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Corruption, democracy and bureaucracy

Aviral Kumar TIWARI
ICFAI University, Tripura, India
aviral.eco@gmail.com & aviral.kr.tiwari@gmail.com

Abstract. *This paper examines the relationship of corruption with democracy and bureaucracy in the 82 countries in a panel framework. For the analysis we use rule of law, regulatory quality, control over corruption and secondary school enrollment ratio as control variables. We find that democracy, rule of law and control over corruption decreases the level of corruption. When we allowed for interaction effect among independent variables we find the evidence of strong interaction effect between all of the explanatory variables. We also find that, surprisingly, higher democracy and rule of law are positively associated with the level of corruption while higher bureaucracy negatively.*

Keywords: corruption; democracy; bureaucracy; panel data.

JEL Codes: F35, C23, G39.
REL Codes: 13I, 13J.

1. Introduction

Corruption is everywhere. Every country either developed or developing is suffering from the negative consequences of the corruption; of course the level of corruption is different in different countries. Myint (2000) has correctly said that corruption occurs in all countries "both developed and developing, in the public and private sectors, as well as in non-profit and charitable organizations." Though the phenomenon of corruption exist in each country, disregarding the level of severity of the problem, it is common in developing countries up such an extent that it is regarded as a way of life in Nigeria, it has become culture of Sierra Leone and in Sudan it is treated as fifth factor of production (Hwedie, 2000). Corruption is a multi-faced term and it is very difficult to give precise definition of it. Johnston (1999) defines it as "misuse of public power for private benefits, e.g., bribing of public officials, kickbacks in public procurement, or embezzlement of public funds". However, Transparency International (1999) has widened its scope by focusing its existence in private sector too. Transparency International (1999) defines corruption as "giving or receiving undue advantage in the course of business activities leading to acts in breach of a person's duties". Further, we can argue that it is the public sector which plays crucial role in providing the conducive environment (by creating necessary institutional and market conditions) and for nurture of corruption not only in the domain of public sector activities but also in the sphere of private sector activities. Therefore, in such cases it creates a possibility for the Principle-Agent problem wherein the core difficulty lies in the mechanism to monitor the actions of those to whom authority is delegated but where the information is possessed asymmetrically by the agent.

Akcay (2002) has mentioned several causes due to which it arises like widespread poverty, low level of public sector salaries, lack of well developed labour market, lack of risk spreading mechanism etc. Corruption affects negatively our each aspect of socio-economic life and political and institutional activities of the nations. Corruption is multidimensional term which may exist in any form like bribery, fraud, extortion, nepotism, insider trading, embezzlement, and so on and so forth. Its impact is not only limited to the size of the payments involved, but the very process of extorting and giving bribes has distortionary effects that are socio-economic and political, even in terms of economic growth. In fact corruption reinforces bureaucratic delays. Corruption has a more distortionary impact on the economy than taxation, because of the need to keep corruption secret. Efforts to avoid detection and punishment cause corruption to be more distortionary than taxation. Further, corruption slows down investment and economic growth, raises the cost of doing business,

creates opportunities for delays for the work to be done and unnecessary requirements by official, discourages new ideas and innovations, promotes inequality among firms, reduces the quality of products, creates opportunities to divert funds from investment and other production activities, loss of faith on the part of the people and thus its legitimacy and power, strengthens bad governance (through the absence of the rule of Law, respect for human rights, no accountability, and transparency), weakness of structure and institutions which is crucial for better governance and so on and so forth.

Therefore, recognizing the role played by corruption in every aspect of our life and in every sphere of organizational activities in all nations the present study is attempting to seek out a relationship of corruption with democracy and bureaucracy. For the analysis we used data of 82 countries for the period 2002 to 2007 in panel framework.

Rest of the paper is organized as follows. Section 2nd attempts to establish a relationship among corruption, democracy and bureaucracy followed by discussion on data source, variables definition and methodology adopted for empirical analysis in section 3rd. In section 4th results of data analysis have been presented followed by conclusions drawn from the empirical analysis in section 5th.

2. Relationship of corruption with democracy and bureaucracy

There are certain questions that need to address before going for conduct analysis. For example, whether there is any relationship between corruption and democracy? If yes, then whether democratic countries are less corrupt? Addressing on these issues Paldam (1999) finds that there is negative relationship between corruption and the level of democracy. He added that since there is strong interaction of democracy with pattern of transition and vice-versa too, therefore the independent effect of democracy on corruption is uncertain. Akcay (2002) has mentioned that more democratic nations are less corrupt because of two reasons. First, democratic regimes posses effective democratic governance system, rule of law, accountability, transparency and access whereas undemocratic regimes do not. Second, democratic regime embraces those leaders who have political will to address corruption and create the environment in which civil organization can deal with corruption, and support anticorruption activities. Similar argument is put forward by Shleifer and Vishny (1993) who says that countries with more political competition have stronger public pressure against corruption – through laws, democratic elections, and even independent press – and so, are more likely to use government organizations that contain rather than maximizes corruption

proceeds. Therefore, we can conclude that democracy is negatively related with corruption.

Bureaucracy, in simple words is defined as “rules by officials”. Roth and Wittich (1978) said that Max Weber argued that bureaucracy would increase fairness that minimizes nepotism and other types of public corruption and not only this, he added, it is most efficient administrative structure for achieving organizational goals rationally. Hope (1985) admitted that over the years span of state activities has expanded which has resulted in an expanding bureaucracy with increasing discretionary power which is abused for personal benefit contributed to the bureaucratic corruption in developing countries. Therefore, we can conclude that bureaucracy is positively associated with corruption.

3. Methodology, variables description and data source

This study focuses on establishing the relationship among corruption, democracy and bureaucracy. For the analysis purpose data from 82 countries has been employed covering period of 2002 to 2007. In this study we have preferred panel data analysis technique as it has an advantage of containing “the information necessary to deal with both the intertemporal dynamics and the individuality of the entities being investigated” (Dielman, 1989).(1)

In the study we measure corruption by Corruption Perception Index (CPI). CPI is calculated by a Transparency International, a German based international agency since 1999. This agency constructs CPI by collecting information on perception of resident of a country belonging to almost each class of the society. The index ranks nations on a scale from 10 to 0; value near to 10 represents lower level of corruption and value closer to 0 represents higher level of corruption.

Government Effectiveness (GE) index is used as a proxy to measure bureaucracy. GE captures the perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.

Democracy is proxied by Voice and Accountability (VA) index. VA captures the perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.

Further, while measuring the relationship among corruption, democracy and bureaucracy it is imperative for analysis that we should use some control variables so that estimated parameters represent true values and results will be reliable. Therefore, we used Secondary School Enrollment Ratio (SSER), Rule

of Law (RL), Regulatory Quality (RQ) and Control over Corruption (CC) as control variables. RL measure the extent to which agents abide the roles of society. Examples include perceptions of crime, effectiveness and predictability of the judiciary and enforceability of contracts. RQ captures the perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. And CC captures the perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. According to The World Bank (2007), the governance indicator scores are measured between -2.50 and 2.50 over time with lower scores indicating poor achievements and vice versa. Data for CPI is obtained from official website of Transparency International and for rest of variables from official website of World Bank on 14 August, 2010.

By incorporating the above mentioned variables the evaluation of a pooled OLS regression can be specified as follows:

$$\begin{aligned} CPI_{it} &= \beta_0 + \beta_1(VA_{it}) + \beta_2(GE_{it}) + \beta_3(RQ_{it}) + \beta_4(RL_{it}) + \beta_5(CC_{it}) + \\ &+ \beta_6(SSER_{it}) + \varepsilon_{it}, \end{aligned} \quad (1)$$

where i represents country, t represents time, and the remainder is error term, ε_{it}, which is assumed to white noise and varies over both country and time.

However, while using a pooled OLS regression, countries' unobservable individual effects are not controlled therefore; heterogeneity of the countries under consideration for analysis can influence measurements of the estimated parameters (Bevan, Danbolt, 2004). Further, using a panel data model with incorporation of individual effects has a number of benefits; for example, among others, it allows us to account for individual heterogeneity. Indeed, developing countries differ in terms of their colonial history, their political regimes, their ideologies and religious affiliations, their geographical locations and climatic conditions, not to mention a wide range of other country-specific variables (Serrasqueiro, Nunes, 2008). And if this heterogeneity is not taken into account it will inevitably bias the results, no matter how large the sample is. Therefore, by incorporating countries' unobservable individual effects in equation (1) the model to be estimated is as follows:

$$\begin{aligned} CPI_{it} &= \beta_0 + \beta_1(VA_{it}) + \beta_2(GE_{it}) + \beta_3(RQ_{it}) + \beta_4(RL_{it}) + \beta_5(CC_{it}) + \\ &+ \beta_6(SSER_{it}) + w_{it}, \end{aligned} \quad (2)$$

where $w_{it} = \mu_i + \varepsilon_{it}$, with μ_i being countries' unobservable individual effects. The difference between a polled OLS regression and a model considering

unobservable individual effects lies precisely in μ_i. Further, for the analysis we have used interaction terms also among different explanatory variables meaning thereby happening of the one variable is conditioned upon the happening of other variable as most of the explanatory variables are interrelated.

4. Estimation and empirical results

Results of panel data models without incorporating interaction effect have been presented in Table 1.

Table 1

Regression results of panel data models

Panel data models: Dependent variable is CPI; standard errors in parenthesis				
Independent variables	Model 1	Model 2	Model 3	Model 4
	FE-CS	RE-CS	FE-CSW	FE-AR(1)
VA	0.2524584 * (0.1402519)	-0.1036442 (0.1019085)	0.294245*** (0.064621)	0.1919063 (0.1302277)
GE	-0.1348335 (0.1547716)	0.1200345 (0.1553502)	-0.077756 (0.075309)	-0.1226464 (0.1311539)
RQ	0.3188907 * (0.1652857)	0.0878837 (0.1370919)	0.368447*** (0.072174)	0.3607853** (0.1463432)
RL	0.3078712 (0.1871726)	0.6690767*** (0.1569469)	0.205596** (0.098505)	-0.0794106 (0.1668407)
CC	0.2716615 ** (0.1375291)	1.270768*** (0.1289728)	0.169528*** (0.064831)	-0.0254112 (0.1224076)
SSER	0.0003188 (0.0032015)	0.0049142** (0.0021643)	0.001595 (0.000995)	0.0085983** (0.003701)
C	4.425342*** (0.2749966)	3.746236*** (0.1743174)	4.316718*** (0.088203)	3.95983*** (0.1215182)
Model summary				
R^2 overall	0.8707	0.9368	0.985634	0.6560
Hausman test		659.34***		
Fixed effect(F-test)	12.30 ***			5.53***
Wald chi^2		2145.30***		
Country included	82	82	82	82
Total observations	492	492	492	492

Notes: 1. The Hausman test has $\chi 2$ distribution and tests the null hypothesis that unobservable individual effects are not correlated with the explanatory variables, against the null hypothesis of correlation between unobservable individual effects and the explanatory variables. 2. The Wald test has $\chi 2$ distribution and tests the null hypothesis of insignificance as a whole of the parameters of the explanatory variables, against the alternative hypothesis of significance as a whole of the parameters of the explanatory variables. 3. The F test has normal distribution N(0,1) and tests the null hypothesis of insignificance as a whole of the cross-section dummies incorporated in the analysis. 4. ***, **, and *denote significance at 1, 5 and 10 % level of significance, respectively. 5. EF, CS, CSW, RE and AR(1) denotes fixed-effect, cross-section, cross-section-weights, random effect and auto regressive first order. 6. [----] denotes results are not computed.

Source: Author's calculation.

From Table 1, it is evident that in model 1 coefficients of VA, RQ and CC are statistically significant with positive sign indicating that increase in these variables increase the score of CPI, hence the level of corruption will come down. Model 2, which is based on random effect approach, reviles that, contrary to fixed effect results, RL, CC and SSER have significantly positive impact on scores of CPI and hence lowers the level of corruption. However, results of the Hausman test show that data provide evidence to reject the null hypothesis (as Hausman test is significant at 1% level of significance) of absence of correlation between countries' unobservable individual effects and corruption determinants. Therefore, we can conclude that the most appropriate way to carry out analysis of the relationship between CPI and its determinants is a panel model with fixed effects. Therefore, in the next step, in the model 3, analysis has been conducted with fixed effects but providing the cross-section weights. Results of model 3, besides confirming the results reported in model 1, show that RL also has significant positive impact on CPI scores and hence negative impact on corruption. Further, we have also estimated fixed effect model by allowing first-order auto-regressive scheme and results are presented under model 4. We found that AR process is stationary; therefore model with fixed effect is reliable. Further, we have also tested the stationary property of the residuals calculated from models 1 and 3 and found that residuals posses stationary property (see Appendix 2).

In the next step we have analyzed fixed effect model with allowance of interaction terms as most of the variables are interrelated. Results of panel data analysis with allowance of fixed effect and interaction term with cross-section weights are presented in Table 2.

Table 2

Regression results of panel data models with interaction effects

Panel data models: Dependent variable is CPI; standard errors in parenthesis							
	Model 1	Model 2		Model 3		Model 4	
Variables	FE-CSW	Varia-bles	FE-CSW	Varia-bles	FE-CSW	Varia-bles	FE-CSW
VA	0.318343*** (0.067772)	VA	0.441047*** (0.094043)	VA	0.457445*** (0.095325)	VA	0.471719*** (0.105239)
GE	-0.052880 (0.090979)	GE	-0.086634 (0.091746)	GE	-0.071513 (0.091501)	VA*VA	-0.451656*** (0.100512)
VA*GE	0.115486 (0.078197)	VA*GE	-0.131477 (0.189942)	VA*GE	-0.154782 (0.190704)	GE	-0.375048*** (0.117970)
RQ	0.317842*** (0.072476)	RQ	0.387275*** (0.072471)	RQ	0.379672*** (0.070966)	GE*GE	0.348414*** (0.162204)
VA*RQ	-0.189558** (0.084746)	VA*RQ	-0.569994*** (0.194270)	VA*RQ	-0.587886*** (0.194097)	VA*GE	0.047146 (0.230707)
RL	0.170664* (0.100634)	RL	0.161504 (0.103124)	RL	0.160361 (0.102503)	RQ	0.401742*** (0.091590)

VA*RL	-0.093254 (0.096647)	VA*RL	0.455247** (0.209970)	VA*RL	0.410504* (0.212940)	RQ*RQ	0.063188 (0.153753)
CC	0.152062** (0.066882)	CC	0.055724 (0.078029)	CC	0.030066 (0.080205)	VA*RQ	-0.502290** (0.238539)
SSER	0.001618* (0.000849)	GE*CC	0.194633 (0.136154)	VA*CC	0.096454 (0.090377)	RL	0.013602 (0.119225)
C	4.476892*** (0.093464)	RQ*CC	0.390893*** (0.135666)	GE*CC	0.181345 (0.135277)	RL*RL	-0.514131*** (0.168593)
		RL*CC	-0.489172*** (0.148073)	RQ*CC	0.402343*** (0.135713)	VA*RL	0.834175*** (0.243261)
		SSER	0.000729 (0.001037)	RL*CC	-0.509815*** (0.149863)	CC	0.255984*** (0.093248)
		C	4.525702*** (0.112554)	SSER	0.000781 (0.001068)	GE*CC	-0.456899** (0.252969)
				C	4.533835*** (0.114627)	RQ*CC	0.293630 (0.219679)
						RL*CC	0.126120 (0.258432)
						SSER	0.000642 (0.000886)
						C	4.728644*** (0.107768)
Model summary							
R^2	0.999237		0.999281		0.999289		0.999009
Country included	82		82		82		82
Total observa-tions	492		492		492		492

Notes: 1 ***, **, and *denote significance at 1, 5 and 10 % level of significance, respectively. 2. EF- CSW denotes fixed effect with cross-section weights. 3. ***** denotes interaction between the variables.

Source: Author's calculation.

It is evident from model 1 of Table 2 that now all variables (VA, RQ, RL, CC and SSER) have turned to be significant with positive sign while only RQ is insignificant. Further, we also find that effect of VA is conditional upon RQ. Form model 2, we find that only VA and RQ have significantly positive impact on CPI and hence negative impact on the corruption level. Further, we find that impact of VA is conditional upon RQ, impact of RQ and RL is conditional upon CC. Evaluation of model 3 reveals that only VA and RQ have significant, positive, impact on CPI values and effect of VA is conditional upon RQ and RL and impact of RQ and RL is conditional upon CC. Further, model 4 shows that VA, GE, RQ and CC are significant with positive sign (except GE, which has negative sign). Addition to that we find that VA is conditional upon RQ, RL and CC and GE is conditional upon GE and CC. It is important to note that if VA×CC is significant it will imply both VA is conditional upon CC and CC is

conditional upon VA and if VA×VA is significant with positive sign (as it is not) higher value of VA decreases level of corruption and if coefficients sign is negative (as it is) it will show that higher value of VA has positive impact, surprisingly, on level of corruption. So, care should be taken while analyzing the results.

5. Conclusions

This study is intended to analyze the impact of democracy and bureaucracy on corruption in the panel framework of 82 countries for the period 2002 to 2007. Further, we have also analyzed the interaction effect of the various variables. To measure more reliable estimates of democracy and bureaucracy we have used few control variables, namely rule of law, regulatory quality, control over corruption and secondary enrollment ratio. Results of Hausman test reveals that fixed effect panel data analysis with fixed effect is more appropriate. From fixed effect estimates we find that VA, RL and CC decrease the level of corruption. When we allowed for interaction effect among independent variables we find the evidence of strong interaction effect between all of the explanatory variables (interaction effect of SSER with other explanatory variable is not analyzed). We also find that, surprisingly, higher value of VA that is higher level of democracy and RL that is rule of law are associated with higher level of corruption. Further, we also find that higher bureaucracy lowers the level of corruption.

Note

(1) List of the countries included for the analysis is presented in appendix along with the descriptive statistics.

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Appendix 1

Countries included in the analysis and descriptive statistics

Descriptive statistics

	CPI	VA	GE	RQ	RL	CC	SERS
Mean	4.806911	0.402419	0.440122	0.429492	0.289248	0.318252	84.21590
Median	4.100000	0.500000	0.330000	0.440000	0.180000	0.180000	89.33048
Maximum	9.700000	1.830000	2.240000	1.910000	1.960000	2.470000	160.3465
Minimum	1.200000	-1.910000	-1.180000	-1.740000	-1.660000	-1.510000	17.46335
Std. Dev.	2.383812	0.870880	0.974716	0.904897	1.003648	1.061266	26.49836
Skewness	0.632058	-0.381851	0.184800	-0.192482	0.113107	0.379733	-0.552445
Kurtosis	2.112146	2.218911	1.789603	2.057499	1.758743	1.999843	3.459498
Jarque-Bera	48.91863	24.46349	32.83415	21.24836	32.63379	32.33060	29.35439
Probability	0.000000	0.000005	0.000000	0.000024	0.000000	0.000000	0.000000
Sum	2365.000	197.9900	216.5400	211.3100	142.3100	156.5800	41434.22
Sum Sq. Dev.	2790.137	372.3902	466.4850	402.0502	494.5884	553.0063	344762.1
Observations	492	492	492	492	492	492	492

Countries included in the analysis

Argentina	Czech Republic	Hong Kong	Lithuania	Paraguay	Thailand
Australia	Denmark	Hungary	Luxembourg	Peru	Trinidad & Tobago
Austria	Dominican Rep.	Iceland	Malawi	Philippines	Tunisia
Azerbaijan	Ecuador	India	Malaysia	Poland	Turkey
Bangladesh	El Salvador	Indonesia	Mauritius	Portugal	Uganda
Belarus	Estonia	Ireland	Mexico	Romania	Ukraine
Belgium	Ethiopia	Israel	Moldova	Senegal	United Kingdom
Brazil	Finland	Italy	Morocco	Slovak Republic	Uruguay
Bulgaria	France	Jamaica	Namibia	Slovenia	USA
Cameroon	Georgia	Japan	Netherlands	South Africa	Uzbekistan
Chile	Germany	Jordan	New Zealand	South Korea	Venezuela
Colombia	Ghana	Kazakhstan	Nicaragua	Spain	Zambia
Costa Rica	Greece	Kenya	Nigeria	Sweden	
Croatia	Guatemala	Latvia	Norway	Switzerland	

Appendix 2

Stationary analysis of residuals of models 1 and 3

Panel unit root test: Summary of Model1
Sample: 2002 2007
Exogenous variables: Individual effects
User specified lags at: 1
Newey-West bandwidth selection using Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-21.0807	0.0000	82	328
Breitung t-stat	-2.56577	0.0051	82	246
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-20.3269	0.0000	82	328
ADF - Fisher Chi-square	346.032	0.0000	82	328
PP - Fisher Chi-square	218.514	0.0028	82	410

** Probabilities for Fisher tests are computed using an asympotic Chi -square distribution. All other tests assume asymptotic normality.

Panel unit root test: Summary of Model 3
Sample: 2002 2007
Exogenous variables: Individual effects
User specified lags at: 1
Newey-West bandwidth selection using Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-16.9069	0.0000	82	328
Breitung t-stat	-2.14799	0.0159	82	246
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-13.8300	0.0000	82	328
ADF - Fisher Chi-square	291.299	0.0000	82	328
PP - Fisher Chi-square	211.608	0.0072	82	410

** Probabilities for Fisher tests are computed using an asympotic Chi - square distribution. All other tests assume asymptotic normality.