CSAE Working Paper WPS/2012-02

Media Freedom and Democracy: Complements or Substitutes in the Fight against Corruption?

Sambit Bhattacharyya and Roland Hodler*

February 17, 2012

Abstract

Democracy and media freedom have been suggested as useful tools in the fight against political corruption, but so far their interplay in this fight has received scant attention. We present a game theoretic model which predicts that the corruption-reducing effect of democracy becomes stronger as media freedom increases. Using panel data covering the period 1980-2008 and 126 countries, we find empirical support for this prediction. Our main results hold when we control for the effects of income, time varying common shocks, regional fixed effects and various additional covariates. The complementarity between democracy and media freedom in the fight against corruption is also supported by Indian state level data.

JEL classification: D72, D73, H11

Key words: Corruption; political institutions; democracy; media freedom

*Bhattacharyya: Department of Economics, University of Sussex, email: s.bhattacharyya@sussex.ac.uk, webpage: http://sites.google.com/site/sambitbha. Hodler: Department of Economics, University of Lucerne, email: roland.hodler@unilu.ch, webpage: http://www.rhodler.net. We gratefully acknowledge comments from John Earle and other participants of the AEA meeting in Chicago. All remaining errors are our own.

Centre for the Study of African Economies
Department of Economics · University of Oxford · Manor Road Building · Oxford OX1 3UQ
T: +44 (0)1865 271084 · F: +44 (0)1865 281447 · E: csae.enquiries@economics.ox.ac.uk · W: www.csae.ox.ac.uk

1 Introduction

Many politicians in office seem to have a tendency to engage in corruption and to appropriate public funds. Democracy is often considered to be a powerful tool in the fight against political corruption (e.g., Treisman 2000), as regular fair elections give the public the option of removing incumbent politicians from office if significant government malfeasance is discovered. Also media freedom is generally seen as a useful tool (e.g., Brunetti and Weder, 2003), as a free and independent media can play a crucial role in uncovering corrupt behavior and informing the public. The question of interest is whether democracy and media freedom are complements or substitutes in the fight against political corruption. In other words, do we need both a democratic environment with regular fair elections and a free and independent media to curb corruption, or is one of the two enough?

In this paper, we investigate both theoretically and empirically the relationship between democracy, media freedom and corruption. In the theoretical part, we present a stylized two-period game between politicians and the people. There are some "good" politicians who act in the people's best interest and possibly many more "bad" politicians who primarily care about their own revenues. In period one the incumbent politician chooses the level of corruption. The probability that the people observe the true level of corruption increases in media freedom. The people then update their belief about the incumbent's type, and they decide whether to support the incumbent or his challenger. The people's decision and the quality of the democratic institutions determine the probability that the incumbent can stay in office in period two. We define democratic institutions to be of high quality if the incumbent is likely to stay in office when supported by the people, but unlikely to stay without the people's support. The model predicts that the equilibrium level of corruption is decreasing in the quality of democratic institutions, and that this effect becomes stronger as media freedom increases. Hence, democracy and media freedom are

complements in the fight against corruption. In addition, the model also predicts that media freedom increases observed corruption, without affecting true corruption, if democratic institutions are of poor quality.

In the empirical part, we test our theoretical predictions systematically using a reduced form model and panel data covering the period 1980 to 2008 and 126 countries. Our econometric estimates confirm that democracy and media freedom are complements in the fight against corruption. In particular, we find that an increase in democracy reduces corruption, and that the magnitude of this effect increases in media freedom. We also find that media freedom tends to increase perceived corruption in undemocratic countries. Our basic results hold when we control for the effects of log income, time varying common shocks, regional fixed effects and various additional covariates of corruption, or when we use some alternative measures of democracy, media freedom and corruption. It is also robust across different samples, and when using Limited Information Maximum Likelihood or the Fixed Effect Vector Decomposition method. Moreover we use Indian state level data covering 16 states and the years 2005 and 2008. The Indian data allows us to bypass problems relating to national level unobservables in cross-country analyses. The results provide further evidence for the complementarity of democracy and media freedom in the fight against corruption.

There exists a large literature on the determinants of corruption.[1] Our study is most closely related to contributions focusing on the effects of democracy and media freedom on corruption. Based on cross-country data, Treisman (2000) finds that a long exposure to democracy lowers corruption, Brunetti and Weder (2003) find that higher media freedom lowers corruption, and Chowdhury (2004) finds that democracy and media freedom both reduce corruption.[2] Using panel data covering the period since 1980 and more than 100

[1]Early contributions to this literature include Ades and Di Tella (1999), La Porta et al. (1999), Rose-Ackerman (1999), and Treisman (2000). Bardhan (1997) and Aidt (2003) provide excellent surveys.

[2]In addition, Fan et al. (2009) find that political decentralization may fail to increase government

countries, Adsera et al. (2003) find that democratic institutions and free circulation of daily newspapers both curb corruption, and Bhattacharyya and Hodler (2010) find the effect of natural resource rents on corruption decreases in the quality of democratic institutions. Looking at a panel of Indian states, Besley and Burgess (2002) find that political competition and newspaper circulation increase government responsiveness to falls in food production and crop flood damage (but they do not look at the effects on corruption). In another interesting national level study, Ferraz and Finan (2008) measure how publicly released audits of local government expenditures affect electoral outcomes in Brazilian municipalities. They find that the negative effect of reported incidences of corruption on the political incumbent's reelection chances is larger in municipalities with their own local media outlets. Our paper contributes to this empirical literature on the effects of democracy and media freedom on corruption by highlighting the complementarity of the two: Democratic institutions are much more effective in preventing corruption if the media is free, and media freedom can only be effective if politicians are accountable to the public.

Our theoretical part builds on political agency models in the tradition of Barro (1973) and Ferejohn (1986).[3] There are however several noteworthy differences. First, we assume that voting is forward-looking rather than retrospective. Second, we follow Aidt et al. (2008) and Bhattacharyya and Hodler (2010) in allowing for varying degrees of the quality of democratic institutions and, thereby, imperfect democratic institutions. Third, we allow for varying degrees of media freedom and, hence, different probabilities that the people get accurate information about government behavior. Our model is further related to Besley and Prat's (2006) model in which the incumbent government can capture the media to ensure that its corrupt activities are not reported. In contrast to Besley and Prat (2006), we take the quality of media reporting as exogenous, but focus on how the quality

accountability and reduce corruption if the government structures are complex.

[3]See Persson and Tabellini (2000, chapter 4) and Besley (2007, chapter 3) for excellent reviews of political agency models.

of media reporting interacts with the quality of democratic institutions in determining the level of political corruption.

The remainder of the paper is structured as follows: Section 2 presents the theoretical model. Section 3 derives the equilibrium and some testable predictions. Section 4 discusses our empirical strategy and the international panel data. Section 5 presents the empirical evidence and various robustness tests. Section 6 presents our empirical analysis with Indian state level data. Section 7 concludes.

2 The Model

There is an economy inhabited by three players: an incumbent president I, who is in office for exogenous reasons, a challenger, and the people. Each of the two politicians i is a good type $\theta_i = \overline{\theta}$ with probability $\alpha \in (0,1)$, and a bad type $\theta_i = \underline{\theta}$ with probability $1-\alpha$. Their types θ_i are private information, but α is common knowledge.[4]

There are two periods $t \in \{1,2\}$. In each period the politician in office i can decide whether to abstain from corruption, which is in the interest of the people, or to engage in corruption and the expropriation of public funds. That is, he can choose the level of corruption $c_t(\theta_i) \in \{0,\kappa\}$, with 0 representing absence of corruption and κ representing considerable corruption.[5]

The instantaneous von Neumann-Morgenstern utility of the people and the politician in office are $w_t = w(c_t)$ and $u_t = u(c_t,\theta_i)$, respectively. The people are better off in the absence of corruption than in its presence, i.e., $w(0) > w(\kappa)$. A good politician in office is also better off in the absence of corruption, i.e., $u(0,\overline{\theta}) > u(\kappa,\overline{\theta})$. The idea is that he values the well-being of the people, and that corrupt activities lead to moral costs that

[4]Results are independent of the value of α as long as $\alpha \in (0,1)$. Hence, they hold even if good politicians are rare.

[5]Results remain qualitatively unchanged if the low corruption level is strictly positive, or if we allow for multiple corruption levels or even a continuum of them.

outweigh his material benefits. In contrast, a bad politician in office is better off with corruption, i.e., $u(0,\underline{\theta}) < u(\kappa,\underline{\theta})$, as he enjoys spending expropriated public funds almost as much as spending his official salary. The instantaneous utility of politicians out of office is normalized to zero. Due to the official salary, any politician prefers being in office (even) in the absence of corruption to being out of office. Hence, $u(0,\theta_i) > 0$ for $\theta_i \in \{\overline{\theta},\underline{\theta}\}$. For later use, we set $u(0,\underline{\theta}) = (1-\psi)u(\kappa,\underline{\theta})$, where $\psi \in (0,1)$ measures the relative instantaneous utility loss of a bad politician in office from abstaining from corruption. For simplicity, we assume that the common discount factor is $\beta = 1$.

The people observe the true level of corruption c_1 with probability Π, and they observe no evidence of corruption independently of its true level with probability $1-\Pi$. Denoting the observed level of corruption by $\hat{c}_t$, it holds that $\hat{c}_t = c_t$ with probability Π, and $\hat{c}_t = 0$ with probability $1-\Pi$. The people may directly observe some corrupt activities. To a large extend, however, they have to rely on information about government behavior reported in the media; and the probability that the media uncovers corrupt actives and publishes the evidence increases in the freedom enjoyed by the media. We thus assume $\Pi = \pi_0 + (\pi_1 - \pi_0)M$, where $M \in [0,1]$ measures media freedom, and where $0 < \pi_0 < \pi_1 < 1$.

The quality of democratic institutions determines the chances that the people's favored candidate ends up in office. We assume that the incumbent can stay in office with probability p if the people support him, and with probability q if the people support the challenger, where $0 \leq q \leq p \leq 1$. We use $D \equiv p - q$ to measure the quality of democratic institutions. This measure implies that democratic institutions are sound if the incumbent can stay in office if and only if the people want him to stay; and that democratic institutions are poor if the people's preferences have only a small effect on the chances that the incumbent can stay in office.

The timing and the players' actions are as follows: In period one the incumbent chooses the level of corruption $c_1(\theta_I)$. Nature and media freedom then determine the level of

corruption $\hat{c}_1$ observed by the people. The people then update their belief $\mu(\overline{\theta}|\hat{c}_1)$ that the incumbent is a good type, and they decide whether to support the incumbent or the challenger. Thereby we assume that they support the incumbent when indifferent.[6] Nature, the quality of the democratic institutions and the people's decision then determine the politician in office in period two. In period two the politician in office i chooses $c_2(\theta_i)$. Finally, payoffs are realized and the game ends.

The appropriate solution concept for this dynamic game of incomplete information is perfect Bayesian equilibria (PBE).

3 Theoretical results

In this section we first derive and discuss the equilibrium. We then derive testable predictions from our model.

3.1 Equilibrium

We use backward induction and start by solving the period two subgame. The politician who is in office in period two has no strategic incentives and simply chooses the level of corruption $c_2(\theta_i)$ that maximizes his payoff. Therefore it directly follows from $u(0,\overline{\theta}) > u(\kappa,\overline{\theta})$ and $u(0,\underline{\theta}) < u(\kappa,\underline{\theta})$:

Lemma 1 *In period two, a good politician in office chooses* $c_2(\overline{\theta}) = 0$ *and a corrupt politician in office chooses* $c_2(\underline{\theta}) = \kappa$.

That is, a good politician abstains from corruption in period two, while a bad politician engages in corruption and the expropriation of public funds.

[6] To motivate this tie-breaking rule, we could, e.g., assume that there is a small probability $\epsilon \to 0$ that the challenger is a kleptomaniac who chooses some excessive and harmful level of corruption K that leads to $w(K) < w(\kappa)$ and $u(K,\theta_i) < u(\kappa,\theta_i)$ for $\theta_i \in \{\overline{\theta},\underline{\theta}\}$.

It follows from Lemma 1 and $w(0) > w(\kappa)$ that the people are better off in period two with a good politician in office. Hence they support the incumbent at the end of period one if and only if their updated belief that he is a good type exceeds the probability that the challenger is a good type, i.e., if and only if $\mu(\overline{\theta}|\hat{c}_1) \geq \alpha$.

We now turn to the incumbent's choice of the level of corruption $c_1(\theta_I)$ in period one. A good incumbent would like his instantaneous utility $u(c_1, \overline{\theta})$ to be high, and to ensure the people's support. His instantaneous utility is maximized by $c_1(\overline{\theta}) = 0$. Moreover, Bayes' rule implies that the people's updated belief must satisfy $\mu(\overline{\theta}|0) \geq \alpha$ whenever $c_1(\overline{\theta}) = 0$. Therefore we focus on PBE in which a good incumbent abstains from corruption and plays $c_1(\overline{\theta}) = 0$. (Proposition 1 below confirms that no other PBE exist.)

It remains to determine the level of corruption that a bad incumbent chooses. We first derive the expected lifetime utility of a bad incumbent who also abstains from corruption in period one. In this case it holds that $c_1(\underline{\theta}) = c_1(\overline{\theta}) = 0$, and the media will be unable to find and publish any evidence of corruption, independently of media freedom M and the incumbent's type θ_I. As a consequence, the people observe $\hat{c}_1 = 0$ with probability one, and they cannot learn anything about the incumbent's type. Hence, their updated belief that the incumbent is good is $\mu(\overline{\theta}|0) = \alpha$. They thus support the incumbent, who can therefore stay in office with probability p. Consequently, the expected lifetime utility of a bad incumbent who plays $c_1(\underline{\theta}) = 0$ is $U(0, \kappa, \underline{\theta}) = u(0, \underline{\theta}) + pu(\kappa, \underline{\theta})$.

We now derive the expected lifetime utility of a bad incumbent who decides to engage in corruption already in period one. In this case the people observe $\hat{c}_1 = \kappa$ with probability Π and $\hat{c}_1 = 0$ with probability $1 - \Pi$ if the incumbent is bad, and $\hat{c}_1 = 0$ with probability one if the incumbent is good. Therefore, the people know that the incumbent must be bad if they observe $\hat{c}_1 = \kappa$, i.e., $\mu(\overline{\theta}|\kappa) = 0$. In this case the people support the challenger, such that the incumbent can only stay in office with probability q. If they observe $\hat{c}_1 = 0$, then it follows from Bayes' rule that the people's updated belief that the incumbent is

good is $\mu(\overline{\theta}|0) = \frac{\alpha}{\alpha+(1-\alpha)(1-\Pi)} > \alpha$. The people thus support the incumbent, who can then stay in office with probability p. Consequently, a bad incumbent playing $c_1(\underline{\theta}) = \kappa$ can stay in office with probability $(1-\Pi)p + \Pi q$, and his expected lifetime utility is $U(\kappa, \kappa, \underline{\theta}) = [1 + (1-\Pi)p + \Pi q]u(\kappa, \underline{\theta})$.

A bad incumbent is better off playing $c_1(\underline{\theta}) = 0$ if $U(0, \kappa, \underline{\theta}) \geq U(\kappa, \kappa, \underline{\theta})$, and playing $c_1(\underline{\theta}) = \kappa$ otherwise.[7] Together with $D \equiv p - q$ and $u(0, \underline{\theta}) = (1-\psi)u(\kappa, \underline{\theta})$, the expressions for $U(0, \kappa, \underline{\theta})$ and $U(\kappa, \kappa, \underline{\theta})$ derived above imply that $U(0, \kappa, \underline{\theta}) \geq U(\kappa, \kappa, \underline{\theta})$ is equivalent to $\Pi D \geq \psi$.[8] Hence, equilibrium behavior can be characterized as follows:

Proposition 1 *There exists a PBE in which a good incumbent plays $c_1(\overline{\theta}) = 0$, a bad incumbent plays $c_1(\underline{\theta}) = 0$ if $\Pi D \geq \psi$, and $c_1(\underline{\theta}) = \kappa$ otherwise, and the people support the incumbent if and only if they observe $\hat{c}_1 = 0$. There exist no other PBE.*

Proof: The existence of the PBE characterized in Proposition 1 is already established in the discussion leading to Proposition 1, but it remains to prove the uniqueness of this PBE. Denote by $\psi(\theta_I)$ the probability that an incumbent of type θ_I chooses $c_1(\theta_I) = 0$ rather than $c_1(\theta_I) = \kappa$ in $t = 1$. The discussion leading to Proposition 1 shows that there cannot exist any other PBE with $\psi(\overline{\theta}) = 1$ than the one characterized in Proposition 1. Hence it is sufficient to prove that there cannot exist any PBE with $\psi(\overline{\theta}) < 1$. We prove this by contradiction. A necessary condition for a good incumbent ever to play $c_1(\overline{\theta}) = \kappa$, i.e., for $\psi(\overline{\theta}) < 1$, is that the people support the challenger when observing $\hat{c}_1 = 0$. This requires $\mu(\overline{\theta}|0) < \alpha$, which, in turn, requires $\psi(\underline{\theta}) > \psi(\overline{\theta})$ due to Bayes' rule. However, if the people support the challenger when observing $\hat{c}_1 = 0$, a bad incumbent will always choose $c_1(\overline{\theta}) = \kappa$, i.e., $\psi(\underline{\theta}) = 0$. There is a contradiction as it cannot simultaneously hold that $\psi(\underline{\theta}) > \psi(\overline{\theta})$ and $\psi(\underline{\theta}) = 0$. ■

[7] In the special case in which $U(0, \kappa, \underline{\theta}) = U(\kappa, \kappa, \underline{\theta})$, a bad incumbent is indifferent between $c_1(\underline{\theta}) = 0$ and $c_1(\underline{\theta}) = \kappa$.

[8] The expressions for $U(0, \kappa, \underline{\theta})$ and $U(\kappa, \kappa, \underline{\theta})$ allow to rewrite $U(0, \kappa, \underline{\theta}) \geq U(\kappa, \kappa, \underline{\theta})$ as $u(0, \underline{\theta}) \geq [1 + \Pi(q - p)]u(\kappa, \underline{\theta})$, which can then be rewritten as $\Pi D \geq \psi$ after making use of $D \equiv p - q$ and $u(0, \underline{\theta}) = (1 - \psi)u(\kappa, \underline{\theta})$.

The PBE described in Proposition 1 is pooling if $\Pi D \geq \psi$, and separating otherwise. The reason for the former is that a bad incumbent mimics a good incumbent to ensure the people's support if high media freedom makes the people likely to become informed, if sound democratic institutions make the people's support important for staying in office, and if his short-term utility loss from abstaining from corruption is moderate. A bad incumbent is however better off engaging in corruption if the media is unlikely to report corrupt activities, or if the people have little effect on the chances that he can stay in office, and if his short-term utility loss of abstaining from corruption is high.

We can think of ΠD as a measure of corruption control in our economy. The higher ΠD is, the higher can $u(\kappa, \underline{\theta})$ be relative to $u(0, \underline{\theta})$ such that a bad incumbent still refrains from corruption in period one. This measure of corruption control increases in both, media freedom M and the quality of democratic institutions D. More interestingly, the cross-derivative of this measure with respect to M and D is positive as well. That is, an improvement in media freedom is the more valuable, the higher the quality of democratic institutions is; and better democratic institutions are the more valuable, the higher media freedom is. Hence, media freedom and sound democratic institutions are complements in the fight against corruption.

This result is intuitively appealing: Better democratic institutions are not overly helpful to get rid of corrupt incumbent politicians if a suppressed media is unlikely to find and report evidence of corruption. Therefore better democratic institutions have little effect on corruption when media freedom is poor. But the situation is very different when media freedom is high. Then, people are likely to learn the true level of corruption and better democratic institutions become useful to effectively punish corrupt incumbent politicians. As a consequence, engaging in corruption becomes unattractive even for bad incumbents. Better democratic institutions are thus more conducive to eradicating corruption when the media is free and independent.

3.2 Predictions

The model presented in section 2 and solved in section 3.1 cannot be tested directly for at least two reasons. First, it predicts a threshold level for ΠD below which corruption is high, and above which corruption is absent. The existence of such a non-linear relationship in the data is highly unlikely. More importantly, we would only expect to find such a non-linearity if the economic environment were identical across time and countries. This is obviously not the case. Below we therefore introduce some randomness in a very simple form to let the model make smoother and more realistic predictions. Second, as politicians often hide corrupt activities, there are no empirical measures of true corruption available. Available indices of corruption measure perceived corruption only (see section 4). We thus need to work out the model's predictions of how democracy and media freedom affect perceived corruption.

To address the first issue we assume that the bad incumbents' short-run utility loss from abstaining from corruption, ψ, is randomly drawn from the uniform distribution on the unit interval at the beginning of period one. We know from Proposition 1 that equilibrium play of the bad incumbent then depends on the realization of ψ. Further, we measure the expected level of corruption by the ex-ante probability that the incumbent acts corruptly in period one. This probability is $c_1^e = (1-\alpha)(1-\Pi D)$, where $(1-\alpha)$ is the probability that the incumbent is bad, and $(1-\Pi D)$ the probability that a bad incumbent acts corruptly. It is straightforward to show that c_1^e decreases in D, and that the corruption-reducing effect of D is the more pronounced, the higher M is. Similarly, c_1^e decreases in M unless $D = 0$ (in which case c_1^e does not depend on M), and the corruption-reducing effect of M is the more pronounced, the higher D is.

To address the second issue we also look at the expected level of *observed* corruption, which we measure by the ex-ante probability that the people observe corruption in period one. This probability is $\hat{c}_1^e = \Pi c_1^e = \Pi(1-\alpha)(1-\Pi D)$. It also decreases in D, with the

decrease becoming stronger as M increases. The effect of M on $\hat{c}_1^e$ is however ambiguous in general, and negative for $D = 0$. That is, better media freedom raises observed corruption in non-democratic societies, where it has no effect on true corruption, but raises the observability of corruption.

Independently of whether empirical measures of perceived corruption (such as the corruption index introduced below) are closer to true corruption c_1^e or observed corruption $\hat{c}_1^e$, our model predicts that better democratic institutions D reduce perceived corruption, and that this effect is the stronger, the higher media freedom M is. Should measures of perceived corruption be closer to observed than true corruption, our model further predicts that media freedom M increases perceived corruption if democratic institutions are sufficiently poor.

4 Empirical Strategy and International Panel Data

In the main empirical part we use panel data covering 126 countries and five year averages over the period 1980 to 2008.[9]

To estimate the effects of democratic institutions, media freedom, and their interaction on corruption, we use the following model:

$$CI_{srt} = \alpha_r + \beta_t + \gamma_1 D_{srt-5} + \gamma_2 M_{srt-5} + \gamma_3 (D_{srt-5} \times M_{srt-5}) + \phi Y_{srt} + X'_{srt}\Lambda + \varepsilon_{srt}, \quad (1)$$

where CI_{srt} is an index of perceived corruption in country s in region r averaged over the years t to $t + 4$, α_r is a region dummy variable covering seven regions of the world[10] to control for regional fixed effects, β_t is a year dummy variable to control for time varying

[9]Due to data limitations, not all specifications cover exactly 126 countries and in most specifications, the panel is unbalanced. The (five year) averages cover the periods 1980-84, 1985-89, 1990-94, 1995-99, 2000-2004, and 2005-2008, respectively, with the last being a four year average.

[10]The regions are Europe and Central Asia, East Asia and the Pacific, Latin America, Western Europe and North America, the Middle East and North Africa, South Asia, and Sub Saharan Africa.

common shocks, D_{srt-5} is a measure of democracy in country s in region r averaged over the years $t-5$ to $t-1$, M_{srt-5} is a measure of media freedom in country s in region r averaged over the years $t-5$ to $t-1$, Y_{srt} is log per capita income in country s in region r averaged over the years t to $t+4$, and X_{srt} is a vector of other control variables.

To discuss what our theoretical model predicts for the signs of the coefficients γ_1, γ_2 and γ_3, it is important to know that higher values of CI_{srt} correspond to lower levels of corruption, and that D_{srt-5} and M_{srt-5} are both scaled between 0 and 1, with higher values standing for better democracy and higher media freedom, respectively. First, our model predicts that γ_1 is positive, i.e., that higher democracy D_{srt-5} has a positive effect on CI_{srt} (implying less corruption) even if the media is not free. Second, it predicts that γ_2 is non-positive, i.e., that higher media freedom M_{srt-5} has a weakly negative effect on CI_{srt} (implying higher perceived corruption) in undemocratic countries. Lastly, and most importantly, it predicts that γ_3 is positive, i.e., that democracy and media freedom are complements in the sense that democracy is more effective in reducing corruption if media freedom is high, and vice versa.

The choice of five year averages has both an economic and a statistical rationale. In economic terms five years is a reasonable period to capture the corruption response to changes in democracy and media freedom. Much shorter duration than five years might not allow for institutional checks on corruption to be implemented. Conversely, taking a much longer period than five years might strain the credibility of attributing any statistical link between corruption and institutions. Statistically, measuring all the variables as five year averages limits the noise in high frequency data originating from measurement error, but still allows a reasonable sample size.[11]

We use the corruption index (CI_{srt}) from the Political Risk Services (PRS). This index is clearly a measure of perceived corruption, as it is constructed based on the subjective

[11] We also estimate our model using annual data, three year averages, seven year averages, and ten year averages. Our results (which are available upon request) are robust.

analysis of available information. It is predominantly an assessment of corruption within the political system, and covers most common forms of corruption.[12] The PRS corruption index varies between 0 and 6, with higher values indicating lower levels of corruption. Averaged over the sample period, the Democratic Republic of Congo was the most corrupt country with an average value of CI_{srt} of 0.6, and Finland was the least corrupt country with an average value of CI_{srt} of 6.0.

The advantages of using the corruption index from the PRS are the following: First, it suits our purpose as it nicely captures our notion of corruption in the theoretical model in which corruption is part of the political process. Second, it covers the time period 1980 to 2005 and has the largest number of observations. This allows us to use panel data and minimizes the sample selection bias both across countries and over time. It is also widely used in the literature (e.g., Adsera et al., 2003, Brunetti and Weder, 2003). As alternatives we use the corruption perception index from Transparency International, and data from the World Bank Enterprise Survey. Using these alternative measures however reduces our sample size.[13]

Our democracy measure D_{srt-5} is calculated using the Polity IV database, which is described by Marshall and Jaggers (2002). This database reports democracy and autocracy scores, which both vary between 0 and 10 with 10 being the most democratic or most autocratic, respectively. The POLITY2 score is the difference between the democracy and autocracy scores. It measures the competitiveness and regulation of political participation, the openness and competitiveness of executive recruitment, and constraints on the executive. We average the POLITY2 scores over the period $t-5$ to $t-1$, and we scale these averages such that our democracy measure D_{srt-5} ranges from 0 to 1, with higher values

[12]For example, patronage, nepotism, job reservations, secret party funding, bribes connected with export and import licenses, exchange controls, tax assessments, police protection, loans etc.

[13]Even though Transparency International covers more countries than the PRS, the actual number of observations in the Transparency International dataset is roughly half that of the PRS.

implying better democratic institutions.[14]

The democracy measure D_{srt-5} suits our purpose for the following reasons: First, it is a net measure of democracy that distinguishes between different shades of democracy. It is therefore best able to capture our notion of the quality of democratic institutions in the theoretical model, where this quality is defined as the difference between p and q. Second, D_{srt-5} is perhaps able to address endogeneity related concerns because it is a lagged measure. Even though less corrupt countries are likely to be more democratic, it is less likely that corruption in time t will affect democracy in time $t-5$.[15] We also employ the instrumental variable method of estimation using lagged values as instruments. Furthermore, in order to address endogeneity we use a long run measure of democracy (i.e., the fraction of years a country has been democratic since 1950), and democracy before the beginning of our sample period. We also use measures of democracy from other sources to check the robustness of our main results.

Our media freedom measure M_{srt-5} is from Freedom House. For the period 1980 to 1993, Freedom House classifies a country's electronic and print media as 'free', 'partly free', or 'not free'. From 1994 onwards, it reports the Freedom House media freedom index which runs from 0 to 100, with scores between 0 and 30 signifying that the media is 'free', scores between 31 and 60 implying 'partly free', and scores between 61 and 100 implying 'not free'. Our measure M_{srt-5} is constructed using these classifications following a two step procedure. First, we convert this information into a discrete variable. A country-year gets a value of 0 if the classification suggests that media is 'not free', a value of 0.5 if the media is 'partly free', and a value of 1 if the media is 'free'. Second, we average these scores over the period t to $t-4$. Therefore, by construction M_{srt-5} ranges from 0 to 1, with higher

[14] In particular, $D_{srt}=0$ if the averaged POLITY2 score is -10, and $D_{srt}=1$ if the averaged POLITY2 score is 10.

[15] One might however argue that institutions are persistent, such that corruption today is very similar to corruption in 1980 or even earlier. Even though this may be the case with other measures of institutions, the corruption index is not very persistent, with the correlation between 1980 and 2005 being 0.59.

values implying more media freedom.

We choose M_{srt-5} as our preferred measure of media freedom for the following reasons. First, it provides us with the largest country-year coverage and thereby minimizes the risk of selection bias. Second, it is also a lagged measure and may allow to bypass endogeneity related concerns. Third, our way of constructing the media freedom measure successfully negotiates the challenge that Freedom House reports media freedom data differently across different time periods. Nevertheless, we also use long run media freedom measured by the fraction of years a country's media has been free since 1980, the Freedom house media freedom index for 1994-2008, and the press freedom index developed by the NGO Reporters Without Borders as alternative measures.

Log per capita income and several other additional control variables are also used in our study. Detailed definitions and sources of all variables are available in Appendix A. Table 1 reports descriptive statistics of the major variables used.

Finally, there are concerns of multi-collinearity and omitted variables that we need to address in our estimations. First, the correlation between D_{srt-5} and M_{srt-5} is 0.86. This high correlation could cause multi-collinearity and, as a consequence, the estimated standard errors would be magnified. It speaks for the robustness of our results that most estimates are statistically significant despite the potentially magnified standard errors. Second, we tackle the issue of omitted variables by controlling for unobserved region specific heterogeneity, time varying common shocks and additional covariates that are expected to influence the level of corruption. In some specifications we also control for standard country fixed effects and apply the Fixed Effect Vector Decomposition approach.

5 Empirical Evidence from International Panel Data

Figure 1 plots the relationships between the corruption index CI_{srt} and democracy D_{srt-5}, and between CI_{srt} and media freedom M_{srt-5}. Positive patterns emerge from the data indicating that higher democracy scores and media freedom are associated with lower levels of corruption (as CI_{srt} is an inverse measure of corruption). Table 2 presents our main results. In column 1 we start by looking at the effects of democracy D_{srt-5} on the corruption index CI_{srt}. We notice a statistically significant positive effect, which suggests that democracies are associated with less corruption. As this association may be driven by omitted factors influencing both democracy and corruption, we add income Y_{srt}, regional dummies, year dummies, and media freedom M_{srt-5} in columns 2 and 3. We notice that the positive relationship survives but the magnitude of the coefficient falls. In column 4 we present our baseline regression, which includes the interaction term $D_{srt-5} \times M_{srt-5}$. We notice that the coefficient on D_{srt-5} and $D_{srt-5} \times M_{srt-5}$ are both positive and statistically significant. This confirms the predictions of our theoretical model that democracy reduces corruption, and that media freedom strengthens the corruption-reducing effect of democracy. The negative coefficient on M_{srt-5} is consistent with our theoretical prediction that media freedom may increase observed corruption (without affecting true corruption) in undemocratic countries.

To put the results from our baseline regression into perspective, let us focus on Angola – a developing country with poor democratic institutions ($D_{AGO2000} = 0.35$, i.e., a POLITY2 score of -3), no media freedom ($M_{AGO2000} = 0$), and high corruption ($CI_{AGO2005} = 2$). If the quality of democratic institutions in Angola increased by one sample standard deviation ($\Delta D_{AGO2000} = 0.37$), then our estimates predict that Angola's corruption index would increase by one quarter of the sample standard deviation ($\Delta CI_{AGO2000} = 0.32$). If the media in Angola were free as in neighboring Botswana ($M_{BWA2000} = 1$), a one standard deviation

increase in the quality of democratic institutions would even lead to an increase in Angola's corruption index of almost two thirds of the sample standard deviation ($\Delta CI_{AGO2000} = 0.78$).[16] Hence, the increase would be more than twice as high. This simple example illustrates that democratic institutions are much more successful in reducing corruption when supported by media freedom.

Given the high correlation between democracy D_{srt-5} and media freedom M_{srt-5}, the interaction term $D_{srt-5} \times M_{srt-5}$ could potentially be picking up some non-linear effects of D_{srt-5} and M_{srt-5} on CI_{srt}. In column 5 we add the squared terms D^2_{srt-5} and M^2_{srt-5} to our baseline regression to test whether our results are driven by such non-linear effects. We indeed find evidence for a non-linear effect of democracy. More importantly, we find that all our coefficients of interest remain statistically significant.

In column 6 we use twice lagged media freedom M_{srt-10}, twice lagged democracy D_{srt-10}, the twice lagged interaction term $D_{srt-10} \times M_{srt-10}$, and lagged income Y_{srt-5} as instruments for M_{srt-5}, D_{srt-5}, $D_{srt-5} \times M_{srt-5}$, and Y_{srt} to allay concerns of reverse causation.[17] These instruments are correlated with the suspected endogenous variables. Given their lagged nature, it is plausible that they are orthogonal to the error term. They are also not weak instruments as they satisfy the Stock-Yogo criteria. We notice that the coefficients of interest remain statistically significant when using these instruments. To further allay concerns of endogeneity we use long-run measures of democracy and media freedom in table 5 (columns 4 and 5) and table 6 (column 2), respectively.

In column 7 we analyze whether our results are mainly driven by variation across or within countries. We do this by including country fixed effects. The coefficients of interest

[16] These results are calculated as follows: $\Delta CI_{AGO2005} = (0.89 + 1.23 M_{AGO2000}) \Delta D_{AGO2000} = 0.32$, and $\Delta CI_{AGO2005} = (0.89 + 1.23 M_{BWA2000}) \Delta D_{AGO2000} = 0.78$.

[17] Standard instruments for institutional quality, e.g., settler mortality, make use of the colonial history of countries. However, employing these instruments would have two drawbacks in our setting. First, they eliminate all countries that were not subject to European colonization from the sample, which leads to a drastic reduction in sample size and the exclusion of most established democracies. Second, the cross-section nature of these instrument magnifies the problem of multi-collinearity at the second stage of the instrumental variable estimation.

still show the predicted signs, but become statistically insignificant, which suggests that results are mainly driven by variation across countries. This finding is not surprising given that the explanatory variables M_{srt-5} and D_{srt-5} and the dependent variable CI_{srt} change slowly over time, and that the time dimension of our data matrix (with a maximum of six time periods per country) is much smaller than the cross-sectional dimension (with 126 countries in our baseline regression). In column 8 we use the Fixed Effects Vector Decomposition (FEVD) approach, which Plümper and Troeger (2007) designed for the estimation of time invariant and rarely changing variables in panel data models with country fixed effects. We find that the coefficients of interest are again statistically significant.[18]

Furthermore, to allay the concern that insignificance in the presence of country fixed effects could result from omitting country-specific factors that affect the divergent corruption levels across countries, we show next that our main results remain significant when controlling for various additional covariates suggested in the literature. In addition, in section 6 we present evidence based solely on variation within a single country, India.

In table 3 we thus add additional covariates into our specification to address the issue of omitted variables. In column 1 we add the share of Protestants as an additional control because Protestant countries are less likely to be corrupt (Treisman, 2000). In column 2 we control for legal origins as colonial ties and legal origins may also impact upon corruption (La Porta et al., 1999; Treisman, 2000; Fan et al., 2009). In column 3 we add ethnic fractionalization as an additional control because ethnically fractionalized countries tend to be more corrupt (Mauro, 1995; La Porta et al., 1999). In columns 4-10 we further control for official development assistance (ODA), real exchange rate distortions, black market premium, FDI, the Sachs and Warner trade liberalization index, trade shares, and

[18]The FEVD approach consists of three stages. The first stage runs a fixed effects model to obtain the country fixed effects. The second stage breaks down the country fixed effects into a part explained by the time-invariant and rarely changing variables and an error term. The third stage re-estimates the first stage by pooled OLS including the time-invariant and rarely changing variables plus the error term of the second stage, which then accounts for the unexplained part of the country fixed effects. The strengths and weaknesses of the FEVD approach are discussed in the spring 2011 special issue of *Political Analysis*.

resource rents. Our basic results survive in all instances. In column 11 we control for all additional control variables that were statistically significant at least at the 10% level. Our basic results survive again.

Table 4 presents robustness results with alternative samples. Columns 1-5 check whether our results are influenced by any particular continent. We take out Africa, Neo-Europe[19], Asia, the Americas, and Europe, one at a time from our base sample. In columns 6-8 we omit former British colonies, former French colonies, and former Spanish colonies one at a time. In columns 9-11 we omit influential observations using Cook's distance, DFITS, and Welsch distance formulas, respectively. Our coefficients of interest remain statistically significant in all instances.

In table 5 we use alternative measures of democracy. In columns 1 and 3 we replace our net democracy measure with alternative ordinal measures of democracy. These measures are the lagged democracy index DI_{srt-5} from the Polity IV dataset (i.e. the democracy score without subtracting the autocracy score), and the lagged Freedom House democracy index DFH_{srt-5}. We scale both indices such that they range from 0 to 1, with higher values again implying better democratic institutions. As some scholars view a simple dichotomy between democracy and non-democracy as the most appropriate empirical definition (e.g., Przeworski et al., 2000), we use a cardinal measure of democracy in column 2. This measure, DD_{srt-5}, is a dummy variable, which is equal to 1 if the POLITY2 score is positive in the year $t-5$, and equal to 0 otherwise. A related view is that democratic capital or longer-lived democratic experience is important (e.g., Treisman, 2000). In column 5 we therefore use the fraction of years a country has been democratic between 1950 and the year $t-5$, DLR_{srt-5}.[20] In column 6 we use the fraction of years a country was democratic between 1950 and 1975. This measure is completely independent of our sample period

[19]Neo-Europe includes all Anglo-Saxon countries outside Europe: Australia, Canada, New Zealand, and the United States.

[20]The year 1950 is chosen as a reference year since many former colonies became independent around that time (i.e., in-between 1945 and 1965). Treisman (2000) also uses 1950 as a reference year.

and, therefore, unlikely to be causing any endogeneity bias. In all columns we find that the coefficients of interest show the predicted signs (even though democracy and media freedom are often insignificant), and that the interaction terms between media freedom and these different measures of democracy are always statistically significant. These findings provide further evidence for the complementarity of democracy and media freedom in the fight against corruption.

In table 6 we check the robustness of our results using alternative measures of media freedom and corruption. In column 1 we use a dichotomous measure of media freedom using the Freedom House coding. The dummy variable MD_{srt-5} is equal to one if the Freedom House coding indicates that the media is free or partly free, and equal to zero if it indicates that the media is not free. In column 2 we use a long run measure of media freedom. This measure, MLR_{srt-5}, is based on the dummy variable MD_{srt-5}. It indicates the fraction of years since 1980 in which a country's media has been free or partly free. In columns 1 and 2 all coefficients of interest show the predicted signs and are statistically significant. In column 3 we use the Freedom House media freedom index MI_{srt-5}, which runs from 0 to 100, but is only available for the years from 1994 to 2008. We use five year averages and rescale the index, such that it ranges from 0 to 1, with higher values implying higher media freedom. In column 4 we use the index of media freedom from the Reporters without Borders, $MRWB_{srt-5}$. This index is compiled on the basis of a worldwide survey carried out by journalist organizations. Respondents of the survey are correspondents around the world, partner organizations for freedom of expression, as well as journalists, researchers, jurists and human rights activists. We again use five year averages and rescale the variable such that it ranges from 0 to 1, with higher values implying higher media freedom. In columns 3 and 4 the coefficient on D_{srt-5} remains statistically significant, but the other two coefficients of interest are no longer statistically significant. This may be due to a reduction in sample sizes by more than half. The sample sizes are 207 and 228 in

columns 3 and 4, compared to 544 our baseline regression.

In column 5 of table 6 we examine the impact of internet penetration on corruption, expecting that the internet has similar effects as a free and independent media. We use fixed broadband internet connection per 100 people as a measure of internet penetration, and find that internet penetration along with democracy helps reduce corruption.

We finally look at alternative measures of corruption. In column 6 of table 6 we replace the corruption index from PRS by the corruption perception index from Transparency International. All coefficients still show the predicted sign, but are statistically insignificant. We suspect the much smaller sample size to be the main reason.

In table 7 we use the World Bank Enterprise Survey (WBES) data to test how democracy and media freedom affect corruption experience and perception of firms around the world. The WBES data is collected at the firm level. However, given that our measures of democracy and media freedom are at the national level, we aggregate the firm level data and again use national levels as the unit of analysis. Most of the surveys of firms across different countries were conducted by the World Bank between 2005 and 2008. Therefore, we use our observations of democracy and media freedom from 2005, i.e., D_{sr2005} and M_{sr2005}. As national measures of corruption at the firm level we use the percentages of firms answering 'yes' to the survey questions whether firms are expected to give gifts in order to get an operating license (column 1), to secure a government contract (column 2), or to tax officials (column 3).[21] We find that all coefficients of interest show the predicted sign, and that those on media freedom and the interaction term are also statistically significant.

[21] In some countries the survey was conducted twice. For these countries we use the average percentage of firms answering 'yes'.

6 Empirical Evidence from Indian States

India is an important case study for analyzing the political economy of corruption. India is a federal democracy in which popularly elected politicians sometimes engage in corruption. However the press in India is extremely active and often publish stories that make politicians more accountable to their constituents. Indian press, especially non-English and non-Hindi regional language press, also experienced rapid growth post independence (Jeffrey, 2000). Therefore, press activity in Indian states exhibit significant time-series and cross-sectional variation. Furthermore, studying variation across Indian states allows us to bypass the problem of unobserved country specific heterogeneity which is a common criticism leveled against cross-country studies.

We use a measure of state level corruption from the India Corruption Study conducted by Transparency International in 2005 and 2008. Using their raw data we compute corruption using a two step procedure. First, an average is computed of the percentage of respondents answering 'yes' to the questions whether they have direct experience of bribing, direct experience of using a middleman, and their perception that a department is corrupt, or that corruption increased over time for eight different sectors (banking, land administration, police, education, water, Public Distribution System (PDS), electricity, and hospitals). Second, these averages are averaged over all eight sectors to generate one observation per state i and time period t. Higher value of the corruption measure implies higher corruption. The state of Bihar in 2005 turns out to be the most corrupt in our sample with 59 percent of respondents reporting corruption. In contrast Karnataka in 2008 is the least corrupt with only 18 percent of the respondents reporting corruption.

Direct measures of the quality of democratic institutions and media freedom are not available at the state level. We therefore follow Besley and Burgess (2002) in using an index of political competition and newspaper circulation. The index of political compe-

tition (PC_i) is defined as one minus the average absolute difference in vote share of the Congress party and its nearest rival at the 1999 and 2004 national parliamentary elections (Loksabha) in a particular state.[22] Higher values of PC_i imply more political competition and, arguably, better democracy. We use newspaper circulation (NP_{it-1}) per one million inhabitants in 2004 and 2007 as proxy for state level media freedom.

In table 8 we test the predictions of our theoretical model using the data from Indian states. In column 1 we find a negative association between political competition (PC_i) and corruption. In columns 2 and 3 we see that this negative association becomes insignificant once we add year dummies and control for state level incomes and newspaper circulation (NC_{it}).[23] In column 4 we add the interaction term $PC_i \times NC_{it}$. The results suggest that political competition would have no significant effect on corruption in the absence of any newspaper circulation, and that newspaper circulation would increase perceived corruption in the absence of any political competition. More importantly, the significantly negative coefficient on the interaction term implies that corruption is particularly low if political competition and newspaper circulation are both high.

This analysis with Indian state level data suffers from a small sample size and imperfect proxies for democracy and media freedom. Nevertheless, in our view, it provides further evidence for the complementarity of democracy and media freedom in the fight against corruption.

[22]Congress has been a major political force in the history of parliamentary democracy in independent India ruling the country for 52 of the 64 years since independence in 1947. It had almost absolute influence in the early years of Indian democracy. However, in recent times its influence has waned in many states. Therefore, a measure capturing political competition faced by the Congress party is likely to be a good measure of political competition in India.

[23]The coefficient on income is negative, but statistically insignificant throughout columns 2-4.

7 Conclusions

Democracy and media freedom have both been suggested as useful tools in the fight against political corruption. However, so far, their interplay in this fight has received scant attention. We have presented a stylized game theoretic model that shows that democracy and media freedom are complements in the fight against political corruption. In particular, the model predicts that democracy reduces corruption, and that this effect is magnified by media freedom. Using panel data covering the period 1980-2008 and 126 countries, we have provided empirical support for this prediction. We have shown that our main results are fairly robust and hold when we control for the effects of income, time varying common shocks, regional fixed effects and various additional covariates of corruption. They are also robust across different samples, and to the use of alternative measures of democracy, media freedom and corruption. We have also presented some evidence from state level Indian panel data in support of the complementarity of democracy and media freedom in the fight against corruption.

Our findings suggest that the fight against political corruption is hard to win only by democratization, or only by promoting free and independent media. The winning strategy must contain sound democratic institutions *and* free media.

Appendix A: Data description

A.1 International data

Corruption index (CI_{srt}): A 7-point (0-6) index with higher values indicating less corruption. Source: ICRG, PRS Group.

Corruption perception index: An 11-point (0-10) index with higher values indicating less corruption. Source: Transparency International.

Democracy (D_{srt}): POLITY2 scores from the Polity IV dataset, averaged over the period t to $t+4$ and scaled such that it ranges from 0 to 1 with higher values indicating better democratic institutions. POLITY2 is defined as the difference between democracy and autocracy scores. Source: Polity IV.

Democracy Index (DI_{srt}): Democracy score from the Polity IV dataset, averaged over the period t to $t+4$ and scaled such that it ranges from 0 to 1 with higher values indicating better democratic institutions. Source: Polity IV.

Democracy Freedom House (DFH_{srt}): Democracy index from Freedom House, averaged over the period t to $t+4$ and scaled such that it ranges from 0 to 1 with higher values indicating better democratic institutions. Source: Freedom House.

Democracy Dummy (DD_{srt}): Generated by using the POLITY2 coding from the Polity IV dataset. This dummy is equal to 1 if the POLITY2 score is positive in t, and equal to 0 otherwise. Source: Polity IV.

Fraction of democratic years since 1950 (DLR_{srt}): Generated by using the POLITY2 coding from the Polity IV dataset. Fraction of years between 1950 to t in which POLITY2 is positive. Source: Polity IV.

Media Freedom (M_{srt}): Freedom House classify a country's electronic and print media as 'free', 'partly free', or 'not free'. We convert this classification into a discrete variable. A country-year gets a 0 if the media is 'not free', a 0.5 if it is 'partly free', and a 1 if it is 'free'. The scores are then averaged over the period t to $t+4$. Source: Freedom House.

Media Freedom Dummy (MD_{srt}): Dummy variable equal to one if Freedom House classifies the media as 'free' or 'partly free', and equal to zero if it classifies the media as 'not free'. Source: Freedom House.

Long-run media freedom (MLR_{srt}): Fraction of years for which Freedom House classified the media as 'free' or 'partly free' at time t since 1980. Source: Freedom House.

Media freedom index MI_{srt}: Media freedom index from Freedom House, which is available since 1994. It ranges from 0 to 100, but we re-scale it so that it ranges from 0 to 1 with higher values

implying higher media freedom. Source: Freedom House.

RWB Media Freedom ($MRWB_{srt}$): Media freedom from the Reporters without Borders. It ranges from 0 to 100, but we re-scale it so that it ranges from 0 to 1 with higher values indicating higher media freedom. Source: Reporters without Borders.

Fixed Broadband (FB_{srt}): Fixed broadband internet connection per 100 people. Source: WDI Online, World Bank.

Per Capita Income (Y_{srt}): Log GDP per capita PPP in current international $. Source: WDI Online, World Bank.

Share Protestant: Percentage of Population Protestant in 1980. Source: La Porta et al. (1999).

Legal Origins: Dummies for British, German, Scandinavian, and Socialist legal origins, with others being the omitted category. Source: La Porta et al. (1999).

Ethnic Fractionalization: Probability that two randomly selected individuals from a population belong to different ethnic groups. Source: Alesina et al. (2003).

Trade Share: Total volume of trade as share of GDP. Source: WDI Online, World Bank.

FDI: Net inflow of foreign direct investment as share of GDP. Source: WDI Online, World Bank.

Official Development Assistance: Log of official development assistance per capita by all donors. Source: WDI Online, World Bank.

Real Exchange Rate Distortions: Real overvaluation. Source: WDI Online, World Bank.

Sachs and Warner Trade Liberalization Index: Fraction of years open between t and $t+4$. Source: Wacziarg and Welch (2003).

Black Market Premium: Source: WDI Online, World Bank.

Resource rent: Log of the per capita rent from natural resources, which include energy, minerals and forestry, averaged over the period t to $t+4$. Rents are defined as the world market price minus the average extraction costs. Source: Adjusted Net Savings Dataset, World Bank.

Percentage of firms identifying corruption as a major constraint. Source: WBES, World Bank.

Percentages of firms expected to give gifts to get an operating license, to secure a government contract, or to tax officials. Source: WBES, World Bank.

A.2 Indian data

Corruption: Authors' calculation using the two step procedure described in section 6. Source: India Corruption Study 2005 and 2008, Transparency International.

Political Competition (PC_i): One minus the absolute difference in vote share of the Congress party and its nearest rival, averaged over the 1999 and 2004 national parliamentary elections. Source: Election Commission of India.

Newspapers (NP_{it-1}): Number of registered newspapers in circulation in 2004 and 2007 divided by population size in millions, with population data for 2004 and 2007 being interpolated from census data for 2001 and 2011. Source: Registrar of Newspapers, Government of India.

Income (Y_{it-1}): Real state GDP per capita for 2004 and 2007 measured in 2009 constant prices. Source: Planning Commission, Government of India.

Appendix B: Baseline Samples

B.1 International sample

Algeria, Angola, Argentina, Australia, Austria, Azerbaijan, Bahrain, Bangladesh, Belarus, Belgium, Bolivia, Botswana, Brazil, Bulgaria, Burkina Faso, Cameroon, Canada, Chile, China, Colombia, Dem. Rep. Congo, Rep. Congo, Costa Rica, Cote d'Ivoire, Croatia, Cuba, Cyprus, Czech Rep., Denmark, Dominican Rep., Ecuador, Egypt, El Salvador, Estonia, Ethiopia, Finland, France, Gabon, The Gambia, Germany, Ghana, Greece, Guatemala, Guinea, Guinea Bissau, Guyana, Haiti, Honduras, Hungary, India, Indonesia, Iran, Iraq, Ireland, Israel, Italy, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Korea Dem. Rep., Rep. Korea, Kuwait, Latvia, Lebanon, Liberia, Libya, Lithuania, Madagascar, Malawi, Malaysia, Mali, Mexico, Moldova, Mongolia, Morocco, Namibia, Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pak-

istan, Panama, Papua New Guinea, Paraguay, Peru, The Philippines, Poland, Portugal, Qatar, Russian Fed., Saudi Arabia, Senegal, Serbia and Montenegro, Sierra Leone, Singapore, Slovak Rep., Slovenia, Somalia, Spain, Sri Lanka, Sudan, Sweden, Switzerland, Syria, Taiwan, Tanzania, Thailand, Togo, Trinidad and Tobago, Tunisia, Turkey, Uganda, Ukraine, United Arab Emirates, United Kingdom, United States, Uruguay, Venezuela, Vietnam, Zambia, Zimbabwe.

B.2 Indian sample

Andhra Pradesh, Assam, Bihar, Chhattisgarh, Delhi, Gujarat, Haryana, Himachal Pradesh, Jammu and Kashmir, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, West Bengal.

References

[1] Ades, A., Di Tella, R. (1999). "Rents, competition, and corruption." American Economic Review 89, 982-993.

[2] Adsera, A., Boix, C., Payne, M. (2003). "Are you being served? Political accountability and quality of government." Journal of Law, Economics and Organization 19, 445-490.

[3] Aidt, T. (2003). "Economic analysis of corruption: A survey." Economic Journal 113, F632-F652.

[4] Aidt, T., Dutta, J., Sena, V. (2008). "Governance regimes, corruption and growth: Theory and evidence." Journal of Comparative Economics 36, 195-220.

[5] Alesina, A., Devleeschauwer, A., Easterly, W., Kurlat, S., Wacziarg, R. (2003). "Fractionalization." Journal of Economic Growth 8, 155-194.

[6] Bardhan, P. (1997). "Corruption and development: A review of issues." Journal of Economic Literature 35, 1320-1346.

[7] Barro, R. (1973). "The control of politicians: An economic model." Public Choice 14, 19-42.

[8] Belsley, D., Kuh, E., Welsch, R. (1980). "Regressions Diagnostics: Identifying Influential Data and Sources of Collinearity." New York: John Wiley & Sons.

[9] Besley, T. (2007). "Principled Agents? The Political Economy of Good Government." Oxford: Oxford University Press.

[10] Besley, T., Burgess, R. (2002). "The political economy of government responsiveness: Theory and evidence from India." Quarterly Journal of Economics 117, 1415-1451.

[11] Besley, T., Prat, A. (2006). "Handcuffs for the grabbing hand? Media capture and government accountability." American Economic Review 96, 720-736.

[12] Bhattacharyya, S., Hodler, R. (2010). "Natural resources, democracy and corruption." European Economic Review 54, 608-621.

[13] Brunetti, A., Weder, B. (2003). "A free press is bad news for corruption." Journal of Public Economics 87, 1801-1824.

[14] Chowdhury, S.K. (2004). "The effect of democracy and press freedom on corruption: an empirical test." Economics Letters 85, 93-101.

[15] Fan, S., Lin, C., Treisman, D. (2009). "Political decentralization and corruption: Evidence from around the world." Journal of Public Economics 93, 14-34.

[16] Ferejohn, J. (1986). "Incumbent performance and electoral control." Public Choice 50, 5-25.

[17] Ferraz, C., Finan, F. (2008). "Exposing corrupt politicians: The effects of Brazil's publicly-released audits on electoral outcomes," Quarterly Journal of Economics 123, 703-745.

[18] Hausman, J., Stock, J., Yogo, M. (2005). "Asymptotic properties of the Hahn-Hausman test for weak instruments." Economics Letters 89, 333-342.

[19] LaPorta, R., Lopez-de-Silanes, F., Shleifer, A., Vishny, R. (1999). "The quality of government." Journal of Law, Economics and Organization 15, 222-279.

[20] Marshall, M., Jaggers, K. (2002). "Polity IV Project: Political Regime Characteristics and Transitions, 1800-2002." University of Maryland.

[21] Mauro, P. (1995). "Corruption and growth." Quarterly Journal of Economics 110, 681-712.

[22] Persson, T., Tabellini, G. (2000). "Political Economics: Explaining Economic Policy." Cambridge: MIT Press.

[23] Plümper, T., Troeger, V.E. (2007). "Efficient estimation of time-invariant and rarely changing variables in finite sample panel analyses with unit fixed effects." Political Analysis 15, 124-139.

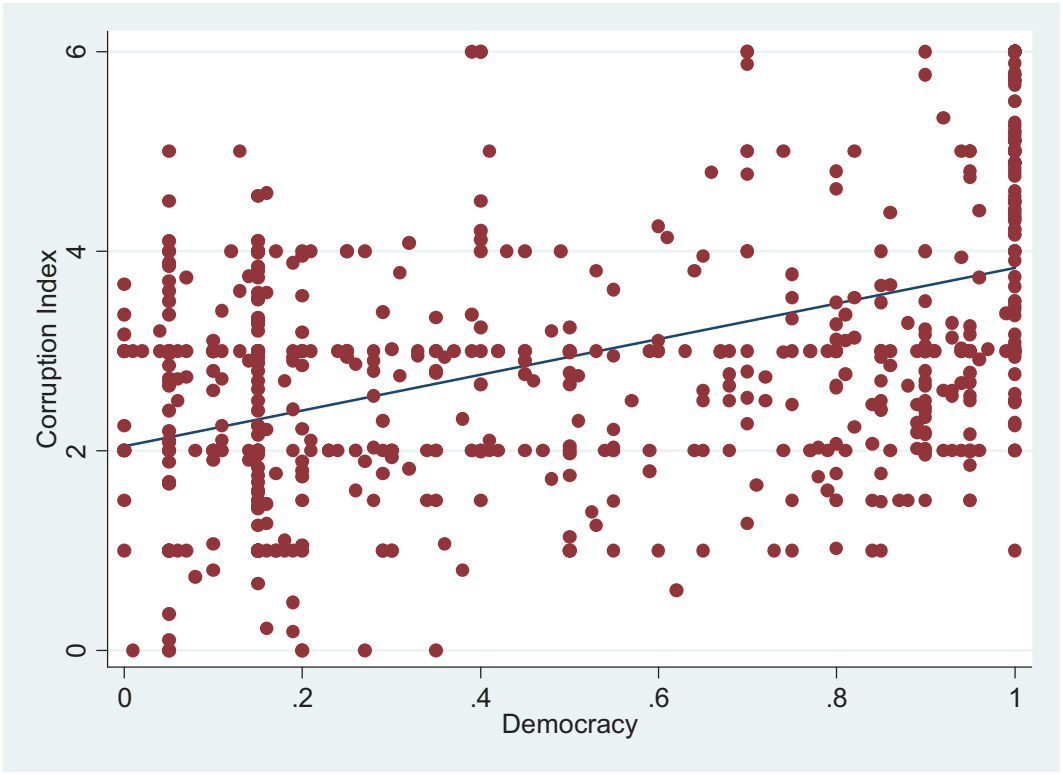
[24] Przeworski, A., Alvarez, M., Cheibub, J., Limongi, F. (2000). "Democracy and Development: Political Institutions and Material Well-Being in the World, 1950-1990." New York: Cambridge University Press.

[25] Rose-Ackerman, S. (1999). "Corruption and Government: Causes, Consequences and Reform." Cambridge: Cambridge University Press.

[26] Treisman, D. (2000). "The causes of corruption: A cross-national study." Journal of Public Economics 76, 399-457.

[27] Wacziarg, R., Welch, K. (2003). "Trade liberalization and growth: New evidence." NBER Working Paper 10152.

Figure 1: Democracy, Media Freedom and Corruption



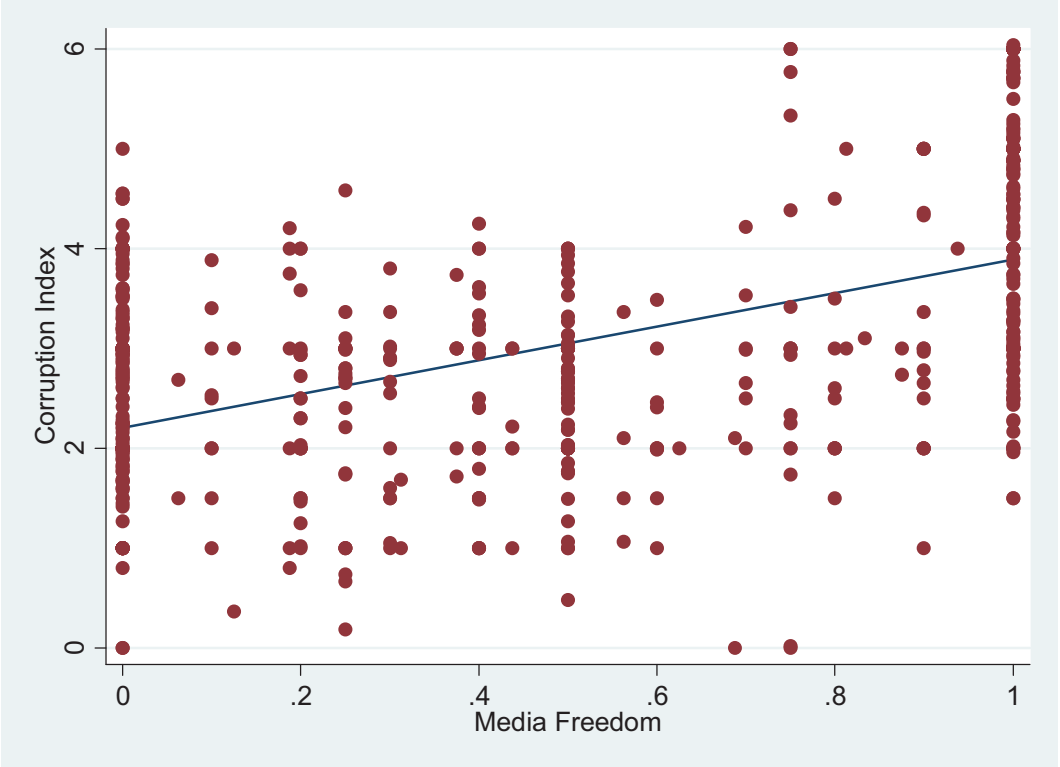


Table 1. Summary Statistics

Variable	Number of observations	Mean	Standard Deviation (overall)	Standard Deviation (between countries)	Standard Deviation (within countries)	Minimum	Maximum
Corruption Index (CI_{srt})	759	3.05	1.44	1.22	0.72	0	6
Media Freedom (M_{srt-5})	1069	0.48	0.40	0.32	0.25	0	1
Democracy (D_{srt-5})	1573	0.51	0.37	0.29	0.22	0	1
$D_{srt-5} \times M_{srt-5}$	895	0.37	0.39	0.34	0.22	0	1
Income (Y_{srt})	1684	7.67	1.36	1.06	0.87	4.08	10.87

Table 2: Democracy, Media Freedom and Corruption

	Dependent Variable: Corruption Index (CI_{srt})							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS Estimates					LIML Fuller 1 IV Estimates (GMM)	Fixed Effect Estimates	Fixed Effect Vector Decomposition (FEVD) Estimates
Democracy (D_{srt-5})	4.34*** (0.14)	1.41*** (0.22)	1.35*** (0.31)	0.89*** (0.33)	2.86*** (0.84)	0.81* (0.49)	0.67 (0.49)	1.90*** (0.20)
Media Freedom (M_{srt-5})			-0.33 (0.24)	-1.10** (0.44)	-1.89*** (0.55)	-2.74*** (0.97)	-0.62 (0.45)	-0.69** (0.28)
$D_{srt-5} \times M_{srt-5}$				1.23** (0.60)	2.91** (1.15)	2.90*** (1.07)	0.48 (0.71)	5.46*** (0.34)
Income (Y_{srt})		0.26*** (0.01)	0.38** (0.09)	0.36*** (0.09)	0.39*** (0.09)	0.33*** (0.11)	0.27 (0.27)	0.82*** (0.05)
D^2_{srt-5}					-2.59** (1.02)			
M^2_{srt-5}					-0.18 (0.69)			
Controls:								
Ctry Dum.	NO	NO	NO	NO	NO	NO	YES	YES (FEVD)
Region Dum.	NO	NO	YES	YES	YES	YES	NO	NO
Year Dummies	NO	NO	YES	YES	YES	YES	YES	YES
F-stat on EI						192.46		
Partial R^2 EI						0.43		
Stock-Yogo						16.85		
Countries	127	126	126	126	126	124	126	126
Observations	641	615	544	544	544	433	544	544
Adjusted R^2	0.76	0.89	0.62	0.62	0.63	--	0.84	0.79

Notes: ***, **, and * indicates significance level at 1%, 5%, and 10% respectively against a two sided alternative. Figures in the parentheses are cluster standard errors and they are robust to arbitrary heteroskedasticity and arbitrary intra-group correlation. Sample years are every fifth year (averages) from 1985 to 2008. In column (5) M_{srt-10}, D_{srt-10}, $D_{srt-10} \times M_{srt-10}$, and Y_{srt-5} are used as instruments for M_{srt-5}, D_{srt-5}, $D_{srt-5} \times M_{srt-5}$, and Y_{srt}. '*F*-stat on EI', 'Partial R^2 EI', and 'Stock-Yogo' indicate *F*-statistic on excluded instruments, Partial R^2 on excluded instruments and Stock-Yogo critical values respectively. Fuller's modified LIML estimator with $\alpha = 1$ (correction parameter proposed by Hausman et al., 2005) is used in column (5). Reported Stock-Yogo critical value is the 5 percent significance level critical value for weak instruments tests based on, respectively, 30 percent and 5 percent maximal Fuller relative bias. The null of weak instruments is rejected in the case that the *F*-statistic on the excluded instruments exceeds the Stock-Yogo critical value. Note that the Sargan/Hansen overidentification test for all instruments is not reported as we have an exactly identified system.

Table 3: Democracy, Media Freedom and Corruption: Robustness with Additional Covariates

	Dependent Variable: Corruption Index (CI_{srt})										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Democracy (D_{srt-5})	0.86**	1.20***	0.94***	0.77**	1.34***	0.75*	0.90**	0.62*	0.88**	0.69**	0.94**
	(0.33)	(0.37)	(0.34)	(0.33)	(0.47)	(0.45)	(0.36)	(0.38)	(0.35)	(0.31)	(0.52)
Media Freedom	-1.06**	-0.88**	-1.06**	-0.94**	-1.31**	-1.22**	-1.34***	-1.43**	-1.12**	-1.15**	-1.77***
(M_{srt-5})	(0.46)	(0.44)	(0.45)	(0.44)	(0.50)	(0.49)	(0.45)	(0.45)	(0.45)	(0.44)	(0.51)
$D_{srt-5} \times M_{srt-5}$	1.12*	0.88**	1.15**	1.00*	1.08*	1.54**	1.37**	1.52**	1.34**	1.35**	2.21***
	(0.63)	(0.34)	(0.60)	(0.61)	(0.64)	(0.72)	(0.63)	(0.62)	(0.63)	(0.59)	(0.75)
Controls:											
Income (Y_{srt})	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Region Dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year Dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Additional Controls	Share Protestant (+***)	Legal Origin Dummies	Ethnic Fractional.	Official Develop. Assistance (+*)	Real Exchange Rate Distortion	Black Market Premium (-***)	FDI	S&W Trade Lib. Index (+ ***)	Trade Shares (+**)	Resource Rent (- **)	All stat. significant additional covariates
Countries	122	124	122	105	84	116	117	112	123	120	78
Observations	531	538	529	436	384	360	499	490	513	517	235
Adjusted R^2	0.94	0.94	0.94	0.92	0.95	0.94	0.94	0.95	0.94	0.94	0.95

Notes: ***, **, and * indicate significance level at 1%, 5%, and 10% respectively against a two sided alternative. Figures in parentheses are clustered standard errors and they are robust to arbitrary heteroskedasticity and arbitrary intra-group correlation. Sample years are every fifth year (averages) from 1985 to 2008. In column 11, we include all statistically significant additional controls which are Share of Protestants, Official Development Assistance, Black Market Premium, the Sachs and Warner Trade Liberalization Index, Trade Shares, and Resource Rent.

Table 4: Democracy, Media Freedom and Corruption: Robustness with Alternative Samples

	Dependent Variable: Corruption Index (CI_{srt})										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Democracy (D_{srt-5})	0.75** (0.38)	0.91*** (0.33)	0.61* (0.34)	0.99** (0.39)	1.10*** (0.33)	1.29** (0.59)	0.98*** (0.45)	1.35*** (0.50)	0.80*** (0.28)	0.80*** (0.28)	96*** (0.31)
Media Freedom (M_{srt-5})	-1.40** (0.62)	-0.96** (0.44)	-0.91* (0.50)	-1.21** (0.53)	-1.12** (0.45)	-0.94 (0.63)	-1.08* (0.55)	-1.12** (0.50)	-0.91** (0.37)	-0.91** (0.37)	-1.04** (0.43)
$D_{srt-5} \times M_{srt-5}$	1.56** (0.75)	0.95** (0.48)	1.04* (0.56)	1.32* (0.71)	1.17* (0.65)	1.03* (0.59)	1.11* (0.65)	1.05* (0.66)	1.05** (0.51)	1.05** (0.51)	1.09** (0.57)
Controls	Income (Y_{srt}), Region Dummies, Year Dummies										
Omitted Observations	Base sample without Africa	Base sample without Neo-Europe	Base sample without Asia	Base sample without the Americas	Base sample without Europe	Base sample without British Colonies	Base sample without French Colonies	Base sample without Spanish Colonies	Obs. Omitted using Cook's Distance	Obs. Omitted using DFITS	Obs. Omitted using Welsch Distance
Countries	92	122	95	103	91	66	85	86	126	126	126
Observations	395	525	415	433	403	312	396	398	516	516	542
Adjusted R^2	0.94	0.93	0.94	0.94	0.92	0.94	0.94	0.94	0.95	0.95	0.94

Notes: ***, **, and * indicate significance level at 1%, 5%, and 10% respectively against a two sided alternative. Figures in parentheses are clustered standard errors and they are robust to arbitrary heteroskedasticity and arbitrary intra-group correlation. Sample years are every fifth year (averages) from 1985 to 2008. In column 9, omit if $|Cooksd_i|>4/n$; in column 10, omit if $|DFITS_i|>2(k/n)^{1/2}$; and in column 11, omit if $|Welschd_i|>3k^{1/2}$ formulas are used (see Belsley et al., 1980). Here n is the number of observation and k is the number of independent variables including the intercept. The influential observations according to the Cook's Distance and DFITS formula are ARG1985, BGD1985, BGD1990, CHL1985, CRI1985, CYP1985, CYP1990, GAB1990, GAB1995, GAB2000, GMB1985, IDN1985, IDN1990, IRQ1995, IRL2000, LBR1990, LBR1995, MDG2005, NZL1985, NZL1990, PHL1985, PNG2005, POL1990, POL1995, PRK1990, QAT1985, SGP2005 and ZWE2005. The influential observation according to the Welsch Distance formula is CYP1985 and GAB1995.

Table 5: Democracy, Media Freedom and Corruption: Robustness with Alternative Measures of Democracy

	Dependent Variable: Corruption Index (CI_{srt})				
	(1)	(2)	(3)	(4)	(5)
Media Freedom (M_{srt-5})	-0.48	-0.46	-0.61	-0.09	-0.01
	(0.30)	(0.32)	(0.39)	(0.19)	(0.17)
Democracy Index (DI_{srt-5})	0.72**				
	(0.35)				
Democracy Dummy (DD_{srt-5})		0.11			
		(0.17)			
Democracy Freedom House (DFH_{srt-5})			0.11		
			(0.07)		
Fraction of years democratic since 1950 (DLR_{srt-5})				0.17	
				(0.33)	
Fraction of years democratic 1950-1975 (DLR_{sr1975})					0.65*
					(0.38)
$DI_{srt-5} \times M_{srt-5}$	0.69**				
	(0.33)				
$DD_{srt-5} \times M_{srt-5}$		1.03***			
		(0.38)			
$DFH_{srt-5} \times M_{srt-5}$			0.45***		
			(0.10)		
$DLR_{srt-5} \times M_{srt-5}$				1.53**	
				(0.47)	
$DLR_{sr1975} \times M_{srt-5}$					2.02***
					(0.53)
Controls	Income (Y_{srt}), Region Dummies, Year Dummies				
Countries	123	126	132	126	118
Observations	529	543	574	543	514
Adjusted R^2	0.93	0.93	0.93	0.94	0.94

Notes: ***, **, and * indicates significance level at 1%, 5%, and 10% respectively against a two sided alternative. Figures in the parentheses are cluster standard errors. Sample years are every fifth year (averages) from 1985 to 2008.

Table 6: Democracy, Media Freedom and Corruption: Robustness with Alternative Measures of Media Freedom and Corruption

	Dependent Variable: Corruption Index (CI_{srt})					**Corruption Perception Index**
	(1)	(2)	(3)	(4)	(5)	(6)
Media Freedom (M_{srt-5})						-0.38
						(0.97)
Media Freedom Dummy (MD_{srt-5})	-0.82***					
	(0.21)					
Long Run Media Freedom (MLR_{srt-5})		-0.42*				
		(0.25)				
Media Freedom Index (MI_{srt-5})			-0.11			
			(0.69)			
RWB Media Freedom ($MRWB_{srt-5}$)				0.35		
				(0.65)		
Fixed Broadband (FB_{srt-5})					-0.19	
					(0.14)	
Democracy (D_{srt-5})	1.02***	1.38***	1.27*	1.15**	0.61**	0.11
	(0.39)	(0.30)	(0.71)	(0.45)	(0.29)	(0.56)
$D_{srt-5} \times M_{srt-5}$						1.41
						(1.34)
$D_{srt-5} \times MD_{srt-5}$	0.82**					
	(0.42)					
$D_{srt-5} \times MLR_{srt-5}$		0.63*				
		(0.36)				
$D_{srt-5} \times MI_{srt-5}$			1.13			
			(1.12)			
$D_{srt-5} \times MRWB_{srt-5}$				1.63		
				(1.02)		
$D_{srt-5} \times FB_{srt-5}$					0.24*	
					(0.13)	
Controls	Income (Y_{srt}), Region Dummies, Year Dummies					
Countries	126	126	122	117	121	141
Observations	544	544	228	207	168	282
Adjusted R^2	0.67	0.63	0.59	0.61	0.65	0.94

Notes: ***, **, and * indicates significance level at 1%, 5%, and 10% respectively against a two sided alternative. Figures in the parentheses are cluster standard errors. Sample years are every fifth year (averages) from 1985 to 2008.

Table 7: Democracy, Media Freedom and Corruption: Evidence from Firms around the World

	Percentage of firms expected to give gifts to get an operating license	**Percentage of firms expected to give gifts to secure a government contract**	**Percentage of firms expected to give gifts to tax officials**
	(1)	(2)	(3)
	OLS Estimates		
Democracy in 2005 (D_{sr2005})	-6.32 (12.50)	-16.13 (13.55)	-5.18 (12.53)
Media Freedom in 2005 (M_{sr2005})	63.24* (32.61)	80.39** (35.18)	53.36** (21.44)
$D_{sr2005} \times M_{sr2005}$	-74.58** (33.86)	-71.89* (38.59)	-60.18** (24.34)
Controls:	Income (Y_{srt}), Region Dummies		
Countries	88	98	100
Observations	88	98	100
Adjusted R^2	0.26	0.48	0.42

Notes: ***, **, and * indicates significance level at 1%, 5%, and 10% respectively against a two sided alternative. Figures in the parentheses are cluster standard errors clustered at the country level and they are robust to arbitrary heteroskedasticity and arbitrary intra-group correlation. The dependent variables are averaged over the period 2005-2008

Table 8: Democracy, Media Freedom and Corruption: Evidence from Indian States

	Dependent Variable: Corruption			
	(1)	(2)	(3)	(4)
	OLS Estimates			
Political Competition (PC_i)	-88.39** (34.40)	-32.40 (31.76)	-31.74 (27.46)	124.23 (74.38)
Newspapers (NP_{it-1})			0.004 (0.047)	1.68** (0.73)
$PC_i \times NP_{it-1}$				-1.91** (0.83)
Controls:	none	Income (Y_{it-1}), Year Dummies		
States	16	16	16	16
Observations	32	32	32	32
Adjusted R^2	0.06	0.71	0.71	0.75

Notes: ***, **, and * indicates significance level at 1%, 5%, and 10% respectively against a two sided alternative. Figures in the parentheses are cluster standard errors and they are robust to arbitrary heteroskedasticity and arbitrary intra-group correlation. Sample years for the corruption data are 2005 and 2008. PC_i is averaged over the general election years 1999 and 2004. NP_{it-1} and Y_{it-1} are for the years 2004 and 2007.