharp illustrations of the horizon and demand effects, with observers having written about how corruption has ebbed and flowed in these countries as political stability has fluctuated.

The paper's second main point is empirical: We uncover a U-shaped pattern between the country-level indices of corruption perception commonly used in empirical work, and various measures of political stability.[6] The strength of this pattern, which is documented extensively in Section 3, can be verified along many dimensions. This U-shaped relationship shows up consistently in our main specification using the Kaufmann, Kraay and Mastruzzi (2006, henceforth KKM) corruption perception measure, even after we control for a battery of additional determinants of corruption deemed important in the literature. It is also robust to the use of the Transparency International and International Country Risk Guide indices, two additional measures that are also widely used in empirical work. We obtain these results using two different measures of political stability: (i) the historically-observed average tenure of a country's chief executive; and (ii) the average tenure of the party in power. (We also find supportive results using a more indirect measure of stability, the governing coalition's share of seats in the legislative.) Our findings hold both in a cross-section of countries (where we average the relevant variables over time), as well as when estimation is performed on the yearly data using dynamic panel GMM techniques which help to allay concerns over endogeneity arising from country-specific unobservables or reverse causality. Finally, we find support for a corollary concerning the relationship between corruption and the size of government. Our model predicts that the latter variable is positively correlated to stability, and hence also stands in a U-shaped pattern with corruption; we do indeed find some evidence for such a pattern in the data.

Our analysis yields meaningful policy implications regarding what institutional settings might be optimal for keeping corruption at bay. The non-monotonic relationship between corruption and political stability identified in our theory and supported in our empirical analysis suggests that a combination of the possibility of reelection and the presence of term limits is necessary: The former counteracts the incentives to embezzle posed by the horizon effect, whereas the latter keeps the demand effect in check.

1.1 Related Literature

Our paper falls within an extensive literature on the causes of corruption.[7] It builds on a well-established body of empirical work which has identified various systematic determinants of corruption, including ethnolinguistic fractionalization (Mauro 1995), the presence of economic rents (Ades and Di Tella 1999),

[5] As further illustration, it has been suggested that the reason why the Baltic countries had a better track record on corruption than other transition economies was that "because [their] governments are [relatively] weak and fast-changing, they are also limited in their ability to advance their financial backers' interests" (*The Economist*, 11 Dec 2004, p.48). This is precisely the spirit behind the demand effect that we have outlined.

[6] Interestingly, in one of the first cross-country studies on corruption, Mauro (1995) reported a positive correlation between the Business International corruption index for 1980-1983 and a subjective index of political stability from the same source. However, his paper did not explore the possibility of a non-monotonic relationship.

[7] For an overview of issues, see Bardhan (1997), Lambsdorff (1999), and Svensson (2005).

the level of democracy (Treisman 2000), and electoral rules (Persson, Tabellini and Trebbi 2003). As we will show, our empirical results are robust to the inclusion of these controls, which suggests that political stability also belongs on this list as a key proximate determinant of the incentives for corruption. While political stability has previously been linked to outcomes such as aggregate growth (Alesina and Perotti 1996, Alesina et al. 1996), this is one of the first attempts (to the best of our knowledge) to model and estimate a link to corruption.

Several earlier studies have alluded to a potential link between corruption and stability. Olson's (1991, 2000) and DeLong and Shleifer's (1992) discussions of the importance of decision-making horizons on the behavior of incumbents, and to some extent the models of electoral accountability such as Barro (1973) and Ferejohn (1986), include forces similar to our horizon effect.[8] As for the demand effect, similar considerations are implicit in Rose-Ackerman's (1999) discussion of the role of checks and balances on the government in curbing corruption. Along similar lines, Fredriksson and Svensson (2003) analyze how corruption and instability interact in influencing policy in a lobbying model. While their paper contains ideas that resemble the horizon and demand effects, it does not deal directly with the impact of stability on corruption, taking instead the incumbent's propensity for corruption as an exogenous parameter. In a different but related context, Acemoglu (2005) also obtains a U-shaped relationship between a ruler's incentives to act in detriment of public welfare and the inherent strength of the state, arising from a similar interplay between his incentives to invest in the economy and his ability to extract rents. While his mechanism operates via investment in public goods, ours is based on the possibility of accumulating resources into the future.

Most recently, and quite importantly, a growing body of work based on micro-level measures of corruption has emerged that strongly affirms the empirical relevance of the key mechanisms underlying our theory. Using evidence from Brazilian municipality audits, Ferraz and Finan (2007) compare mayors who are in their first term in office to those who are in their second term, which by law has to be their last one. They show that mayors in their mandatory last term tend to be more corrupt, a result which is entirely consistent with the horizon effect. More direct support comes from Gamboa-Cavazos, Garza-Cantú and Salinas (2006), who explicitly test an extension of our model. They obtain measures of local corruption reported by private firms in Mexico, and regress them on measures of the stability of state governors, namely the number of years left in office and their legislative support. Their finding of a U-shaped relationship between corruption and these stability variables is an important piece of evidence that complements the cross-country results we obtain, and further strengthens the case for our framework.[9] The paper proceeds as follows. Section 2 presents the model and our key theoretical results. While we present the model in

[8] Shleifer and Vishny's (1993) prediction that weak decentralized governments would exhibit more corruption also hints at a relationship with political stability. Their mechanism, however, is the lack of coordination among different public officials, whom private firms need to bribe to obtain licenses that are complementary to each other. Our model, by contrast, focuses on public officials who deal with corruption opportunities that are essentially unrelated.

[9] Le, Mehlkop and Graeff (2004) find mixed evidence when investigating the cross-country relationship between corruption and stability, but their analysis uses measures of stability that focus more narrowly on political violence and unrest.

a more general setting in which the incumbent can divert some resources towards bolstering his stability, for pedagogical purposes, we first build up the intuition from a baseline case in which the incumbent treats his stability as an exogenous parameter. We also discuss here two country case studies that provide further illustration for the horizon and demand effects that we propose. We then turn in Section 3 to the cross-country evidence on the U-shaped relationship between corruption and political stability. Section 4 concludes.

2 Theory: How Instability Shapes the Incentives for Corruption

2.1 The Model

2.1.1 Basic Setup

We consider an infinite-horizon economy with an initial pool of available resources, K_0, the allocation of which is controlled by an incumbent. There is some probability α that the incumbent and his policies survive from one period to the next; α thus measures the incumbent's stability. For simplicity, this incumbent derives personal utility only from diverting resources towards his corruption rents. At any given point in time, t, resources can be diverted through either: (i)"Embezzlement", E_t, which entails direct stealing, or (ii) "Licensing", L_t, which involves granting private sector firms control over some of the resources in exchange for an upfront bribe payment. In addition, the incumbent can choose to spend some amount, P_t, out of the initial pool of resources to boost his own stability (and thereby increase his probability of staying in power to enjoy future rents): α is an increasing function of P_t, $\alpha(P_t)$.[10]

The distinctive characteristic of the forms of corruption we gather under the "licensing" label is that they entail an interaction between the incumbent and private sector firms. Let $\pi(L_t, \alpha(P_t))$ denote the *ex ante* expected value of profits reaped by the private firm from the license L_t. The key assumption here is that π is an increasing function of stability. (In deriving the equilibrium below, we will in fact impose the simplifying assumption that the licenses become void when the incumbent is ousted, but we do not need to go to this extreme.) This captures the idea that, to the extent that there is an intertemporal dimension in the corrupt relationship, the presence of the incumbent in power is valuable to the firm with whom he maintains that relationship: An unstable incumbent will be less likely to be able to deliver on his side of the deal, and hence will be less valuable to his prospective private-sector partner. In particular, we specify that $\pi(L_t, 0) = 0$, so that firms have no interest in bribing an unstable incumbent who has zero probability of being in power in the next period.[11] We assume that the incumbent has the ability to extract a fraction σ of expected profits as an upfront bribe payment for the license; σ thus measures the

[10] In the event that the incumbent is ousted, we assume he receives a zero payoff in all subsequent periods.

[11] This description of the "demand side" of the corrupt relationship can be reconciled with a model of "political cycles" in which an incumbent might increase the number of licenses issued just before an election, when his stability is at its lowest. In our setup, this increased supply would be met by a low level of demand given the unstable position of the incumbent, and hence fetch a low "price" per license. It is therefore possible for corruption rents from licensing to fall during such periods of low stability.

incumbent's bargaining power with respect to the private sector.

Finally, in each period, the remaining untouched resources are transformed into the pool of resources available in the next period, subject to diminishing returns: $K_{t+1} = A(K_t - E_t - L_t - P_t)^\gamma$. This has the interpretation of being a growth equation with technological parameter A. In other words, what is not embezzled, licensed, or spent in boosting stability, is left for the "rest of the economy" and accumulates over time. This sequence of events is summarized in Figure 1:

[INSERT FIGURE 1]

The incumbent's problem is one of maximizing his expected income.[12] The sequence problem for the incumbent can be described by:

$$\max_{E_t \geq 0,\ L_t \geq 0,\ P_t \geq 0} \sum_{t=0}^{\infty} \alpha(P_t)^t [E_t + \sigma\pi(L_t, \alpha(P_t))] \quad \text{where} \quad K_{t+1} = A(K_t - E_t - L_t - P_t)^\gamma \tag{1}$$

Our definition of corruption in each period, Γ_t, is the amount of illicit income that the incumbent receives, normalized by the resources available at the start of the period, namely:

$$\Gamma_t = \frac{E_t + \sigma\pi(L_t, \alpha(P_t))}{K_t} \tag{2}$$

The normalization ensures that the measure of corruption is not subject to scale effects, so that larger countries are not deemed more corrupt simply because there are more resources available.

2.1.2 Stability

We now elaborate on our formulation of incumbent stability. The variable P_t captures the idea that the stability of the incumbent can be affected by the resource allocation decisions he makes. Concretely, one can think of P_t as an amalgam of expenditures that can improve his stability in different ways, including: public goods spending that is valued by the masses, such as on education, healthcare or infrastructure; expenditures that can be used to restrain public opposition, such as military or police spending; and patronage strategically dispensed to cultivate political support from key voters or political players. While we will refer to P_t as "public goods provision", the important thing for our purposes is that this expenditure boosts the incumbent's stability but also diverts resources away from his own pocket. Following this discussion, we specify stability to be a function of the incumbent's choice of P_t, denoted by $g(P_t)$, where $g(\cdot)$ is increasing and concave, with $g(0) = 0$. This function enables us to describe how effective public goods provision is in bolstering the incumbent's position.

In practice, however, an incumbent's stability also depends on some factors that he cannot easily affect. We incorporate this feature by assuming that overall stability also depends on the intrinsic stability of

[12] We implicitly assume that the incumbent can smooth his consumption over time, for example, by depositing the income in an offshore account. We treat such funds as unrecoverable by the state should the incumbent be ousted. For simplicity, there is no time discounting in addition to what is implicitly introduced by the stability parameter.

the polity, denoted by $\zeta \in [0,1]$. We interpret ζ as an exogenous, "systemic" level of stability capturing underlying features such as the ethnic composition of the population or cultural norms, which are largely beyond the incumbent's control. Note that these deep-seated features can in turn be mapped into a desired level of public goods provision, P_ζ, defined by $g(P_\zeta) = \zeta$. For instance, following Alesina, Baqir and Easterly (1999), a more fractionalized polity with a lower ζ would in equilibrium have a lower desired level of public goods provision, since each individual attaches a smaller value to public goods consumption by other people who do not belong to his/her ethnic group.

In sum, we specify stability (with a slight abuse of notation) to be $\alpha = \alpha(\zeta, g(P))$, where the latter expression allows us to distinguish between the components of stability that are under the incumbent's control, and those that are beyond it.

2.2 Benchmark Case: Exogenous Stability

It is useful to start by presenting a benchmark special case of the model in which stability is entirely beyond the incumbent's control, namely where $g(P)$ and hence α are constants. This special case conveys the basic intuition in its sharpest form; we will then move on to show how the intuition generalizes, and how new testable predictions can be obtained in the more general model.

2.2.1 Characterizing the Equilibrium

For ease of exposition, we focus on a simple case for the private sector's expected profit function: $\pi(L_t, \alpha) = \alpha A_F L_t$, where A_F is the private sector technology parameter. This corresponds to a situation where the license is valid for one period only, period $t+1$, and production is undertaken with an AK technology, subject to the possibility that the license will be voided in the event of a discontinuation of the incumbent's policies.[13] The problem in (1) can now be re-formulated as a Bellman equation with value-function $V(\cdot)$:

$$V(K_0) = \max_{E_0 \geq 0,\ L_0 \geq 0} \{E_0 + \sigma\alpha A_F L_0 + \alpha V(K_1)\} \quad \text{where} \quad K_1 = A(K_0 - E_0 - L_0)^\gamma \tag{3}$$

It is easy to show, from the first-order conditions with respect to E_0 and L_0, that one of these quantities must be zero, except in a knife-edge scenario. (This is a consequence of the linear functional forms in this baseline model. In an appendix available upon request, we have also established our results with an objective function which is jointly concave in both embezzlement and licensing revenues, and which therefore allows both forms of corruption to coexist in equilibrium.) Which of these two cases will prevail depends on the parameters of the model. If $\sigma\alpha A_F < 1$, then the marginal gain from a small increment in E_0 exceeds that from a similar increment in L_0. In this case, the incumbent does not allocate any resources to licensing, and corruption takes only the form of embezzlement. Conversely, if $\sigma\alpha A_F > 1$, then the incumbent reaps private revenues through licensing only. The analysis is most interesting when

[13] The basic results in the propositions below hold for a fairly general class of functional forms for $\pi(L_t, \alpha)$ satisfying $\pi_L > 0$, $\pi_\alpha > 0$ and $\pi_{L\alpha} > 0$.

the cut-off value of α separating the two cases, $\alpha^* \equiv \frac{1}{\sigma A_F}$, lies in the interval $[0,1]$, which happens when $\sigma A_F > 1$. Intuitively, this condition means that the incumbent's ability to extract surplus and the private technology parameter are high enough, so that licensing is attractive over part of the relevant $[0,1]$ range for α. We now characterize the two cases:

Case 1: $\sigma\alpha A_F < 1$, ie $\alpha < \frac{1}{\sigma A_F}$.

In this case, $L_t = 0$ for all $t \geq 0$. Using the FOCs, the Envelope Thorem, and (2) one can solve for the level of embezzlement-related corruption:

$$\left.\begin{array}{rcl} \Gamma_0 & = & 1 - \frac{(A\alpha\gamma)^{\frac{1}{1-\gamma}}}{K_0} \\ \Gamma_t & = & 1 - \alpha\gamma, \quad \forall\ t \geq 1 \end{array}\right\} \tag{4}$$

Observe that corruption depends on the initial endowment of resources, K_0, only in the very first period ($t = 0$); from $t = 1$ onwards, the model is in a "steady state" in which corruption remains constant, given the parameter values.[14]

Case 2: $\sigma\alpha A_F > 1$, ie $\alpha > \frac{1}{\sigma A_F}$.

Here, the marginal gain from a small increment in L_0 exceeds that from a similar increase in E_0. The incumbent now does not allocate any resources to embezzlement, and corruption takes only the form of licensing revenues. From the FOCs and (2), this yields the following expression for corruption:

$$\left.\begin{array}{rcl} \Gamma_0 & = & \sigma A_F \alpha \left[1 - \frac{(A\alpha\gamma)^{\frac{1}{1-\gamma}}}{K_0}\right] \\ \Gamma_t & = & \sigma A_F \alpha (1 - \alpha\gamma), \quad \forall\ t \geq 1 \end{array}\right\} \tag{5}$$

2.2.2 Corruption and Stability

We now analyze the comparative statics for corruption with respect to stability, focusing on the steady state ($t \geq 1$).[15] Consider first Case 1. It is straightforward to see from (4) that Γ_t is decreasing in α, hence corruption is decreasing in stability for $\alpha < \alpha^*$. Here, the one force at play is the *horizon effect* operating through the incentives to embezzle: More unstable incumbents have a greater incentive to steal resources now instead of leaving them to future periods when they are likely to be out of office. While firms do have some incentive to offer bribes to the incumbent so long as $\alpha > 0$, the expected returns from these licenses

[14] In this basic framework, we thus have a "*cleaning-up*" property, in which any amount of the period-0 endowment in excess of the steady state value of K_t is consumed immediately and the economy reaches a steady state with a constant level of corruption in one period. This "cleaning-up" property holds whenever the incumbent's per-period utility is linear in E_t.

[15] The difference between comparative statics in steady state and in transition has to do with whether the pool of resources at the start of the period is exogenous, or whether this is taken to be the steady state value of K_t. More precisely, a change in α will shift the economy towards a new steady state; Γ_0 thus captures the short-run behavior of corruption in transition, while Γ_t $(t \geq 1)$ describes the behavior of corruption in the new steady state. From the expressions in (4) and (5), it is clear that the response of corruption to α is qualitatively similar in both transition and steady state, so long as K_0 is sufficiently large. Note also that a quick substitution of $\alpha = \frac{1}{\sigma A_F}$ into the expressions for Γ_0 and Γ_t from the two cases shows that corruption is indeed a continuous function of stability for all periods.

are small, so that any bribes offered are insufficient to persuade the incumbent to substitute away from embezzlement.

Turning to Case 2, notice from (5) that α now enters the expression for Γ_t in two places, which generate opposite effects on the level of corruption. The influence of α on corruption thus involves a rich interplay between a horizon effect – since the optimal amount of licensing also takes into consideration the tradeoff with respect to leaving resources to the future – and a new *demand effect*, whereby firms are willing to pay higher bribes to more stable incumbents. It is the latter effect that tends to make corruption increase in stability. It turns out that when γ is sufficiently small ($\gamma \leq \frac{1}{2}$), diminishing returns set in fast enough in the accumulation equation for K_t, so that it is relatively unattractive for the incumbent to set resources aside for the future. In this situation, the demand effect unambiguously prevails over the horizon effect. If on the other hand we have $\gamma > \frac{1}{2}$, the demand effect still prevails over some range of stability, so long as licensing represents a sufficiently large source of corruption rents for the incumbent (σA_F is large enough). Now, however, the horizon effect may kick in again at the highest levels of stability, as very stable incumbents may find it worthwhile to allow some resources to accumulate into the future instead of disbursing more licenses.[16] In short, the general lesson is that corruption will be increasing over some range of stability, while possibly but not necessarily becoming decreasing in stability at the highest levels of α.

Bringing these two cases together, we have our central proposition on how stability affects corruption in steady state:

Proposition 1 *Suppose that* $K_0 > A^{\frac{1}{1-\gamma}}(\alpha\gamma)^{\frac{\gamma}{1-\gamma}}$ *(so that* K_0 *exceeds the steady state level of resources in the economy), and* $\sigma A_F > \max\{2\gamma, 1\}$. *Then:*

(i) If $\gamma \leq \frac{1}{2}$, *steady-state corruption is decreasing in stability* α *for* $\alpha < \alpha^* \equiv \frac{1}{\sigma A_F}$, *and increasing in* α *for* $\alpha > \alpha^*$.

(ii) If $\gamma > \frac{1}{2}$, *steady-state corruption is decreasing in stability* α *for* $\alpha < \alpha^*$, *increasing in* α *for* $\alpha^* < \alpha < \alpha^{**} \equiv \frac{1}{2\gamma}$, *and decreasing in* α *for* $\alpha > \alpha^{**}$.

In words, our model generates a steady state where at first corruption decreases with stability, and eventually starts to increase (with a possibility that it starts to decrease once again for very high levels of stability). Put differently, we end up with a *non-monotonic relationship between corruption and stability*, which will look like a *U-shape* so long as diminishing returns play an important role in the accumulation of resources: Very stable and very unstable incumbents will tend to be more corrupt than those at an intermediate range of stability.

The logic that drives this result is very intuitive, and it is the key message of our paper. In the range of low stability, firms are unwilling to pay high bribes to unstable incumbents, so that embezzlement

[16] Specifically, we have from (5) that $\frac{d\Gamma_t}{d\alpha} = \sigma A_F(1 - 2\alpha\gamma)$, for all $t \geq 1$. A necessary and sufficient condition for $\frac{d\Gamma_t}{d\alpha} \geq 0$ for all $\alpha \in [\alpha^*, 1]$ is $\gamma \leq \frac{1}{2}$. If $\gamma > \frac{1}{2}$, then corruption will increase for $\alpha < \frac{1}{2\gamma} \equiv \alpha^{**}$, while $\frac{d\Gamma_t}{d\alpha} < 0$ for values of α that exceed α^{**}. Note that a necessary and sufficient condition to ensure that $0 < \alpha^* < 1$ and $\alpha^{**} > \alpha^*$ is $\sigma A_F > \max\{2\gamma, 1\}$, so that revenues from licensing will be sufficiently large to allow the demand effect to gain salience over some range of α.

becomes the main means for self-enrichment. As a result, the horizon effect dominates: Corruption falls as the incumbent's stability improves and the incentive to embezzle decreases. Beyond a certain level of stability, however, licensing becomes the more profitable option, as sufficiently stable incumbents are able to extract larger bribes from firms. Therefore, the demand effect kicks in over the range of high stability so long as σA_F is sufficiently large: Corruption increases as stability improves, since firms are willing to offer ever larger amounts of bribes. This demand effect is sure to dominate over at least some range of high stability, although the horizon effect, which naturally affects both types of corruption, may under some circumstances regain the upper hand at the very highest levels of stability. The overall U-shaped pattern, by which we mean that corruption decreases in stability for lower levels of α, then eventually starts to increase, is the key testable prediction of our model.

Furthermore, the model yields several interesting predictions on the effects of parameter shifts:

Proposition 2 *Based on the expressions for steady-state corruption in (4) and (5):*

(i) Corruption is weakly increasing in the incumbent's bargaining power vis-à-vis the private sector, σ, and the productivity of the private sector technology, A_F.

(ii) Over the range of α where the demand effect dominates, in response to a given rise in σ or A_F, the increase in corruption is larger when the incumbent is more stable (ie α is higher).

Proof of Proposition 2. By inspection of (4) and (5), it is clear that σ and A_F increase corruption from licensing while not affecting corruption from embezzlement. This establishes part (i) of the proposition. For part (ii), it is easy to check from (5) that the cross-derivative with respect to σA_F and α is positive, whenever Γ_t is increasing in α. ■

This proposition lends itself to a natural interpretation. Part (i) follows from the fact that corruption revenues from the private sector rise when either the bargaining position of the government is strengthened or when the private sector technology improves. As for part (ii), notice that σ and A_F affect the corruption revenues from licensing, but not from embezzlement. As a result, these parameters gain salience in the range of α where licensing dominates, resulting in a larger increase in corruption when the incumbent is more stable. Note that our formulation takes σ to be independent of α, but one could also expect more stable incumbents to command more bargaining power over the private sector. Incorporating this simple extension would only reinforce the upward-sloping relationship between corruption and stability for the high levels of α where the demand effect prevails.

2.3 General Case: Endogenous Stability

Armed with the intuition from this benchmark case, we now turn to consider the general formulation in which the incumbent can divert resources to bolster his stability: $\alpha = \alpha(\zeta, g(P))$. For concreteness, we think of P_ζ, the desired level of public goods provision defined in section 2.1.2, as establishing a "ceiling"

on stability, whereby any shortfall of public goods provision with respect to this level will weaken the incumbent's position. We thus model stability, α, as:

$$\alpha = \min(\zeta, g(P))$$

Note that this boils down to an assumption that public goods provision and intrinsic stability are (perfect) complements from the standpoint of how they contribute to α. In other words, polities that are intrinsically more stable allow an incumbent to better translate spending on public goods into enhanced stability. Two things are worth stressing in that regard, the first one being that we do not need perfect complementarity: Our results hold as long as there is sufficient complementarity between the endogenous and exogenous components of stability, so that ζ and $g(P)$ co-vary together. Second, while this complementarity is ultimately an empirical question (to which our results will speak indirectly), we believe there is *a priori* good reason to consider it plausible. To the extent that the systemic component ζ is tied to deeper features of the polity such as ethnic fractionalization, if ζ and P were instead substitutes, one would then expect to see higher levels of endogenous public goods provision in more ethnically fractionalized countries, to try to compensate for the poor systemic stability in these polities. This would be at odds however with the empirical evidence that fractionalization tends to be associated with less public goods spending (Alesina, Baqir and Easterly 1999). Moreover, one might then expect to observe no specific relationship between ethnic fractionalization and overall political stability, $\alpha(\zeta, g(P))$, whereas it has instead been established that the correlation between these two variables is indeed clearly negative (Alesina et al. 2003).

The incumbent's problem from the benchmark case, (3), can now be adapted as follows:

$$\begin{aligned} V(K_0) &= \max_{E_0 \geq 0,\ L_0 \geq 0,\ P_0 \geq 0} \{E_0 + \sigma \min(\zeta, g(P_0)) A_F L_t + \min(\zeta, g(P_0)) V(K_1)\} \\ \text{where } K_1 &= A(K_0 - E_0 - L_0 - P_0)^\gamma \end{aligned} \tag{6}$$

We can now state a result that mirrors Proposition 1 on the non-monotonic relationship between corruption and stability:

Proposition 3 *Suppose that $g(P)$ belongs to the class of increasing concave functions $g(P) = (cP)^\rho$, where $c > 0$ and $0 < \rho < 1$. Moreover, suppose that A and K_0 are sufficiently large, and that $\sigma A_F > 2$. Then there exists $\tilde{\alpha}^*, \tilde{\alpha}^{**} \in [0,1]$, with $\tilde{\alpha}^* < \tilde{\alpha}^{**}$, such that:*

(i) If $\gamma \leq \frac{1}{2}$, steady-state corruption is decreasing in stability α for $\alpha < \tilde{\alpha}^*$, and increasing in α for $\alpha > \tilde{\alpha}^*$.

(ii) If $\gamma > \frac{1}{2}$, steady-state corruption is decreasing in stability α for $\alpha < \tilde{\alpha}^*$, increasing in α for $\tilde{\alpha}^* < \alpha < \tilde{\alpha}^{**}$, and decreasing in α for $\alpha > \tilde{\alpha}^{**}$.

The proof of this proposition is similar to, albeit more extended than, that for the baseline model (details available in a separate appendix upon request). Intuitively, when there is sufficient complementarity between ζ and $g(P)$, both of them co-vary together. At low levels of ζ, the incumbent thus has

little incentive to set aside resources for public goods, since this has little incremental effect on his actual stability, so that corruption will be high when α is low. On the other hand, at high levels of ζ, there is some incentive to raise P; nevertheless, since the mechanism for improving stability (the function $g(\cdot)$) exhibits diminishing returns, this rise in P is relatively moderate and does not detract from the fact that a significant quantum of resources is still being allocated to embezzlement or licensing. In short, corruption remains high when α is high. It is moreover straightforward to see that the comparative statics from Proposition 2 continue to hold in this extension.

On a separate note, we are now in a position to derive a testable implication concerning how corruption and stability co-vary with the level of public goods provision. In our model, we interpret public goods provision as equivalent to the size of government, given that P is the only form of government expenditure. This yields the following result:

Proposition 4 [Size of Government] *Given the same parameter conditions as in Proposition 3, if corruption is U-shaped with respect to stability, then corruption also stands in a U-shaped relationship with respect to the size of government.*

Proof of Proposition 4. Public goods provision is weakly increasing in the level of intrinsic stability, given the complementarity between ζ and P. Thus, the relationship between corruption and the size of government inherits the same shape as that between corruption and (intrinsic) stability. ■

In words, governments which are either very small or very large are associated with more corruption, but those of an intermediate size witness lower levels of corruption. In our model, the reason for this pattern is that governments are very small or very large because they are (respectively) intrinsically highly unstable or highly stable, and both of these extremes are associated with high levels of corruption.

2.4 Case Studies

The logic of our model can be vividly illustrated through a couple of country case studies. These examples highlight how the horizon and demand effects can be useful for understanding individual country's experiences with corruption and political stability over time.

2.4.1 Brazil

Brazil in the 1990s is a clear example of a country that started with very low levels of stability and high levels of corruption, but which later transitioned into a less corrupt regime as stability improved. Its experience is therefore consistent with the "downward-sloping arm" of the U-shape between corruption and stability, driven by the horizon effect.[17]

In the 1980s, Brazil underwent a transition from military rule to democracy. Soon afterwards however, in 1992, the first directly elected president in 29 years, Fernando Collor de Mello, became the first Brazilian

[17] What follows draws upon Skidmore (1999), Geddes and Ribeiro Neto (1999) and Souza (1999).

president to be impeached, as evidence of widespread and rampant corruption mounted against him and his closest associates. According to Geddes and Ribeiro Netto (1999, p.22), it is apparent that "corruption did increase in Brazil during the 1980s and early 1990s... The amounts of money described and numbers of people implicated in corruption schemes investigated... are substantially greater than those described in earlier inquiries." Similarly, Skidmore (1999, p.8) describes the levels of corruption during the Collor administration as "unprecedented".

One feature consistently stressed by many scholars that have studied this period was the high level of instability. The electoral rules created during the democratic transition led to a proliferation of political parties, so that it became extremely hard for the chief executive to build a stable coalition. No less than 17 parties were represented in Congress by 1990, with the three largest delegations not adding up to a simple majority. Collor's party, despite his winning the presidential election, held only 6.3% of the legislative seats as the new administration took office. That the president was impeached during his third year in office is itself illustrative of how unstable his administration was. The president's ability to push through his policies was severely limited, and Geddes and Ribeiro Neto (1999) argue explicitly that this institutional setup was central in explaining the increase in corruption.

Observers have also linked the short time horizons of public officials during this period to the high levels of corruption, which is precisely what we have termed the horizon effect. For instance, Geddes and Ribeiro Neto (1999) stress that, in light of their unimpressive professional status, "many of the appointed members of Collor's original team could expect only a short term in office... [and] the temptation to 'take the money and run' increased" (p.42). In short, there is clear evidence of a link between an environment of high instability and high levels of corruption, with a strong embezzlement component.

Following Collor's impeachment, the corruption situation is widely seen to have improved as stability increased over time under the Itamar Franco (1992-1994) and the Fernando Henrique Cardoso administrations (1995-2002), as is consistent with our theory. The coalition that elected Cardoso held nearly one-half of all congressional seats, and was reputed to be "fairly stable", while Cardoso himself came "from a party of respectable size and reasonable coherence" (p.45). Add to this the approval in 1997 of a constitutional amendment allowing for reelection to executive offices, and what emerged was a context of significantly improved stability. Consequently, Geddes and Ribeiro Neto (1999) argue that the 'take the money and run' temptation "lessened in post-Collor administrations. Franco's appointees... had every reason to expect their careers in public life to continue afterward [and] Cardoso's appointments to high-ranking positions include many of the best economists in the country, as well as able professionals in other fields... [S]uch appointees have a longer time horizon" (p.42). At the same time, various institutional measures to fight corruption were also implemented. These included a law to regulate government procurement (Lei de Licitações), which is acknowledged to have been an effective tool in reducing corruption (Gonçalves da Silva 2000), as well as a law requiring public officeholders to disclose personal assets and income sources, both introduced in 1993. Such measures culminated with the establishment in 2001 of the Controladoria-

Geral da União, a widely praised anti-corruption agency at the ministerial level (Ferraz and Finan 2007). We thus conclude that the case of Brazil in the 1990s provides support for the mechanisms behind the "downward-sloping arm" of the U-shape in our theory.

2.4.2 Mexico

Mexico illustrates the converse phenomenon: A country that started with very high levels of stability and corruption, which later became less corrupt as the absolute stability of the regime weakened.

Starting in 1929, the Institutional Revolutionary Party (PRI) was in power in Mexico for more than seven decades without interruption. This was undoubtedly a very stable regime, under control of the president whose powers were "almost those of a monarch" (Preston and Dillon 2004, p.52). The president himself selected party candidates for congressional posts, and turned the PRI-dominated legislature into a rubber-stamping machine for his decisions. Although reelection was prohibited, long political horizons were guaranteed by the fact that the president got to pick the party's candidate for his succession – which amounted to anointing his successor, in a process nicknamed *dedazo* ("finger tap") – and the "unwritten rule that former presidents and their families would not be criticized, let alone prosecuted" (p.57).

Our theory would therefore predict high levels of corruption as a result, as is indeed the conclusion of just about every observer. According to Preston and Dillon (2004), "among the system's basic codes of conduct, corruption seemed to be one of the most fundamental" (p.57). Moreover, the demand effect would predict that licensing and bribery would have been an important part of the way corruption manifested itself. This is confirmed by existing accounts: "With business heavily dependent on government contracts, the lines between the public and private sectors were often blurred. An executive receiving a substantial government contract would include in his cost calculations, as a matter of course, a commission for the official who approved the deal... [G]overnment officials often became silent partners in the deals they authorized" (p.184). Indeed, this link between stability and corruption in the PRI regime has not gone unnoticed: "Authoritarian rule tended to breed corruption. Because PRI officials were finally accountable to no one but the President, it behooved special interests to ply them with bribes, and with the President drawn from the same party over the decades, incoming administrations had little incentive to clean house or punish abuses by their predecessors" (p.326).

Starting in the 1990s, however, stability started to decrease towards a more moderate level consistent with a better-functioning democracy, and this transition appears to have been accompanied by some reduction in corruption, in line with our model. Ernesto Zedillo became president in 1994 after the *dedazo* system was disrupted by the assassination of Carlos Salinas' anointed successor. Zedillo implemented reforms in the electoral process that reduced the party's control over election results, and in 1997, for the first time in modern Mexican history, the PRI was left with less than 50% of the seats in the lower house of Congress. As a culmination of this process, the opposition won the 2000 presidential elections behind Vicente Fox. Fox's party, however, controlled less than 40% of the seats in both houses. Under these

circumstances, "democratic checks were restricting his powers to a degree faced by no previous Mexican president... [T]he Congress had become far more assertive, defeating a considerable percentage of the bills he proposed and rewriting everything" (p.514).

While there is widespread disappointment that Fox did not live up fully to high public expectations on corruption eradication, it has nevertheless been argued that the administration "actually made important investments in the future of clean government ... bringing the anticorruption agency up to global standards" (Rosenberg 2003). An acclaimed "freedom of information act" was also implemented. This suggests that corruption has decreased somewhat. In short, the Mexican experience of falling corruption as stability improved is consistent with the "upward-sloping arm" of our U-shape.

3 Empirics: Cross-Country Evidence

Having developed a set of theoretical predictions on the relationship between corruption and stability, we turn now to the cross-country empirical evidence. We first discuss the measures we employ, particularly the variables that we use to capture stability (Section 3.1). Using this data, we demonstrate a systematic U-shaped pattern linking corruption and stability, one that is remarkably robust to the use of different corruption indices as well as measures of incumbent stability (Section 3.2). We also find suggestive evidence of a U-shaped relationship between corruption and the size of government, consistent with a key corollary of the model (Section 3.3).

3.1 Measures of Corruption Perception and Political Stability

3.1.1 Corruption Perception

Corruption is a particularly difficult phenomenon to quantify, much less compare across countries, given the illicit nature of such transactions. Following much of the cross-country empirical literature, we focus therefore on indices of corruption perception that are based on institutional assessments or surveys.[18] Our main dependent variable is the "Control of Corruption" measure from Kaufmann, Kraay and Mastruzzi (2006), a comprehensive effort that pools together country governance indices from disparate sources. In all, 31 indices from 25 different organizations (such as Gallup International, the World Bank, and the World Economic Forum) were collected and aggregated using an unobserved components methodology, yielding an extensive dataset with more than 150 countries. KKM reports scores between 1996-2002 at two-year intervals, and thereafter for 2002-2005 on an annual basis.

We also use two other leading corruption indicators to corroborate our results, namely the Corruption Perceptions Index (CPI) and the International Country Risk Guide (ICRG). The CPI is released annually by Transparency International, a global anti-corruption civic organization. Like KKM, it also combines institutional assessments of corruption, but uses a non-parametric aggregation procedure instead. The

[18] See Kaufmann, Kraay and Mastruzzi (2007) for a detailed response to criticisms against such corruption measures.

CPI is deliberately more selective in its choice of indices included in the aggregation; the 2005 CPI, for example, was based on 16 indices from 10 different organizations (see Lambsdorff 2005 for details). As a result, the CPI is available for slightly fewer countries, exceeding 100 countries only after 2001. The aggregation approach adopted by KKM and the CPI is intended to reduce the effects of biases that might be inherent in any single source index. To further screen out potentially less reliable data points, we dropped all observations that were based on fewer than three source indices in our analysis. (None of our conclusions change if we instead use all the data points; results available on request.)

Our third and final corruption index – the ICRG – is based on a distinct methodology independently developed by Political Risk Services, a private country risk assessment agency. The ICRG country ratings cover a broad set of political and economic categories, including one component on corruption within the political system. These ratings are available on a commercial basis – ICRG clients are understood to include firms seeking business opportunities overseas – and so the ICRG corruption score focuses on aspects of corruption that are pertinent to the conduct of private business. The ICRG is released on a monthly basis for up to 140 countries. We averaged the monthly corruption scores to obtain an annual measure, when all 12 months of corruptions ratings were available.[19]

For comparability, we linearly re-scaled all three measures so that they range between -2.5 and 2.5, with higher values corresponding to more perceived corruption. Overall, the three indices are very highly correlated. The KKM and CPI country mean scores (averaged over 2002-2005) sport a high correlation coefficient of 0.98. The correlation with the 2002-2005 ICRG country average is only slightly lower (0.88 with KKM and 0.90 with the CPI), which suggests that the ICRG may be picking up on slightly different dimensions of country corruption.[20] These indices provide a natural starting point for our empirical tests of the U-shaped relationship between total corruption and political stability, since they in principle provide assessments of overall corruption, without excluding specific corrupt activities – such as embezzlement or licensing – that are subject to the different effects highlighted in our theory. The CPI, for example, states that its component sources are selected from surveys that do not emphasize one form of corruption over another (Lambsdorff 2005, p.5).[21] While the ICRG focuses more on political corruption such as close ties between politicians and firms, it does not exclude more direct and petty forms of extortion and bribery that hinder the regular conduct of business activities.

[19] It should be noted that the ICRG is a component index used in KKM, but not in the CPI.

[20] The high level of agreement between alternative corruption perception indices is also noted by Svensson (2005).

[21] "It has been suggested in numerous publications that distinctions should be made between these forms of corruption, e.g. between nepotism and corruption in the form of monetary transfers. Yet, none of the data included in the CPI emphasize one form of corruption at the expense of other forms. The sources can be said to aim at measuring the same broad phenomenon. As also emphasized in the background documents of previous years, the sources do not distinguish between administrative and political corruption, nor between petty and grand corruption." (Lambsdorff 2005)

3.1.2 Political Stability

Turning to our key explanatory variable, we worked with two distinct sets of stability measures, the first of which focuses on the historically-observed average length of incumbent tenures. We view this as a simple means to capture how long a political incumbent can expect to hold onto the reins of executive power given recent conditions in the country, with a longer average tenure corresponding to a higher level of incumbent stability. To construct this measure, we used an encyclopedia – WorldStatesmen.org – that compiles chronologies of heads of state and heads of government for countries and territories around the world, including their party affiliation and dates of political transitions. This encyclopedia is extremely comprehensive and regularly updated (political changes in real-time are typically updated within a week), while also fully disclosing the list of sources and contributors consulted in assembling the chronologies. As a cross-check, we compared the accounts in WorldStatesmen.org for consistency with Beck et al.'s (2001) Database of Political Institutions (DPI), to corroborate the years in which political transitions occurred (see the Data Appendix for details).[22]

We construct these average tenure measures using a 20-year window. Specifically, for each year in our sample, we calculate average tenure as 20 divided by one plus the number of observed government changes that took place in the preceding 20 years. Two separate variables were constructed counting respectively changes in individual chief executives, and changes in the party holding the seat of chief executive. While political titles differ across countries, we took the chief executive to be the *de facto* head of government as coded in the DPI.[23] In particular, for most communist states, we follow the DPI in coding the secretary-general of the communist party as the chief executive.[24] For our purposes, we treat military rulers and independents as separate and distinct parties, while also counting all interim and acting heads of government. We count situations in which an incumbent switches party affiliation while in power as a change in party. We adopt these mechanical rules to avoid making judgement calls about how substantial these changes to the political scene were; implicitly, this rule views the need for an acting head or for a change in party allegiance to be a signal of some potential instability in the political status quo.

We report results using both "Executive Tenure" and "Party Tenure", since good arguments can be made in favor of both as measures of the relevant decision-making horizon of political office-holders. On the one hand, "Executive Tenure" likely understates political stability in countries, such as Japan and Mexico,

[22] We did not use the DPI as our main source, since it documents the identity and party of the chief executive as of 1 January of each year, and does not record instances of multiple changes within a calendar year.

[23] Panama offers an example of a country where the nominal head of government did not command real executive power for a long period. General Manuel Noriega is coded by the DPI as the chief executive between 1982-1989, even though he never assumed the formal post of President. There are also a handful of countries in which the post to which chief executive powers are attached switched midway during the sample period. For example, Bangladesh switched from a presidential to a parliamentary system in 1992. Our codings follow whoever the chief executive is, as designated in the DPI, regardless of the exact title of the relevant post.

[24] An exception here is China under Deng Xiaoping, who never held the position of secretary-general, although he was the unquestioned *de facto* leader from 1978 until his death in 1997. Our codings designate Deng as the chief executive during these years, although this is inconsequential for the average party tenure measure.

which experienced regular turnover of heads of government, even though the ruling party (the LDP and PRI respectively) remained entrenched for several decades. On the other hand, changes in individual chief executives are often accompanied by turnover across the government hierarchy and patronage networks, in which case the decision-making horizon for corrupt agents would be better captured by "Executive Tenure" rather than by "Party Tenure". It is reassuring therefore that our empirical results work well with either tenure measure.

When constructing these variables, we adopt a 20-year window to allow a sufficiently long period over which to assess the average duration of an incumbent's stay in power. With the first year in the KKM sample being 1996, the earliest window we use is 1976-1995, so we can calculate average tenure using a full 20-year window for countries that became independent prior to 1976. This covers most of the countries that gained independence in the post-World War II wave of decolonization. For countries that gained independence more recently, we can still calculate average tenure using only the years since independence, but this comes at the cost of introducing more noise as we shorten the window over which the average is taken. For this reason, we typically exclude these young countries (most of which are from the former Soviet Union) from our sample. In our preferred specifications, we also drop Switzerland since average tenure is arguably a poor proxy for political stability in this instance: The Swiss have practised a unique seven-member presidency for more than 150 years, in which the post of chief executive rotates yearly among the seven members, and thus the average tenure of individual chief executives severely understates how stable the polity is.[25]

Our second measure of political stability is more straightforward to describe. We focus here on the strength of the incumbent's position in the country's legislative body. To this effect, we use the "Majority" variable from the DPI, which is equal to the share of seats in the legislature occupied by the governing party or coalition. A higher fraction of seats controlled by the ruling party would imply a lower likelihood of the opposition impeding policy decisions (including decisions, for example, to award licenses and contracts to favored private firms) or attempting to oust the incumbent, so that higher values of "Majority" would correspond to more incumbent stability.

3.2 The U-shape between Corruption and Stability

We proceed to our results on the robust U-shaped relationship between corruption and incumbent stability. We consider evidence from two types of empirical specifications: (i) Cross-section regressions, where the dependent variable is the average corruption score from 2002-2005 for each country; and (ii) Regressions where the dependent variable is the corruption score from individual years pooled across all years from 1996-2005. Since all three corruption indices display a high level of persistence over time, it is natural to attempt first to identify any relationship between corruption and stability at the cross-country level

[25] In practice, our results from the cross-section regressions do not change much when we include Switzerland; results available upon request.

through the cross-section regressions.[26] We then turn to the pooled regressions to make full use of all the years of information at our disposal. Here, we also use dynamic panel techniques that allow us to account for country fixed effects, while instrumenting for political stability to address potential problems arising from reverse causality.

3.2.1 Average Incumbent Tenure

We present first the results from the cross-section regressions using average incumbent tenure as our measure of political stability. In order to pick up the non-monotonic relationship between corruption and stability, we include both stability and its square on the right-hand side of our regressions. Specifically, we estimate the following via ordinary least-squares:

$$Corrup_i \;=\; \beta_0 + \beta_\alpha \cdot Stab_i + \beta_{\alpha^2} \cdot (Stab_i)^2 + \beta_X X_i + \varepsilon_i \tag{7}$$

where i indexes country. The dependent variable, $Corrup_i$, is the mean corruption score from 2002-2005, where the sample includes only those countries for which all 4 years of corruption scores were available. We use "Executive Tenure" and "Party Tenure" as measures of political stability, $Stab_i$, in Tables 1 and 2 respectively. X_i denotes additional determinants of corruption included as control variables, with β_X being the corresponding coefficient vector. Since our focus here is on the long-run determinants of corruption, the explanatory variables on the right-hand side of (7) are averages over the same lagged window used in the construction of the average tenure variable unless otherwise stated (this is 1982-2001 in most columns). We report Huber-White robust standard errors for the coefficient estimates, to account for possible heteroskedasticity in the residuals, ε_i. (Appendix Table 1 provides summary statistics for the variables used in this cross-section analysis, while the Data Appendix documents how these variables were collected or constructed.)

[INSERT TABLE 1A]

Table 1A reveals a clear, robust U-shaped relationship between the KKM corruption index and political stability as measured by the average tenure of the chief executive. Throughout Columns (1)-(6), we obtain a negative significant coefficient on log "Executive Tenure", and a positive significant coefficient on log "Executive Tenure" squared. Corruption is thus decreasing in stability for low ranges of average tenure, while increasing in stability at high ranges. The estimates imply a U-shape with a fairly stable turning point, with corruption reaching its minimum at around 7-9 years of executive tenure in our full specifications in Columns (5) and (6). The last row confirms that this turning point lies in the interior of the relevant window of 0-20 years with a high probability (typically in excess of 95%), as calculated from 1,000 Monte Carlo draws from the asymptotic multivariate normal distribution of the coefficient estimates.

[26] The correlation between the KKM scores (and likewise for the CPI) in any two years between 1996-2005 is in excess of 0.9. The ICRG is slightly less persistent over time, with a pairwise correlation between any two years exceeding 0.68.

Column (1) presents a bare-bones regression, in which only log "Executive Tenure" and its square are included on the right-hand side. We already find evidence in this minimal specification of a U-shaped relationship between corruption and stability, although the R^2 is understandably low (= 0.03) given the small number of covariates.[27] Column (2) introduces log real GDP per capita (from the World Development Indicators, WDI) and its square, as well as region dummies, to help to control for any components in the corruption index that might be systematically correlated with a country's overall economic performance. Not surprisingly, the income coefficient comes out negative and highly significant; the squared term suggests some concavity in the relationship between corruption and income, but the overall pattern is consistent with the stylized fact that richer countries are perceived as being less corrupt.

This U-shaped pattern continues to be remarkably robust to the introduction of many other explanatory variables for corruption advanced in the literature. Column (3) adds a measure of ethnic fractionalization (from Alesina et al. 2003), democracy (from the Polity IV database), and a full set of legal origin dummies. Consistent with Treisman (2000), we find that democracies tend to be less corrupt (significant at the 10% level). While the regression does suggest that ethnic fragmentation is associated with more corruption (Mauro 1995), this effect is not statistically significant. Despite the inclusion of these important determinants of corruption, the KKM index retains its significant U-shape with respect to log "Executive Tenure".[28] We add in Column (4) a set of variables associated with economic rents, proposed by Ades and Di Tella (1999). Following their lead, we control for fuel and ore exports (normalized by total exports) to capture the availability of expropriable rents, while we proxy for the degree of competition that the domestic economy is exposed to with the value of imports normalized by GDP. Column (5) adds several variables capturing characteristics of political systems. Following Persson, Tabellini and Trebbi (2003), we include an indicator variable for whether legislative seats are allocated under a plurality vote rule, which in principle promotes more accountability from individual politicians and should thus reduce corrupt behavior.[29] We also control for inverse district magnitude (number of electoral districts divided by seats), where the intuition is that smaller districts help to improve accountability. Last but not least, we include a measure for presidentialism, following Kunicova's (2005) argument that presidential systems tend to be associated with more corruption. The results in Table 1A confirm that controlling for these additional determinants does not detract from the significance of the U-shape with respect to executive tenure.

We subject our central finding to a series of robustness tests in the remaining columns. Given the small number of observations in these cross-section regressions, a key concern would be whether any

[27] While we have also experimented with a cubic polynomial in stability in the regressions, none of the coefficients in log "Executive Tenure", its square or its cube show up as statistically significant. Given the limited number of data points in the regression, it does not appear practical to attempt to fit a cubic specification.

[28] The U-shape remains robust if we add the ethnic fractionalization, democracy, or legal origin dummies into the regression separately; regressions available on request.

[29] Our results are similar if we use a more continuous measure of plurality that equals 1 if all seats are won under plurality rule; 2/3 if a majority of seats are won under plurality rule but some are allocated under proportional representation (PR) rules; 1/3 if a majority of seats are allocated under PR with a minority won by a plurality vote; and 0 if all legislative seats are allocated under PR rules.

outliers or influential observations might be driving our results. Column (6) demonstrates that the U-shape remains robust even when we drop those observations that are deemed potentially influential for the coefficient estimates under the Cook's distance criterion (Cook 1977), which recommends further exploring observations for which the Cook's distance metric exceeds 4/(sample size).[30] Column (7) examines what happens when we use a shorter 10-year window in computing executive tenure (the auxillary controls in this regression are 10-year averages over 1992-2001, the same years covered by the tenure window). We continue to obtain a U-shape, although the coefficient on squared stability is now just marginally insignificant at the 10% level. It is worth noting too that the point estimates on the coefficients of log "Executive Tenure" and its square are both smaller in magnitude (attenuated towards zero) when compared to the corresponding full specification in Column (5). This is consistent with the interpretation that the tenure measure constructed with the 10-year window is subject to more classical measurement error, and that a sufficiently long window is necessary to compute average tenure more precisely.[31] We return in Column (8) to the use of a 20-year window, but construct our tenure measure with a window (1986-2005) that overlaps contemporaneously with the corruption variables on the left-hand side. We once again find a robust U-shaped pattern, similar to the full specification using a lagged window instead. (The controls in this specification are averages over 2002-2005, or 2002-2004 when 2005 data is not available; the results are similar using 1986-2005 averages.) Finally, Column (9) verifies that our central findings are not affected when we run the regressions using average tenure in years (instead of log tenure). That said, our preferred specifications are those that use log tenure, since the tenure measures are by construction proportional to the reciprocal of the number of changes of chief executive and thus display a lot of right skew.[32]

[INSERT TABLE 1B]

Table 1B confirms that the U-shaped relationship between corruption and log "Executive Tenure" continues to hold with other leading corruption indices. We perform here the same regression specifications in Table 1A using the CPI and the ICRG mean scores as dependent variables instead (for expositional brevity, the table does not report the coefficients on the auxillary controls). Using the CPI scores in the top panel, the U-shape with respect to log "Executive Tenure" remains a consistent feature of the data despite the smaller number of CPI observations. While we do lose statistical significance on the squared stability term when we experiment with a 10-year window (Column (7)) or a contemporaneous window (Column (8)), this does not detract much from the central message of a U-shape with respect to stability

[30] Our results hold when alternative measures of influence are used to trim the dataset, such as the DFITS metric (Welsch and Kuh 1977), Welsch distance (Welsch 1982), or the COVRATIO criterion (Belsley, Kuh and Welsch 1980).

[31] Not surprisingly, when we use an even shorter 5-year window for computing average tenure, the coefficients on stability and its square are even further attenuated towards zero and no longer statistically significant. Note also that if we include countries that gained independence after 1982 by calculating average tenure using a truncated window starting in their year of independence, we find a similar attenuation in the coefficients of stability and its square, once again suggesting that the shortened window results in an average tenure measure that is more noisy.

[32] We have in effect been penalizing ourselves by using log tenure, as the U-shaped relationship between corruption and stability is even more statistically significant when tenure is left un-logged (results available on request).

with an interior turning point. Our central results also hold with the ICRG mean scores (bottom panel). Although the results weaken a little as we move towards the full specification in Column (5), and when we trim the dataset using the Cook's distance criterion in Column (6), the point estimates remain consistent with a U-shape. Overall, the strength of the U-shape is quite remarkable, especially in light of the small cross-section sample size and the extensive set of control variables used.

[INSERT TABLE 2]

Table 2 repeats our cross-section regression exercise using "Party Tenure" as the measure of stability instead. We once again find evidence of a U-shaped pattern, particularly between the KKM corruption index and log "Party Tenure" (top panel). Not surprisingly, the implied turning point corresponds to a longer average tenure compared to Table 1A (equal to 16.38 years in our full specification in Column (5), or 11.70 years in Column (6) when trimming influential observations using the Cook's distance criterion), reflecting the higher frequency of turnover in individual chief executives compared to changes in the party in power.[33] It is also reassuring that our coefficients on average party tenure and its square are most precisely estimated when we parse our sample down in Column (6) to omit potentially influential observations. Our results are slightly weaker when the CPI mean score is used (middle panel), with the coefficient on the squared party tenure term tending to drop out of the range of conventional statistical significance in several specifications. In the bottom panel with the ICRG mean score, we generally find favorable evidence of a U-shaped relationship with respect to log "Party Tenure", although this is not statistically significant in Column (5) with the full set of control variables.

[INSERT FIGURE 2]

Figure 2 neatly summarizes this relationship between corruption and the average tenure measures. The vertical axis in Figure 2A plots the residuals from the KKM index after controlling for all the right-hand side variables in our Column (5) specification, except for log "Executive Tenure" and its square. Figure 2B does the same for the log "Party Tenure" measure. Both the quadratic fit and a non-parametric kernel regression clearly illustrate the non-monotonic pattern between corruption and stability, with corruption being on average higher in countries that exhibit either very high or very low incumbent tenure lengths, and being on average lower in countries in an intermediate range of political stability.[34]

Our next step is to analyze the results when pooling together the observations from each individual year (between 1996-2005). For this, we run ordinary least-squares regressions of the form:

$$Corrup_{it} \;=\; \beta_{\alpha} \cdot Stab_{i,t-1} + \beta_{\alpha^2} \cdot (Stab_{i,t-1})^2 + \beta_X X_{i,t-1} + D_t + \nu_i + \varepsilon_{it} \qquad (8)$$

[33] The relatively lower Monte Carlo probability of an interior turning point is a consequence of this longer average party tenure, since the turning point is located closer to the upper bound of the $(0, 20)$ interval.

[34] In Figure 2B, the kernel regression appears to suggest that there is a final downward-sloping arm to the non-monotonic relationship at the highest levels of average party tenure, as our theory would predict in the case where γ is sufficiently large (diminishing returns do not set in too rapidly in the accumulation process for resources). We do not wish to over-emphasize this point however, given the limited data points available.

where i indexes country, and t indexes year. We run all regressions with year fixed effects, D_t, since both the KKM and CPI indices are normalized in each year and thus cannot be compared cardinally across years. We use one-year lagged values for all the explanatory variables, including our measures of political stability, in order to reduce the possibility of reverse causality. (As before, $X_{i,t-1}$ denotes a set of additional control variables. Regression results using contemporaneous instead of lagged control variables are similar and available on request.) Note that our average tenure measures for each year are now calculated using a lagged 20-year moving window. Since the earliest window used is 1976-1995 (to calculate average tenure leading up to 1996), we retain only those countries in our dataset that were independent by 1976; as before, we also drop the Swiss observation. Last but not least, we allow for within-country correlation in the residuals (induced by the country-specific error term, ν_i), and therefore report robust standard errors clustered by country. (We present an alternative specification with country fixed effects when we turn to our dynamic panel estimation later below.)

[INSERT TABLE 3]

Table 3 presents the results when the measure of stability is log "Executive Tenure". Column (1) is a minimum specification run with the KKM index as the dependent variable and with only year fixed effects as additional controls, while Column (2) includes the entire set of control variables which we saw in the full specification in Column (5) of Tables 1 and 2. Both columns demonstrate that the U-shape between corruption and average executive tenure continues to hold in the pooled sample, with a turning point that is comparable to that from the prior cross-section regressions. (The results are similarly strong with more parsimonious sets of auxillary controls such as in Columns (2)-(4) of Tables 1 and 2.)

We extend the analysis in Column (3) to test the predictions from Proposition 2 relating to the bargaining strength of the incumbent, σ. To see its effects on the U-shaped relationship between corruption and stability, we introduce σ into the regression and also interact it with both stability and its square:

$$\begin{aligned} Corrup_{it} \quad = \quad & \beta_\alpha \cdot Stab_{i,t-1} + \beta_{\alpha^2} \cdot (Stab_{i,t-1})^2 + \beta_\sigma \sigma_i + \beta_{\alpha,\sigma} \cdot \sigma_i Stab_{i,t-1} + \beta_{\alpha^2,\sigma} \cdot \sigma_i (Stab_{i,t-1})^2 \\ & + \beta_X X_{i,t-1} + D_t + \nu_i + \varepsilon_{it} \end{aligned} \tag{9}$$

We consider two possible proxies for σ. We first use a measure of the regulatory barriers to starting a business, from the World Bank's *Doing Business* database, which is based on the data methodology developed by Djankov et al. (2002). Specifically, this σ proxy is the number of days (averaged over 2003-2005, and re-scaled to lie between 0 and 1) needed to set up a new business following all official procedures. In principle, by imposing high and costly barriers to entry, an incumbent is in a position to extract a higher share of the rents enjoyed by the private sector, as firms will have to make more concessions to circumvent such regulatory hold-up. A second σ proxy which we consider is the "Regulatory Quality" governance index from KKM.[35] Constructed in much the same way as KKM's "Control of Corruption" index, this

[35] We thank a referee for suggesting this alternative proxy for the political incumbent's bargaining power.

measure aggregates institutional assessments of country government's ability to "formulate and implement sound policies and regulations that permit and promote private sector development" (KKM, p. 4). We use the negative of this index as an alternative proxy for governmental regulatory hold-up.[36]

While these proxies are admittedly imperfect, the results are encouraging. Column (3) presents the regressions using the "Days" proxy. First of all, it confirms that the basic U-shaped pattern with respect to "Executive Tenure" still holds.[37] Furthermore, the results are consistent with the comparative statics in Proposition 2: The coefficient on the interaction term between log "Executive Tenure" and our σ proxy is positive and statistically significant at the 5% level. To be fully precise, the net interaction effect between these two variables is given by the empirical cross-derivative of corruption with respect to stability and σ, which is equal to $\beta_{\alpha,\sigma} + 2\beta_{\alpha^2,\sigma} \times$(log "Executive Tenure"). This empirical cross-derivative is indeed positive when evaluated at the median value of log "Executive Tenure" in the regression sample, and we can formally reject the null hypothesis that this net interaction effect is equal to zero (p-value = 0.002). This result is best illustrated in a diagram: Figure 3A shows that when the value of "Days" is increased, the U-shaped curve between the corruption residuals and stability is shifted up, with this shift being more pronounced at higher levels of executive tenure. Thus, an increase in the bargaining power of the incumbent generates a larger increase in corruption at higher levels of stability.[38] Using a one-year lag of the "Regulatory Quality" index as our σ proxy instead in Column (5), we obtain very similar results: The interaction coefficient between the σ proxy and log "Executive Tenure" is positive and significant, and we also reject the null hypothesis of a zero net interaction effect at the 10% level (p-value = 0.078).

[INSERT FIGURE 3]

We explore in Columns (4) and (6) a means to exploit the panel structure of our dataset more extensively, in a way that also helps to allay concerns over potential endogeneity issues arising from unobserved country fixed characteristics or reverse causality. Consider the following model:

$$\begin{aligned} Corrup_{it} &= \beta_\alpha \cdot Stab_{i,t-1} + \beta_{\alpha^2} \cdot (Stab_{i,t-1})^2 + \beta_{\alpha,\sigma} \cdot \sigma_i Stab_{i,t-1} + \beta_{\alpha^2,\sigma} \cdot \sigma_i (Stab_{i,t-1})^2 \\ &\quad + \beta_X X_{i,t-1} + D_t + D_i + \varepsilon_{it} \end{aligned} \tag{10}$$

which is similar to (9), except that we have now included D_i as a country fixed effect. Estimating (10) using conventional fixed effects is likely to lead to biased coefficient estimates, since our key right-hand side variable, the stability of the political incumbent, as well as country income per capita, are both plausibly going to depend on the level of observed corruption in preceding periods. In other words, the error term, ε_{it}, is not strictly exogenous as required under fixed effects estimation ($Corr(\varepsilon_{it}, Stab_{i,t+s}) \neq 0$, for $s \geq 0$).

[36] As with the KKM corruption index, we drop those "Regulatory Quality" observations that are based on fewer than three component indices.

[37] For all specifications where the interaction effect with a σ proxy is considered, the turning point reported is that obtained when setting the σ proxy to its median value in the regression sample.

[38] These tests for Proposition 2 are only slightly weaker when run in the cross-section analysis. The coefficients there have similar signs, although significance levels are lower given the small sample size in cross-section.

To address this, we perform a dynamic panel GMM estimation using lagged levels of corruption, stability, stability squared, stability interacted with "Days", stability squared interacted with "Days", "Days", log income per capita, and log income per capita squared as instruments in the first-differenced version of (10) for these right-hand side variables involving stability and income per capita (Arellano and Bond 1991). At the same time, we also use lagged first differences of these variables as instruments in the levels version of (10), to improve the efficiency of the estimates, and allay concerns related to weak instruments when the right-hand side variables are persistent (Arellano and Bover 1995, Blundell and Bond 1998).[39]

This dynamic panel GMM estimation helps to reinforce the message from the prior OLS regressions: In Column (4), we continue to obtain a statistically significant quadratic U-shaped relationship linking corruption and average tenure. The estimated coefficient on the interaction between log "Executive Tenure" and "Days" remains positive, although this is not significant; that said, we do reject the null hypothesis of a zero net interaction effect at the 10% level (p-value = 0.064).[40] We find mixed results when running the dynamic panel estimation using the "Regulatory Quality" proxy in Column (6): We lose significance on the U-shape with respect to log "Executive Tenure", but obtain a positive and significant net interaction effect between log "Executive Tenure" and our σ proxy (we reject the null hypothesis of a zero net interaction effect; p-value = 0.001).

The remainder of Table 3 provides some reassurance that our results are similarly valid with both the CPI and ICRG indices. We present the OLS and dynamic panel specifications using lagged "Regulatory Quality" as the σ proxy as this has slightly more explanatory power for the dependent corruption variable when compared to the "Days" proxy.[41] (The results using the "Days" proxy are similar and available on request.) The evidence points overall towards a U-shape with respect to log "Executive Tenure", as well as a positive interaction effect with the σ proxy (although the results are less significant in the final column which subjects the ICRG index to the dynamic panel estimation).[42]

For completeness, Table 4 conducts the parallel exercise using "Party Tenure" as the measure of incumbent stability, and we obtain strikingly similar results. The coefficients on log "Party Tenure" and its square continue to paint a consistent story regarding the non-monotonic relationship between corruption and average tenure. Figure 3B illustrates this U-shaped pattern, and also makes evident the impact of "Days" in increasing corruption particularly at higher levels of stability.

[39] We implement this using the `xtabond2` Stata command developed in Roodman (2006).

[40] Several basic specification tests (not reported in Table 3) verify that the key underlying assumptions for the dynamic panel model – including the requirement that ε_{it} be uncorrelated with past values of the right-hand side variables – are not violated. We reject the null hypothesis of no first-order serial correlation in the first-differences of the residuals at the 5% level (p-value = 0.023). At the same time, we do not reject the null hypothesis of no second-order serial correlation (p-value = 0.104). The Sargan-Hansen statistic is small ($\chi^2(183) = 73.41$), so we cannot reject the identifying restrictions for the validity of the instruments (p-value = 1.000), subject to the caveat that this test tends to be weak when the set of instruments is large. We also reach similar conclusions with these diagnostic tests in the Column (6) dynamic panel GMM specification using the "Regulatory Quality" proxy.

[41] The KKM "Regulatory Quality" index is only available every two years from 1996-2002. When necessary, we associate the index value for each year with the next year as well (for example, we associate the index value for 1996 with 1997 as well).

[42] Our results also hold in specifications that use more parsimonious sets of control variables (regressions not shown).

[INSERT TABLE 4]

We thus conclude that the evidence strongly supports the presence of a U-shaped relationship between corruption and stability, when stability is measured by the historically observed average tenures of either the chief executive or the party in power.

3.2.2 Legislative Majority

We turn briefly then to consider the empirical evidence when political stability is measured instead by the strength of the incumbent's position in the legislature, as proxied by "Majority". These results are presented in Table 5, which summarizes findings from both cross-section and pooled regressions.

[INSERT TABLE 5]

Reassuringly, our key conclusions are broadly unchanged. In the baseline cross-section KKM regression in Column (1) that includes only "Majority" and its square as explanatory variables, we already find a significant U-shaped pattern with an interior turning point which suggests that corruption bottoms out when the incumbent's "Majority" is around 0.75 (when the ruling coalition holds about three-quarters of the legislative seats). (As before, the right-hand side variables in these cross-section regressions are 20-year lagged averages between 1982-2001, so we include only countries that were independent prior to 1982.) This non-monotonic pattern in the cross-section persists with more parsimonious sets of auxillary controls, or when we drop potentially influential observations using the Cook's distance criterion (regressions not shown). When we pool together all the yearly observations and use one-year lags of "Majority" as our key explanatory variable following the specification in equation (8) with a full set of controls, the U-shape loses statistical significance (Column (2)).[43] Nevertheless, statistical significance is restored when we further include the "Days" proxy in Column (3) following the specification in equation (9). We moreover find favorable evidence of a positive net interaction effect between "Majority" and our "Days" proxy for σ (we reject the null hypothesis of a zero net interaction effect; p-value = 0.007). Repeating this exercise with the other corruption indices in the remaining columns of Table 5, we find that the statistical significance of our results generally weakens. That said, in the full specifications where the interaction effect of "Days" on stability is also considered (Columns (6) and (9)), we find particularly strong evidence for a U-shaped relationship linking corruption and "Majority".[44] Moreover, we again find a positive net interaction effect between stability and our "Days" proxy for the incumbent's bargaining power (p-value = 0.022 and 0.002 respectively in Columns (6) and (9)).

[43] We do not drop the newly independent countries or Switzerland, since the one-year lags of "Majority" are a valid measure of legislative strength in these countries. Our results do not change substantially if we drop these countries.

[44] The Monte Carlo probability of the turning point lying in the interior of $[0, 1]$ is relatively small in Columns (6) and (9), due to the fact that the point estimate of this turning point when evaluated at the median value of "Days" is already close to the upper bound of this interval in both these specifications.

3.3 Corruption and the Size of Government

Last but not least, we investigate the relationship between corruption and the size of government, motivated by our earlier theoretical prediction (in Proposition 4) that this should also be a U-shaped pattern. The relationship between these two variables has drawn some recent attention: Alesina and Angeletos (2005), for instance, present a model in which a positive relation between corruption and the size of government is taken as a premise, whereby a larger government implies a larger scope for rent-seeking activities. However, this relationship has not been easy to verify empirically: Glaeser and Saks (2006), for example, find no significant correlation between corruption convictions and the size of government at the state level in the United States. Understanding the nature of the relationship between these two variables is clearly an important topic in its own right, given the implications it bears for what an appropriate size of government might be in order to minimize the incentives for public office-holders to engage in corrupt activities.

As it turns out, we do find some suggestive evidence of a U-shaped pattern linking corruption and the size of government, as shown in Table 6. We use total government consumption expenditures as a share of GDP, taken from the WDI, to proxy for the size of government, as is standard in this literature. We focus first on the cross-section regression specifications, since this rids the analysis of budget cycle effects that could confound interpretation of the results by averaging the data over several years.

[INSERT TABLE 6]

Column (1) reports a U-shaped pattern, significant at the 1% level, between the mean KKM corruption score and the size of government when no further controls are added. In this baseline specification, corruption reaches its minimum when the level of government expenditures sits at about 20% of GDP. This turning point lies well within the range of government sizes observed in the sample (between 0% and 50%). This relationship weakens when we add in a full set of controls (Column (2)), but is restored when we turn to the pooled specification based on annual observations (Column (3)). When using the other corruption measures, we find in general that the statistical significance of any U-shape with respect to government size is strong in the minimum baseline specification, but weakens as we add further auxillary controls. Overall though, the point estimates never overturn the basic U-shaped relationship. Of note, throughout all specifications, the Monte Carlo probability of the turning point lying in the interior of the relevant $[0, 50]$ range is large (always in excess of 0.9).

In sum, we find some suggestive evidence that corruption is decreasing in the size of government for countries where the level of these government expenditures is low, but this relationship turns into a positively-sloped one over high ranges of government expenditures.

4 Concluding Remarks

This paper has investigated the relationship between the level of corruption and the degree of instability to which political incumbents are exposed, both from theoretical and empirical perspectives. Our theoretical framework predicts that corruption and stability are related in a non-monotonic pattern that approximates a U-shape, building on the interaction between the horizon effect, by which a less stable incumbent is more willing to embezzle, and the demand effect, according to which higher bribes will be offered to a more stable incumbent.

On the empirical side, we find that the cross-country evidence displays a U-shaped relationship between corruption and political stability, as measured by historically-observed incumbent tenure lengths or by the legislative majority of the government. This result is largely robust to the inclusion of many political and economic control variables, as well as across various estimation methods. We see this robustness as suggesting that cross-country corruption perception indices do contain useful information beyond their oft-noted correlation with GDP per capita. (It is hard to believe that the nonlinear relationships uncovered could be attributed to random noise.)

While the available empirical evidence supports the U-shaped prediction, a natural next step will be to pursue tests to separately identify the horizon and demand effects within a common setting. In this regard, we believe that turning to micro-level data is a promising direction along which to bridge theory and empirics. Most encouragingly, some work based on Mexican firm-level data on corruption has already tested our theory, with the preliminary results being quite supportive (Gamboa-Cavazos, Garza-Cantú and Salinas 2006). Our hope is that further micro-level evidence will allow us to separately measure different types of corruption along the lines suggested by the theory, and we intend to continue working in this direction as part of this research agenda.

As a final note, it is worth highlighting some policy implications stemming from our analysis. The horizon effect suggests that the possibility of reelection should be an important incentive in defusing an incumbent's tendency to embezzle. On the other hand, the demand effect cautions that long-standing incumbents are more liable to engage in long-term illicit licensing relations with private firms. When these two effects are combined, our theory implies that there is an optimal length of tenure at which the marginal incentive to license more exactly offsets the marginal disincentive to engage in more embezzlement. This suggests that an electoral system in which there is the possibility of reelection, but which nevertheless imposes term limits on politicians, is well-placed to approximate such an optimal compromise between the horizon and demand effects. In fact, the data confirm that the length of executive tenure that minimizes corruption – the "turning point" of the U-shape – is around eight years, remarkably close to the term limits (two terms of four years) that are observed in practice in many countries. Advertently or inadvertently, the designers of these electoral institutions appear to have built in a system that balances off the horizon and demand effects highlighted in our analysis.

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6 Data Appendix

A. Corruption Perception Indices

Kaufmann, Kraay and Mastruzzi (KKM): From KKM's (2006) "Control of Corruption" index, itself a composite of different corruption ratings aggregated by an unobserved components methodology. On a scale of -2.5 to 2.5. The negative of the original index is used, so that higher numbers correspond to more perceived corruption. Data are available for 1996-2002 at two-year intervals, and thereafter for 2002-2005 on an annual basis. We drop all observations which were aggregated from less than three source indices. For the cross-section regressions, the dependent variable is the mean KKM score from 2002-2005; we restrict the sample to only those countries where all four years of data were available.

Corruption Perceptions Index (CPI): From Transparency International (TI). The CPI is linearly re-scaled from its original range of 0 to 10, to a -2.5 to 2.5 scale, with higher numbers corresponding to more perceived corruption. Data used are annual observations from 1996-2005. The CPI is also based on corruption scores from different agencies, but its aggregation methodology is non-parametric in nature, using only the ordinal ranks of each country. We use only those data points which CPI aggregates based on at least three sources; these are the data points that TI reports in its annual ranking of countries. For the cross-section regressions, the dependent variable is the mean score for only those countries for which four continuous years of data were available for 2002-2005. (2002 is the first year for which CPI coverage exceeds 100 countries.)

International Country Risk Guide (ICRG): From the Political Risk Services Group, a commercial provider of country risk assessments. The ICRG political risk rating index contains a sub-component for corruption, which is what we use. The original ICRG corruption index is coded on a scale of 0 to 6, and is available on a monthly basis. We linearly re-scaled the scores to lie on a -2.5 to 2.5 interval with a higher score corresponding to more corruption, and took the simple average of monthly scores to obtain an annual score (for each country, this is computed only for those years in which all 12 months of corruption data are available). For the cross-section regressions, we use the mean ICRG score for 2002-2005, where only countries with all four years of data are included in the sample. For more details on the ICRG methodology, see: http://www.prsgroup.com/ICRG_Methodology.aspx

B. Political Stability

Average Tenure: The historically observed average tenure (in years) for political incumbents over a 20-year window. Calculated as $20/(1+x)$, where x is the number of political changes observed in the preceding 20-year window. We compute two separate average tenure measures for: (i) individual chief executives; and (ii) the party in power (holding the seat of the chief executive).

The information on political changes was compiled from: http://www.worldstatesmen.org. We checked the political chronologies from WorldStatesmen.org for consistency against the August 2005 version of the Database of Political Institutions (DPI). The DPI contains two variables "PRTYIN" and "EXECME" that code respectively the number of years that the party of the chief executive has been in power and the name of the party of the chief executive, as of 1 January of each year from 1975-2004. These variables allow us to identify years in which political changes occurred, although they are not ideal since they do not pick up instances of extreme political volatility when more than one change occurred in a year. Notwithstanding this, we used these DPI variables as a cross-check. Reassuringly, few discrepancies were found, and these were resolved by consulting additional sources on political histories, such as the Zarate Political Collections (ZPC).

Majority: From the DPI. Variable used is "MAJ", which is the fraction of seats in the legislature held by members of the governing coalition, as of 1 January of each year.

C. Additional Variables

Real GDP per capita: From the World Bank World Development Indicators (WDI). Real PPP-adjusted GDP per capita (in constant 2000 international dollars).

Ethnic fractionalization: From Alesina et al. (2003). Equal to 1 minus the Herfindahl Index of population shares of ethnic groups within a country. (This variable does not vary over time.)

Democracy: Polity IV democracy score, on a scale of 0 to 10. The reference date for the annual observations in the Polity IV dataset is 31 December of each year. We match these to the data corresponding to 1 January of the following year for consistency with the DPI.

Fuel exports: From the WDI. Value of fuel exports as a percentage of total merchandize exports.

Ore exports: From the WDI. Value of ore and metal exports as a percentage of total merchandize exports.

Imports: From the WDI. Imports of goods and services as a percentage of GDP.

Presidentialism: Calculated from the DPI. The DPI variable "SYSTEM" codes political systems as: 0 for a direct presidential system; 1 for a strong president elected by a legislative assembly; and 2 for a parliamentary system. Our presidentialism variable is equal to (2-"SYSTEM")/2, so higher values indicate more political power concentrated with the president.

Plurality: Equal to the "PLURALTY" variable from the DPI. Variable is 1 if a first-past-the-post rule is used in elections to the legislature for at least some seats. Variable is coded as 0 if all seats are determined by proportional representation (PR) rules, or if elections are not free (all legislators are appointed or there is no competition under one-party rule).

Inverse of District Magnitude: Calculated as 1/"MDMH". The "MDMH" variable is from the DPI, and is equal to the number of legislative seats per electoral district.

Legal Origin: From La Porta et al. (1999). Dummy variables for British, French, Scandinavian, German, and socialist legal origin.

Region dummies: Following the World Bank's classifications, dummy variables for: East Asia and the Pacific; East Europe and Central Asia; Middle East and North America; South Asia; West Europe; North America; Sub-Saharan Africa; Latin America and the Caribbean.

Days to start a business: Days required to start a business following all formally required procedures. Mean taken over the years 2003-2005 (countries with less than three years of data are dropped). From Doing Business: Benchmarking Business Regulations, a World Bank database.

Regulatory Quality: From KKM (2006). The negative of the "Regulatory Quality" index is used, so higher scores correspond to a business environment that is less favorable towards private sector firms. As with the "Control of Corruption" index, we drop all observations aggregated on the basis of fewer than three source indices.

Size of Government: From the WDI. Total government consumption expenditure as a share of GDP.

Year of Independence: From the CIA World Factbook.

Table 1A
The U-Shape between Corruption and Average Chief Executive Tenure (in Cross-section)

Dependent variable: **KKM mean (2002-2005)**	(1) Min. Spec.	(2)	(3)	(4)	(5) Full Spec.	(6) Cook's $< 4/n$	(7) 10-year window	(8) 86-05 window	(9) Ten. not logged
Ln Exec. Tenure	**−0.988****	**−1.103*****	**−1.211*****	**−1.104*****	**−1.219*****	**−0.859*****	**−0.583****	**−0.949*****	**−0.175*****
	(0.485)	**(0.224)**	**(0.233)**	**(0.231)**	**(0.248)**	**(0.200)**	**(0.251)**	**(0.354)**	**(0.039)**
(Ln Exec. Tenure)^2	**0.294****	**0.296*****	**0.296*****	**0.269*****	**0.306*****	**0.199*****	**0.148**	**0.217***	**0.008*****
	(0.135)	**(0.068)**	**(0.070)**	**(0.071)**	**(0.077)**	**(0.058)**	**(0.090)**	**(0.113)**	**(0.002)**
Ln Real GDP per cap.		2.984***	3.435***	3.726***	3.962***	3.391***	3.424***	3.895***	0.751***
		(0.668)	(0.733)	(0.728)	(0.868)	(0.808)	(0.754)	(0.922)	(0.216)
(Ln Real GDP per cap.)^2		−0.225***	−0.245***	−0.263***	−0.279***	−0.237***	−0.246***	−0.273***	0.658***
		(0.041)	(0.046)	(0.045)	(0.054)	(0.050)	(0.046)	(0.055)	(0.199)
Ethnic fractionalization			0.207	−0.051	−0.132	−0.165	−0.159	−0.272	−0.187
			(0.203)	(0.223)	(0.273)	(0.228)	(0.234)	(0.293)	(0.271)
Democracy			−0.040*	−0.037*	−0.025	−0.045**	−0.030	−0.012	−0.023
			(0.021)	(0.019)	(0.026)	(0.023)	(0.018)	(0.020)	(0.026)
Imports / GDP				−0.004	−0.004*	−0.004*	−0.005**	−0.003	−0.004
				(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Fuel / Total exports				0.005***	0.004**	0.005***	0.005***	0.005***	0.004**
				(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Ores / Total exports				−0.002	−0.003	−0.001	−0.002	−0.003	−0.003
				(0.004)	(0.004)	(0.002)	(0.003)	(0.004)	(0.004)
Plurality					−0.099	−0.002	0.001	−0.048	−0.029
					(0.132)	(0.118)	(0.111)	(0.139)	(0.132)
Inv. district magnitude					−0.049	−0.029	0.089	0.049	−0.057
					(0.127)	(0.105)	(0.126)	(0.182)	(0.119)
Presidentialism					0.159	0.036	0.136	0.121	0.184
					(0.148)	(0.140)	(0.120)	(0.122)	(0.146)
Region dummies	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Legal origin dummies	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of obs. (n)	136	125	120	116	105	97	118	91	105
R^2	0.03	0.85	0.86	0.88	0.89	0.91	0.88	0.90	0.89
Turning point (in years)	5.37	6.46	7.72	7.80	7.32	8.65	7.15	8.86	11.24
MC prob. $\in (0, 20)$ (or (0,10))	0.995	1.000	0.998	0.995	0.997	0.971	0.758	0.883	1.000

Notes: Robust standard errors in parentheses, with *, **, and *** denoting significance at the 10%, 5% and 1% levels respectively. Sample includes only countries independent by the start of the relevant tenure window; CHE is excluded. Right-hand side controls (except country fixed factors and ethnic fractionalization) are averages over 1982-2001; the exceptions are Column (7) where averages over 1992-2001 are used, and Column (8) where averages over 2002-2005 are used (or 2002-2004 for variables without 2005 data). Countries dropped in Column (6) under the Cook's Distance criterion are BWA, CAN, CHL, GNQ, NZL, PNG, SGP, and USA. The "MC prob." row reports the Monte Carlo probability that the turning point lies in the interior of the relevant tenure window, based on 1,000 draws from the multivariate normal distribution of the coefficient estimates.

Table 1B
The U-Shape between Corruption and Average Chief Executive Tenure (in Cross-section)

	(1) Min. Spec.	(2)	(3)	(4)	(5) Full Spec.	(6) Cook's $< 4/n$	(7) 10-year window	(8) 86-05 window	(9) Ten. not logged
Dependent variable: **CPI mean (2002-2005)**									
Ln Exec. Tenure	**−1.740****	**−0.966*****	**−1.110*****	**−0.841*****	**−0.930*****	**−0.872*****	**−0.707****	**−1.061****	**−0.173*****
	(0.700)	**(0.331)**	**(0.326)**	**(0.303)**	**(0.306)**	**(0.264)**	**(0.343)**	**(0.499)**	**(0.045)**
(Ln Exec. Tenure)^2	**0.543*****	**0.207****	**0.246*****	**0.182****	**0.214****	**0.205*****	**0.204**	**0.228**	**0.007*****
	(0.194)	**(0.089)**	**(0.092)**	**(0.087)**	**(0.087)**	**(0.074)**	**(0.131)**	**(0.172)**	**(0.002)**
Number of obs. (n)	83	83	81	81	78	70	89	74	78
R^2	0.06	0.86	0.88	0.90	0.90	0.95	0.89	0.90	0.90
Turning point (in years)	4.96	10.30	9.60	10.12	8.77	8.34	5.68	10.20	12.12
MC prob. $\in (0, 20)$ (or (0,10))	0.999	0.890	0.921	0.880	0.921	0.973	0.832	0.789	1.000
Dependent variable: **ICRG mean (2002-2005)**									
Ln Exec. Tenure	**−1.310*****	**−1.297*****	**−1.369*****	**−1.215*****	**−0.899****	**−0.554**	**−0.842***	**−1.258***	**−0.183*****
	(0.428)	**(0.391)**	**(0.392)**	**(0.393)**	**(0.403)**	**(0.371)**	**(0.479)**	**(0.640)**	**(0.056)**
(Ln Exec. Tenure)^2	**0.403*****	**0.353*****	**0.332*****	**0.299*****	**0.189**	**0.082**	**0.296***	**0.326**	**0.007*****
	(0.119)	**(0.118)**	**(0.112)**	**(0.113)**	**(0.116)**	**(0.099)**	**(0.176)**	**(0.205)**	**(0.003)**
Number of obs. (n)	119	111	105	104	96	86	106	86	96
R^2	0.07	0.68	0.72	0.75	0.78	0.84	0.74	0.77	0.78
Turning point (in years)	5.07	6.28	7.85	7.60	10.76	29.79	4.15	6.89	12.22
MC prob. $\in (0, 20)$ (or (0,10))	1.000	0.993	0.980	0.970	0.820	0.633	0.978	0.918	0.989
Income, inc. sq., Reg. dummies	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Eth. Frac., Democ., Legal origin	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Economic rents	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Political system	No	No	No	No	Yes	Yes	Yes	Yes	Yes

Notes: Robust standard errors in parentheses, with *, **, and *** denoting significance at the 10%, 5% and 1% levels respectively. Sample includes only countries independent by the start of the relevant tenure window; CHE is excluded. Right-hand side controls (except country fixed factors and ethnic fractionalization) are averages over 1982-2001; the exceptions are Column (7) where averages over 1992-2001 are used, and Column (8) where averages over 2002-2005 are used (or 2002-2004 for variables without 2005 data). Countries dropped in Column (6) under the Cook's Distance criterion are: CAN, CHL, GRC, KOR, NZL, PHL, USA, and ZMB in the upper panel using CPI scores; and AGO, AUS, GAB, HTI, KOR, KWT, NZL, PNG, SGP, and ZWE in the lower panel using ICRG scores. The "MC prob." row reports the Monte Carlo probability that the turning point lies in the interior of the relevant tenure window, based on 1,000 draws from the multivariate normal distribution of the coefficient estimates.

Table 2
The U-Shape between Corruption and Average Party Tenure (in Cross-section)

	(1) Min. Spec.	(2)	(3)	(4)	(5) Full Spec.	(6) Cook's $< 4/n$	(7) 10-year window	(8) 86-05 window	(9) Ten. not logged
Dependent variable: **KKM mean (2002-2005)**									
Ln Party Tenure	**−1.061***	**−0.819*****	**−0.803*****	**−0.722*****	**−0.728*****	**−0.684*****	**−0.520***	**−0.649***	**−0.083****
	(0.559)	**(0.264)**	**(0.266)**	**(0.257)**	**(0.261)**	**(0.206)**	**(0.293)**	**(0.340)**	**(0.041)**
(Ln Party Tenure)^2	**0.252***	**0.188****	**0.147****	**0.129***	**0.130***	**0.139*****	**0.112**	**0.108**	**0.003**
	(0.146)	**(0.072)**	**(0.071)**	**(0.068)**	**(0.071)**	**(0.049)**	**(0.099)**	**(0.089)**	**(0.002)**
Number of obs. (n)	136	125	120	116	105	93	118	91	105
R^2	0.02	0.84	0.85	0.87	0.88	0.92	0.89	0.90	0.87
Turning point (in years)	8.23	8.87	15.47	16.44	16.38	11.70	10.15	20.35	16.06
MC prob. $\in (0, 20)$ (or (0,10))	0.935	0.956	0.698	0.639	0.639	0.928	0.663	0.585	0.778
Dependent variable: **CPI mean (2002-2005)**									
Ln Party Tenure	**−1.640****	**−0.705***	**−0.741****	**−0.648***	**−0.713****	**−0.663****	**−0.421**	**−0.838***	**−0.111****
	(0.733)	**(0.415)**	**(0.365)**	**(0.336)**	**(0.351)**	**(0.322)**	**(0.389)**	**(0.434)**	**(0.048)**
(Ln Party Tenure)^2	**0.409****	**0.121**	**0.101**	**0.100**	**0.122**	**0.117**	**0.039**	**0.125**	**0.004***
	(0.205)	**(0.114)**	**(0.101)**	**(0.091)**	**(0.097)**	**(0.087)**	**(0.137)**	**(0.117)**	**(0.002)**
Number of obs. (n)	83	83	81	81	78	69	89	74	78
R^2	0.04	0.85	0.88	0.90	0.90	0.94	0.89	0.91	0.90
Turning point (in years)	7.43	18.52	39.31	25.45	18.79	16.93	209.56	28.37	15.19
MC prob. $\in (0, 20)$ (or (0,10))	0.949	0.693	0.444	0.539	0.640	0.651	0.553	0.524	0.829
Dependent variable: **ICRG mean (2002-2005)**									
Ln Party Tenure	**−1.589*****	**−1.188*****	**−1.083****	**−1.042****	**−0.731**	**−0.589**	**−0.794**	**−1.140***	**−0.126****
	(0.495)	**(0.438)**	**(0.440)**	**(0.447)**	**(0.465)**	**(0.410)**	**(0.535)**	**(0.681)**	**(0.055)**
(Ln Party Tenure)^2	**0.410*****	**0.280****	**0.204***	**0.208***	**0.119**	**0.092**	**0.229**	**0.241**	**0.004***
	(0.129)	**(0.114)**	**(0.115)**	**(0.113)**	**(0.122)**	**(0.102)**	**(0.182)**	**(0.175)**	**(0.002)**
Number of obs. (n)	119	111	105	104	96	88	106	86	96
R^2	0.06	0.66	0.71	0.74	0.78	0.84	0.74	0.77	0.77
Turning point (in years)	6.94	8.36	14.28	12.19	21.54	24.58	5.64	10.65	14.64
MC prob. $\in (0, 20)$ (or (0,10))	0.998	0.971	0.719	0.814	0.632	0.653	0.873	0.837	0.862
Income, inc. sq., Reg. dummies	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Eth. Frac., Democ., Legal origin	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Economic rents	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Political system	No	No	No	No	Yes	Yes	Yes	Yes	Yes

Notes: See Tables 1A and 1B. Countries dropped in Column (6) are: BFA, BWA, CAN, CHL, GNQ, ISR, JPN, NZL, PNG, SGP, USA in the upper panel using KKM scores; CAN, CHL, GRC, NZL, PHL, SGP, TUR, USA, ZMB in the middle panel using CPI scores; and AUS, GAB, HTI, KWT, NZL, PNG, SGP, ZWE in the lower panel using ICRG scores.

Table 3
The U-Shape between Corruption and Average Chief Executive Tenure
(Dependent variable: Annual corruption scores, 1996-2005, unbalanced panel)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Corruption index:	KKM	KKM	KKM	KKM	KKM	KKM	CPI	CPI	ICRG	ICRG
σ proxy:	–	–	"Days"	"Days"	"Reg"	"Reg"	"Reg"	"Reg"	"Reg"	"Reg"
	OLS	OLS	OLS	GMM	OLS	GMM	OLS	GMM	OLS	GMM
	Min. Spec.	Full Spec.	Full Spec.	Full Spec.	Full Spec.	Full Spec.	Full Spec.	Full Spec.	Full Spec.	Full Spec.
Ln Exec. Tenure	**−1.001****	**−0.941*****	**−1.256*****	**−0.760****	**−0.506****	**−0.370**	**−0.506***	**−0.738*****	**−0.579***	**−0.863**
	(0.412)	**(0.231)**	**(0.311)**	**(0.333)**	**(0.208)**	**(0.265)**	**(0.285)**	**(0.261)**	**(0.334)**	**(0.565)**
(Ln Exec. Tenure)^2	**0.311*****	**0.230*****	**0.278*****	**0.179****	**0.128****	**0.102**	**0.105**	**0.145****	**0.156***	**0.180**
	(0.113)	**(0.063)**	**(0.095)**	**(0.089)**	**(0.061)**	**(0.076)**	**(0.077)**	**(0.071)**	**(0.093)**	**(0.140)**
σ proxy			−1.402*	—	0.099	—	0.094	—	−0.345	—
			(0.726)		(0.163)		(0.230)		(0.295)	
(Ln Exec. Tenure) × σ			2.015**	0.397	0.366*	0.236*	0.485*	0.233*	0.875**	0.616***
			(0.960)	(0.560)	(0.199)	(0.140)	(0.291)	(0.127)	(0.364)	(0.199)
(Ln Exec. Tenure)^2 × σ			−0.417	−0.001	−0.090	−0.047	−0.134	−0.053	−0.213*	−0.148
			(0.290)	(0.195)	(0.059)	(0.050)	(0.084)	(0.051)	(0.116)	(0.091)
Number of obs. (n)	871	564	528	528	500	500	563	563	723	723
Number of countries	137	94	87	87	94	94	87	87	91	91
R^2	0.04	0.89	0.89	—	0.91	—	0.90	—	0.69	—
p-value (Interaction = 0)	—	—	0.002	0.064	0.078	0.001	0.205	0.036	0.018	0.034
Turning point (in years)	5.00	7.75	9.06	6.92	7.27	6.63	8.71	12.00	6.78	10.33
MC prob. $\in (0, 20)$	0.998	0.998	0.961	0.966	0.946	0.889	0.881	0.762	0.970	0.827
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Income, inc. sq., Reg. dummies	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Eth. Frac., Democ., Legal origin	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Economic rents	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Political system	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Robust standard errors in parentheses, with *, **, and *** denoting significance at the 10%, 5% and 1% levels respectively. In all OLS columns, standard errors are clustered by country. Sample includes only countries independent before 1976, and "CHE" is dropped. Right-hand side variables (except country fixed factors, ethnic fractionalization, and "Days") are one-year lags. The p-value is reported for a t-test of whether the net interaction effect between ln "Exec. Tenure" and the σ proxy equals 0, when evaluated at the median value of ln "Exec. Tenure" in the regression sample. The turning point for columns with these interaction terms is evaluated at the median value of the σ proxy in the regression sample. The last row reports the probability that the turning point lies in the interior of (0,20), based on 1,000 Monte Carlo draws from the multivariate normal distribution of the coefficient estimates.

Table 4
The U-Shape between Corruption and Average Party Tenure
(Dependent variable: Annual corruption scores, 1996-2005, unbalanced panel)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Corruption index:	KKM	KKM	KKM	KKM	KKM	KKM	CPI	CPI	ICRG	ICRG
σ proxy:	—	—	"Days"	"Days"	"Reg"	"Reg"	"Reg"	"Reg"	"Reg"	"Reg"
	OLS	OLS	OLS	GMM	OLS	GMM	OLS	GMM	OLS	GMM
	Min. Spec.	Full Spec.	Full Spec.	Full Spec.	Full Spec.	Full Spec.	Full Spec.	Full Spec.	Full Spec.	Full Spec.
Ln Party Tenure	**−1.052****	**−0.772*****	**−1.593*****	**−1.300*****	**−0.454****	**−0.473**	**−0.659****	**−1.014*****	**−0.555**	**−0.996***
	(0.504)	**(0.293)**	**(0.428)**	**(0.461)**	**(0.185)**	**(0.399)**	**(0.258)**	**(0.350)**	**(0.360)**	**(0.553)**
(Ln Party Tenure)^2	**0.258***	**0.164****	**0.331*****	**0.270****	**0.109****	**0.125**	**0.156****	**0.258****	**0.146***	**0.288****
	(0.131)	**(0.072)**	**(0.109)**	**(0.130)**	**(0.047)**	**(0.111)**	**(0.066)**	**(0.108)**	**(0.088)**	**(0.138)**
σ proxy			−3.870***	—	−0.266	—	−0.476	—	−1.104***	—
			(1.065)		(0.245)		(0.288)		(0.389)	
(Ln Party Tenure) × σ			4.447***	0.161	0.602**	0.369**	0.951***	0.191	1.625***	0.661***
			(1.224)	(0.617)	(0.280)	(0.146)	(0.349)	(0.178)	(0.443)	(0.235)
(Ln Party Tenure)^2 × σ			−0.960***	0.113	−0.110	−0.103*	−0.216**	−0.031	−0.383***	−0.175*
			(0.307)	(0.237)	(0.074)	(0.060)	(0.096)	(0.073)	(0.126)	(0.095)
Number of obs. (n)	871	564	528	528	500	500	563	563	723	723
Number of countries	137	94	87	87	94	94	87	87	91	91
R^2	0.03	0.88	0.89	—	0.91	—	0.91	—	0.70	—
p-value (Interaction = 0)	—	—	0.000	0.086	0.000	0.565	0.001	0.186	0.001	0.310
Turning point (in years)	7.67	10.51	12.17	8.97	9.28	6.53	8.56	7.62	7.37	5.78
MC prob. $\in (0, 20)$	0.951	0.913	0.857	0.948	0.944	0.922	0.991	0.945	0.998	0.987
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Income, inc. sq., Reg. dummies	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Eth. Frac., Democ., Legal origin	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Economic rents	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Political system	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Robust standard errors in parentheses, with *, **, and *** denoting significance at the 10%, 5% and 1% levels respectively. In all OLS columns, standard errors are clustered by country. Sample includes only countries independent before 1976, and "CHE" is dropped. Right-hand side variables (except country fixed factors, ethnic fractionalization, and "Days") are one-year lags. The p-value is reported for a t-test of whether the net interaction effect between ln "Party Tenure" and the σ proxy equals 0, when evaluated at the median value of ln "Party Tenure" in the regression sample. The turning point for columns with these interaction terms is evaluated at the median value of the σ proxy in the regression sample. The last row reports the probability that the turning point lies in the interior of (0,20), based on 1,000 Monte Carlo draws from the multivariate normal distribution of the coefficient estimates.

Table 5
The U-Shape between Corruption and Legislative Majority

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Corruption index:	KKM	KKM	KKM	CPI	CPI	CPI	ICRG	ICRG	ICRG
σ proxy:	—	—	"Days"	—	—	"Days"	—	—	"Days"
	Cross-section Ind. by 1982	Pooled	Pooled	Cross-section Ind. by 1982	Pooled	Pooled	Cross-section Ind. by 1982	Pooled	Pooled
Majority	**−5.721****	**−0.756**	**−2.976*****	**−4.200**	**−0.712**	**−3.771****	**−4.808**	**−0.409**	**−6.540*****
	(2.305)	**(0.576)**	**(1.048)**	**(3.379)**	**(0.838)**	**(1.543)**	**(3.945)**	**(1.192)**	**(2.059)**
(Majority)^2	**3.571****	**0.244**	**1.773****	**2.222**	**0.230**	**2.529***	**2.754**	**0.161**	**4.591*****
	(1.547)	**(0.447)**	**(0.851)**	**(2.461)**	**(0.654)**	**(1.297)**	**(2.728)**	**(0.894)**	**(1.658)**
σ proxy			−2.584**			−3.430**			−7.329***
			(0.995)			(1.454)			(2.059)
(Majority) × σ			8.524**			11.867**			23.359***
			(3.459)			(5.313)			(7.123)
(Majority)^2 × σ			−5.816**			−8.826*			−16.833***
			(2.907)			(4.555)			(5.844)
Number of obs. (n)	108	678	640	79	759	739	97	906	860
Number of countries	108	114	106	79	107	101	97	108	101
R^2	0.87	0.88	0.88	0.90	0.86	0.87	0.76	0.65	0.66
p-value (Interaction = 0)	—	—	0.007	—	—	0.022	—	—	0.002
Turning point	0.80	1.55	0.99	0.95	1.55	0.86	0.87	1.27	0.75
MC prob. $\in (0,1)$	0.937	0.335	0.510	0.644	0.503	0.681	0.761	0.769	0.899
Year dummies	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Income, inc. sq., Reg. dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Eth. Frac., Democ., Legal origin	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Economic rents	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Political system	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Robust standard errors in parentheses, with *, **, and *** denoting significance at the 10%, 5% and 1% levels respectively. In all "Pooled" columns, these standard errors are clustered by country. The dependent variable in the "Cross-section" columns is the mean corruption score over 2002-2005, while right-hand side variables are averages over 1982-2001. In the "Pooled" columns, the right-hand side variables are one-year lags. The p-value is reported for a t-test of whether the net interaction effect between "Majority" and the σ proxy equals 0, when evaluated at the median value of "Majority" in the regression sample. For the specifications involving interaction effects, the turning point with respect to "Majority" is evaluated at the median value of the σ proxy in the regression sample. The last row of the table reports the probability that the turning point lies in the interior of (0,1), based on 1,000 Monte Carlo draws from the multivariate normal distribution of the coefficient estimates.

Table 6
The U-Shape between Corruption and the Size of Government

Corruption index:	(1) KKM Cross-section Ind. by 1982 Min. Spec.	(2) KKM Cross-section Ind. by 1982 Full Spec.	(3) KKM Pooled Full Spec.	(4) CPI Cross-section Ind. by 1982 Min. Spec.	(5) CPI Cross-section Ind. by 1982 Full Spec.	(6) CPI Pooled Full Spec.	(7) ICRG Cross-section Ind. by 1982 Min. Spec.	(8) ICRG Cross-section Ind. by 1982 Full Spec.	(9) ICRG Pooled Full Spec.
Govt. Spending / GDP	**−0.263*** **	**−0.051**	**−0.076*** **	**−0.368*** **	**−0.066***	**−0.056***	**−0.201*** **	**−0.020**	**−0.033**
	(0.050)	**(0.038)**	**(0.023)**	**(0.096)**	**(0.039)**	**(0.031)**	**(0.054)**	**(0.063)**	**(0.044)**
(Govt. Spending / GDP)^2	**0.006*** **	**0.001**	**0.002*** **	**0.007** **	**0.001**	**0.001**	**0.004*** **	**0.000**	**0.001**
	(0.001)	**(0.001)**	**(0.001)**	**(0.003)**	**(0.001)**	**(0.001)**	**(0.001)**	**(0.002)**	**(0.001)**
Number of obs. (n)	135	106	677	84	79	760	118	97	903
Number of countries	135	106	113	84	79	105	118	97	108
R^2	0.18	0.87	0.88	0.33	0.89	0.86	0.12	0.75	0.65
Turning point	23.51	17.30	16.54	25.86	23.79	19.47	23.83	20.65	11.63
MC prob. $\in (0, 50)$	1.000	0.948	1.000	0.961	0.930	0.950	0.997	0.876	0.899
Year dummies	No	No	Yes	No	No	Yes	No	No	Yes
Income, inc. sq., Reg. dummies	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Eth. Frac., Democ., Legal origin	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Economic rents	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Political system	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes

Notes: Robust standard errors in parentheses, with *, **, and *** denoting significance at the 10%, 5% and 1% levels respectively. In all "Pooled" columns, these standard errors are clustered by country. The dependent variable in the "Cross-section" columns is the mean corruption score over 2002-2005, while right-hand side variables are averages over 1982-2001. In the "Pooled" columns, the right-hand side variables are one-year lags. The last row of the table reports the probability that the turning point lies in the interior of (0,50), based on 1,000 Monte Carlo draws from the multivariate normal distribution of the coefficient estimates.

Appendix Table 1
Summary Statistics

	N	Min	Median	Max	Mean	Std. Dev.
A. Corruption perception indices						
KKM (2002-2005)	166	-2.465	0.386	1.748	0.097	1.027
CPI (2002-2005)	102	-2.338	0.65	1.788	0.231	1.197
ICRG (2002-2005)	140	-2.5	0.616	2.5	0.422	0.949
B. Political stability measures						
Avg Executive Tenure (1982-2001)	162	0.952	4.25	20	5.967	5.106
Avg Party Tenure (1982-2001)	162	1.333	5	20	7.773	6.217
Majority (1982-2001)	160	0.303	0.760	1	0.734	0.181
C. Other variables						
Log real GDP per capita (1982-2001)	152	6.222	8.295	10.411	8.332	1.106
Ethnic Fractionalization	163	0	0.484	0.930	0.454	0.258
Democracy (1982-2001)	156	0	3.053	10	4.105	3.768
Imports / GDP (%, 1982-2001)	162	4.993	36.284	176.450	41.759	23.353
Fuel / Total Exports (%, 1982-2001)	154	0.001	3.709	96.538	16.068	26.009
Ore / Total Exports (%, 1982-2001)	155	0.004	2.719	75.145	8.777	14.662
Plurality (1982-2001)	149	0	1	1	0.685	0.448
Inverse District Magnitude (1982-2001)	142	0.007	0.211	1.429	0.438	0.412
Presidentialism (1982-2001)	162	0	0.85	1	0.648	0.413
Days to start a business (2003-2005)	134	2	40.5	203	50.117	37.210
Regulatory Quality (1996-2005)	134	−1.854	−0.096	2.386	−0.091	0.948
Government Spending / GDP (%, 1982-2001)	159	4.449	16.234	43.280	16.653	6.420

Notes: In Panel A, for each corruption index, only those countries with all 4 years of data available are included when calculating the mean corruption score from 2002-2005. Summary statistics for variables in panels B and C are for the sample of countries for which the KKM mean (2002-2005) score was computed.

Figure 1
Sequence of Events

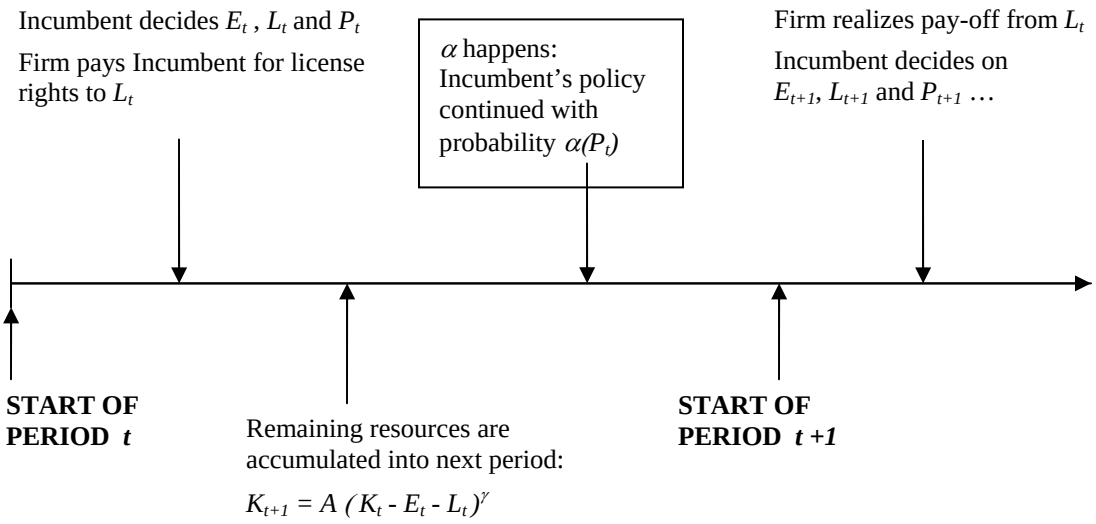
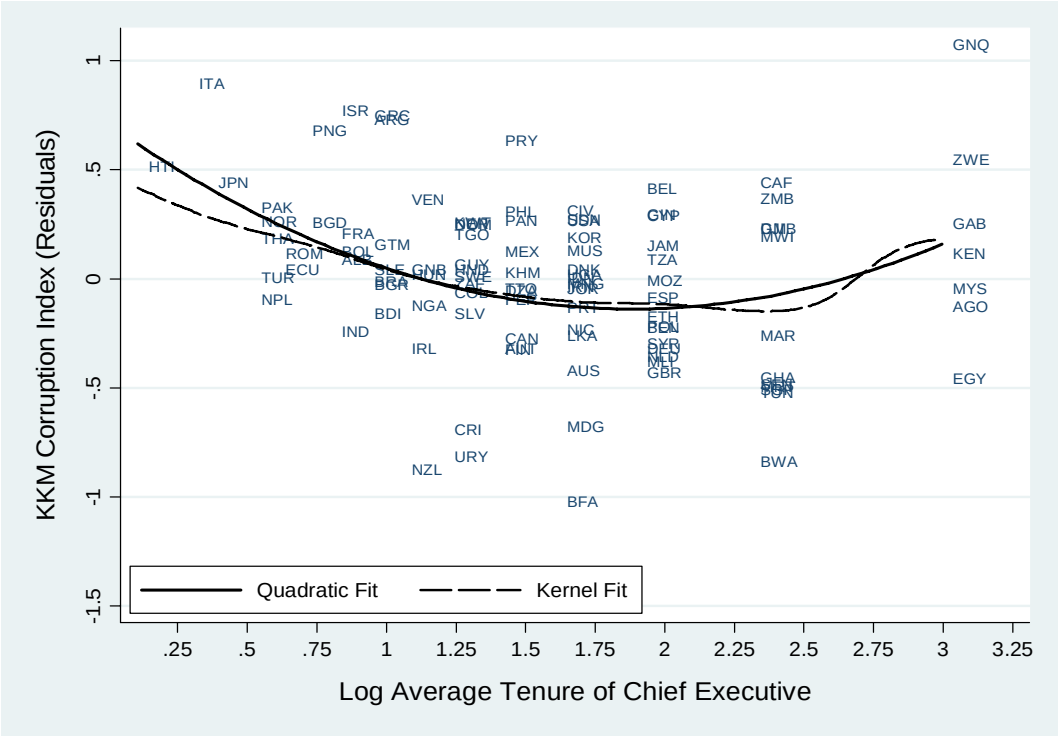
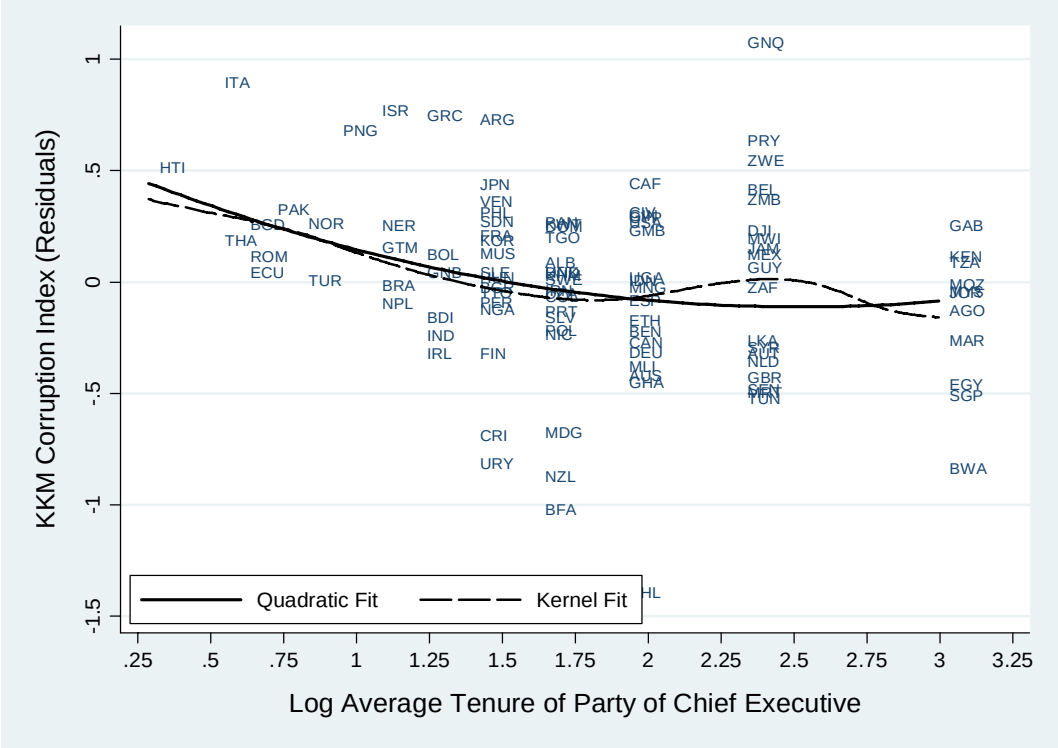


Figure 2
The U-shape between Corruption and Average Incumbent Tenure (Cross-section)

A: Log Executive Tenure



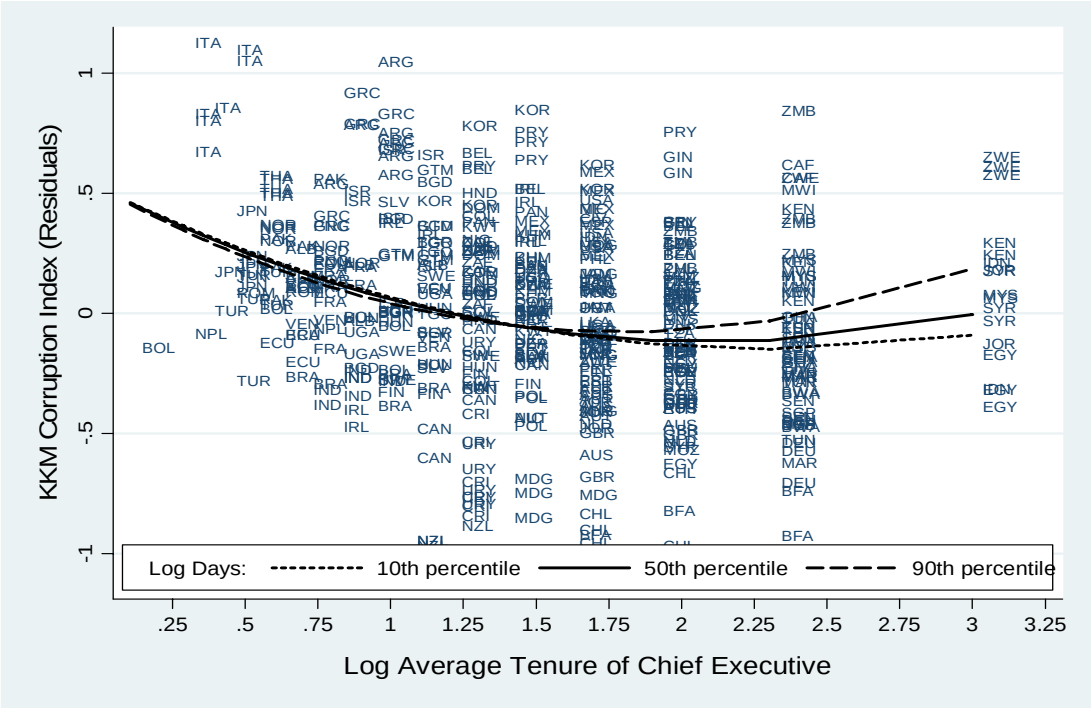
B: Log Party Tenure



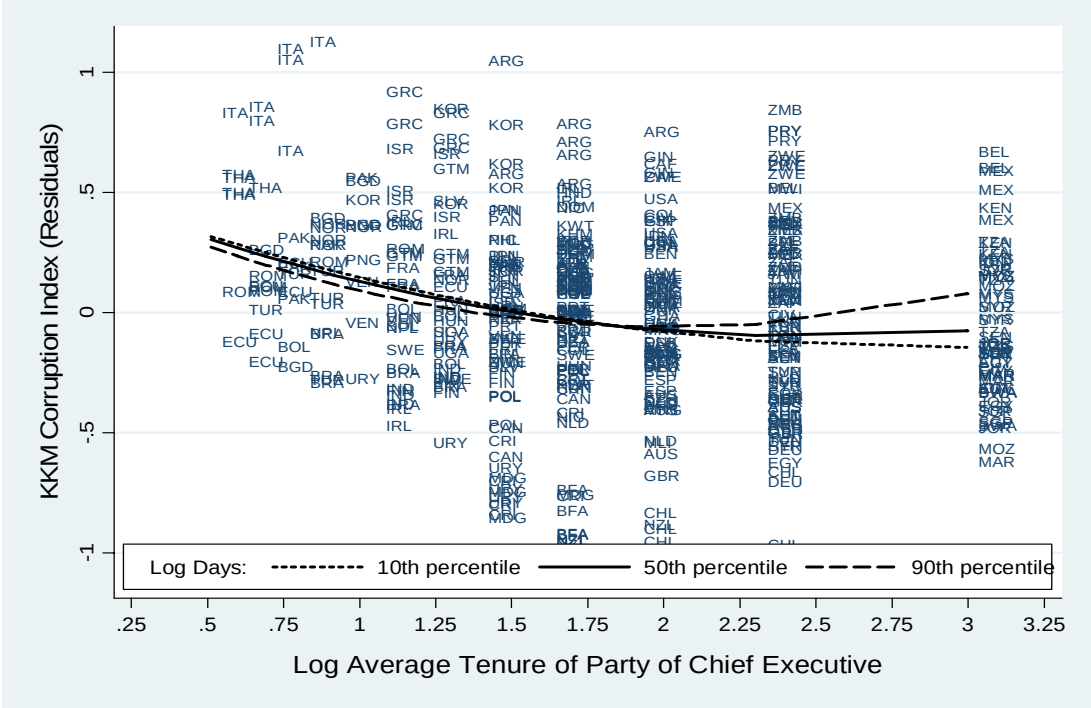
Notes: Figure A is based on regression (5) in Table 1A, while Figure B is based on regression (5) in Table 2 (KKM panel). The kernel regressions use a Guassian kernel function, with bandwidth = 0.25 and 300 gridpoints. Sample excludes all countries not independent by 1982, as well as "CHE".

Figure 3
The U-shape between Corruption and Average Incumbent Tenure (Pooled Observations)

A: Log Executive Tenure



B: Log Party Tenure



Notes: Figure A is based on the regression in Table 3, Column (3), while Figure B is based on Table 4, Column (3). Sample excludes countries not independent by 1976, as well as "CHE". Residuals are obtained by regressing the KKM corruption measure against all right-hand side variables except the relevant log tenure measure, log tenure sq, (log tenure)*(Days) and (log tenure sq)*(Days). Fitted lines are plotted at the 10th, 50th and 90th percentile in-sample values of Days respectively.