Political environment a ground for public sector corruption? Evidence from a cross-country analysis

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Political environment a ground for public sector corruption?

Evidence from a cross-country analysis

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Abstract

This study employs the instrumental variable two-stage least squares regression approach for the data for 121 countries to explore the impact of a country's political environment on its level of corruption. The study provides strong evidence that a higher degree of rule of law, press freedom, readiness and capacity to handle e-governance practices, and urbanization are associated with a lower level of public sector corruption across all 121 countries. The colonial dummies and having a presidential government are found to be valid instruments for rule of law in addressing the issue of endogeniety embedded in it. Further, to a certain degree, landlocked countries are relatively more corrupt than costal countries. Finally, policy implications are discussed based on the findings of the study.

Keywords: Corruption, Political Environment, Endogeniety, Public Sector
JEL Codes: D72, D73, H11, K42

1. Introduction

In general, public sector corruption means misusing entrusted authority or public office for private benefits or personal gains. Yet, the meaning of corruption is contextual and has been articulated in different nation state vernaculars accordingly. For instance, in Italian, corruption is called *spintarella*, which means "a little push", in Greek, *fakelaki*, "a little envelope", in French, *pot-de-vin*, "a glass of wine", and in Spanish, *mordida* "a bite". Likewise, in Slovak, corruption is called *pod stolom*, meaning "under the table", in Korean, *noemul*, "giving goods in secret", and in Japanese, *kuroi kiri*, "black mist". Hence, the term corruption carries different meanings in different contexts with differing ways of application,

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however, sharing the commonality that corruption is a secret act of dishonesty for private interest. Senior (2006), defines corruption as an action to secretly provide a good or a service to a third party, so that he or she can influence certain actions, which benefit the corrupt, a third party, or both in which the corrupt agent has authority.

Today, corruption is all too prevalent, not only in developing countries, but also in the EU (Senior, 2006). Corruption inflicts various adverse impacts on economic, social, and political systems of a country. Economists have clearly shown how economic growth of a country can be adversely affected by corruption: corruption increases transaction costs and reduces incentives for investment, thereby leading to shrink the growth rate of an economy. It also affects income growth, particularly of the poor, redistributing wealth away from the poor to the better-off and employees of government. This gives rise to increased income inequality in a country (see Gupta Davoodi and Alsonso-Terme, 1998; Fisman and Svensson, 2000; Senior, 2006). Moreover, corruption imposes a negative impact on tax revenue of a country. As Ghura (1998) argues, an increase in the level of public sector corruption accompanies a lowering of the tax-revenue-GDP ratio. Tanzi and Davoodi (2000) computed that one-point increase in the Corruption Perceptions Index (CPI) is associated with 2.7 percentage point decline in tax-GDP ratio. Transparency international (2010) points out that public sector corruption erodes the tax revenue base in the long-run, corrodes the tax morality of taxpayers, and distorts tax structures, leading to increase the size of unofficial economy of countries. Public sector corruption can, therefore, causes critical damage to the smooth functioning of an economy.

Further, as argued by Seligson (2002), corruption generates political costs. On the basis of 9,000 observations from four Latin American countries, Seligson contends that corruption erodes belief of participants in the political system and reduces interpersonal trust, questioning the legitimacy of the system. Apart from economic and political costs, corruption involves social and moral costs, meaning that social variables are negatively impacted by corruption. For instance, Dreher and Hezfeld (2005) computed negative impacts of corruption on social variables like life expectancy and school enrollment using data from 71 countries. In sum, as Senior (2006) points out, corruption can cause serious impediment to the development of a market economy and a free society.

Determinants of corruption are numerous and multifaceted, thus making any scientific study of its causes a difficult task. Yet, the rich literature available on the causes of corruption notes that economic, cultural, political, sociological, psychological, and geographical factors

play a major role in determining the level of corruption, whereas Ata and Arvas (2011) considering the mean values of data for 25 European countries during 2004 through 2007 have concluded that higher GDP per capita, lower inflation rates, and lower income disparity reduce the perception of corruption. However, they've found that corruption levels are not affected by rates of economic growth. Several studies have pointed out that economic factors are more important than non-economic factors in reducing corruption. For instance, on the basis of 41 developing countries, Shabbir and Anwar (2007) emphasize that to curb corruption, governments need to focus on economic freedom, globalization, and distribution of income and wealth, while non-economic factors consisting of press-freedom, democracy, and people's religious beliefs do not play a role in corruption. Conversely, some other studies have noted that social factors including population growth rate, literacy rate, and religious beliefs do play a role in deciding the level of public sector corruption. For instance, Akano et al (2013) using vector error-correction models for Nigeria have shown the role of population growth rate and literacy rate in determining corruption, while Treisman (2000) has found that people's Protestant traditions are a significant determinant of curtailing corruption.

Regarding political factors of corruption, Ali and Isse (2003) contend that higher judicial efficiency and smaller governments are associated with lower levels of corruption in countries. However, Kotera et al (2010) argue that the size of government does not matter in determining the level of corruption as long as the level of democracy remains sufficiently high. Therefore, as part of democracy, rule of law has a bigger role to be played in achieving lower levels of corruption (Salih, 2013). Using a non-linear model to show the democracy-corruption link, Sung (2004) has clearly proven the fact that democratic accomplishments reduce the degree of political corruption in a country. Also, some studies have used instrumental variable regressions to consistently show the link between fiscal decentralization and degree of corruption, arguing that fiscal decentralization in public expenditure and taxation leads to reduced corruption levels (for instance see Fisman and Gatti, 2000; Altunbas and Thornton, 2012). Conversely, Pellegrini and Gerlagh (2007) have found no evidence to support fiscal decentralization as a factor of political corruption.

Finally, studies have tested technology related variables to see if there is any link between corruption and technology. For instance, Pathak et al (2009) presenting a Fijian case have emphasized that IT-based service delivery processes contribute to curbing public sector corruption. Also, Murillo (2013) using six-year panel data for 208 countries has shown that

using internet and government web portals reduces the negative perceptions towards public sector corruption.

Within this context, this study is primarily aimed at analyzing the role of political environment in determining the level of public sector corruption in 121 countries, both developed and developing. The 'traditional elements' of political environment, i.e., the elements that have been tested in previous studies, comprise rule of law, press freedom, nature of legislature, being a federal or unitary state, size of government, and openness of markets. In addition to testing these traditional elements, more importantly, this study will be examining the role of e-governance practices and military involvement in politics, two 'potential elements' of political environment that have not been tested before, in curbing corruption. Also, in this study we have used several control variables, namely GDP per-capita, Gini index, and religious beliefs, three variables that have been previously used though, and the rate of urbanization and being a landlocked country, two potential control variables that have not been used in previous studies and thus unique to this study.

Corroborating the findings of previous research, our analyses show that ensuring rule of law and press freedom reduces public sector corruption significantly. Yet, more importantly, for the first time in corruption literature our study shows that e-governance practices can play a significant role in reducing public sector corruption, thus enriching the existing body of knowledge. Based on the estimates of control variables, it was found that countries with higher urbanization rates are less corrupt and vice versa. Further, to a certain degree this study proves that landlocked countries are more corrupt than coastal countries. Since this study is based on 121 countries consisting of both developed and developing countries, the findings are generalized to both contexts, the developed and developing. The rest of the paper is organized in the order that section two elaborates research methodology employed to realize the set objectives, while section three is devoted to elaborate the data and their summary statistics. The empirical results and main findings are discussed in section four, while section five concludes the study together with policy implications.

2. Research Method

We consider the level of public sector corruption of a country as a function of its political environment. As noted above, a wide range of variables are taken into account to capture the impact of political environment on corruption including rule of law, nature of legislature, being a federal or unitary state, press freedom, size of government, openness of

markets, readiness for e-governance practices, and military in politics. The impact of the factors external to the political environment is controlled by including an array of variables in estimating the model. They include a country's main religion, being a landlocked country, urbanization, per capita GDP, and income distribution among people.

Addressing Endogeniety

Endogeniety might be an issue when using rule of law as an explanatory variable in the corruption equation due to reverse causation and measurement errors. Public sector corruption can become a serious issue threatening the rule of law of a country. According to the Committee on Legal Affairs and Human Rights of the Council of Europe (2013), any form of corruption including ministers abusing their power, police officials taking bribes, elections being "bought", crooked judges, money laundering, parliamentarians claiming false expenses, and illegal lobbying weaken public institutions, undermining the rule law of the member states of the Council. Fedotov (2012) points out that rule of law cannot be established and ensured where bribery and corruption are prevalent due to the fact that public sector corruption shuns fair tendering and recruitment processes.

Further, there are several pitfalls in measuring complex social phenomena, such as rule of law. Ginsburg (2011) notes that quantifying rule of law is challenging resulting from the associated issues of conceptualization and measurement. Regarding the concepts of social sciences, it is relatively more difficult to formulate a concept by allowing a certain degree of abstraction. Put differently, in formulating social science concepts, the formulator should be clear enough as to what is being measured. Finally, poor conceptualization leads to bad quantification with measurement errors. This study uses World Bank's World Governance Indicators' Rule of Law Index, which is, however, subject to the same weakness discussed above. Ginsburg (2011) contends that this index aggregates too many discrete elements into a single concept. In computing the rule of law index, the World Bank has included the procedural elements as well as the substantive concepts, whereas procedural elements are related to the process of contract enforcement, the police and the courts, while substantive concepts are security of individuals and freedom from crime. These two categories of elements may not be combined together to formulate a single index.

Therefore, in this study the issue of endogeniety has been addressed using instrumental variables (IVs) and we use instrumental variable two-stage least squares (IV-2SLS) approach to estimate the coefficients. As instrumental variables, we use three dummy

variables that indicate whether a country was a British colony or a Spanish colony and currently a presidential democracy. There is likelihood that these three variables are indirectly related to the level of public sector corruption through rule of law Thus, the main regression model that we are interested in is as follows:

$$Corruption\_Level = \beta_0 + \beta_1(\textbf{Political\_environment}) + \beta_2(\textbf{Other\_Controls}) + \varepsilon \qquad (1)$$

However, rule of law that is included in the vector of political environment is estimated by employing the dummy variables for former British colony, Spanish colony, and current presidential government as instruments to address the issue of endogeniety. As literature contends, colonial history affects the level of rule of law in a country (for instance see La Porta, 1998; Licht, 2003; and Croix and Delevallade, 2011). Cameron et al (2006) argue that the problems of presidential governments are associated with rule of law. They clearly prove that the rule of law is weak in most presidential democracies when compared with parliamentary governments.

$$Rule\_of\_Law = \pi_0 + \pi_1 British\_Colony + \pi_2 Spanish\_Colony + \ldots$$
$$\pi_3 \Pr esidential\_Govt. + \pi_4 \textbf{Other\_exogenous\_variables} + \mu \qquad (2)$$

The predicted values of the variable "Rule of Law" is included in the equation (1) as a component of political environment. Also, ε and μ are structural error terms of the equation (1) and (2), respectively.

The results of the test for over-identifying restrictions and the Durbin-Wu-Hausman test for endogeniety are reported in the last four rows of Table 03. The Wooldridge's score tests of over-identifying restrictions are not statistically significant even at 10 percent error level across three models estimated using different corruption indices as the dependent variable. Thus, we fail to reject the null hypothesis that our instruments are valid. It further says the instrumental variables: two colonial dummies and presidential government dummy are correlated with the rule of law and uncorrelated with the structural error term. Having ensured that the instrumental variables are satisfactory, the Durbin-Wu-Hausman test is conducted to check the endogeniety of the variable, rule of law. The null hypothesis that the regressors are exogenous is rejected at one percent error level for the second model, where the dependent variable is World Governance Indicators-Corruption Index (WGI) and 10

percent error level for the first and the third models, where the dependent variables are Corruption Perception Index (CPI) and International Country Risk Guide-Corruption Index (ICRG), respectively. Therefore, it is clear that the rule of law is an endogenous regressor and that we need to employ instrumental variable approach instead of OLS approach.

Robustness Check

In order to secure robustness of the findings, OLS and IV-2SLS models are estimated by using three different measurements of public sector corruption, namely CPI, WGI, and ICRG. The source and the range of each index are presented in Table 01. These three corruption indices have been compiled by the Transparency International, the World Bank, and the Political Risk Services (PRS) group, respectively. Though their ranges are different, in all three indices, higher index values indicate lower levels of corruption and vice versa. This is a commonly accepted method of checking the robustness of the findings of corruption-related research (for instance see Fisman and Gatti, 2002; Pellegrini and Gerlagh, 2007; Kotera et al, 2010).

3. Data and Summary Statistics

Public Sector Corruption

The data used are based on 2012 and as mentioned above, the number of countries is 121 (n=121). The study uses three indices to account for public sector corruption and the summary statistics of variables are provided in Table 02.

Accordingly, based on CPI and ICRG, North Korea has been identified as the most corrupt, whereas based on WGI and ICRG, Libya has been ranked as the most corrupt in the world. On the other hand, according to all three indices, Denmark has been identified as the cleanest in the world. Finland, New Zealand, Norway, and Sweden are also among the cleanest countries. Figure 01 positions all 121 countries on a CPI-ICRG plane.

Figure 01 shows that as the cleanest countries, Denmark, New Zealand, Finland, Sweden, and Norway are well above the mean index values, while North Korea, Libya, Zimbabwe, Haiti, and Venezuela as the most corrupt countries are far below the mean index values. Though Figure 01 generally depicts a positive correlation between CPI and ICRG, countries are rather sparsely scattered on the graph, showing a variation in the perception of corruption reflected by the two indices. For instance, Indonesia and Bangladesh are located

above ICRG-average, but below CPI-average. Likewise, Lithuania, Costa-Rica, Turkey, and Czech Republic are located above mean-CPI scores, but below mean-ICRG scores.

Political Environment

        The data capturing the nature of each country's legislature include *first*, whether the legislature is unicameral or bicameral and *second*, women's participation in legislature. The data on whether it is a unicameral or bicameral state is recorded as a dummy variable by obtaining information from the World Fact Book by the Central Intelligence Agency (CIA) of the United States. Unicameral is a type of legislature with single house in the legislative council, while bicameral legislative council consists of two houses: lower house and upper house. As Table 02 illustrates, approximately 55.4 percent of the countries have unicameral legislatures. The data on women's participation in legislature were from Inter-Parliamentary Union (IPU), which is the international organization of parliaments. The IPU reports percentage figures of female members in legislature for each country. If the legislature is bicameral, women's participation in both lower and upper houses is reported separately. However, this study uses women's participation in legislature in each country as a whole. On average, in the selected 121 countries, 19 percent of the members in the legislature are women, however, the percentage figures varying vastly across countries. In the legislative councils of Qatar and Saudi Arabia, there is no women's representation, while Sweden records the highest women's representation in legislature. Moreover, the data on whether a country is federal or unitary were also obtained from the CIA World Fact Book. Accordingly, of the sample approximately 15 percent of the countries are federal states.

        The data on press freedom were obtained from the World Press Freedom Index annually published by Reporters without Boarders, a consultancy non-profit organization of the UN and UNESCO. The World Press Freedom Index captures the level of freedom enjoyed by both media personnel and media organizations in each country. It also measures the extent to which the authorities work towards assuring freedom of information. The index ranges from 0 to 100 with 0 being the best possible score, while 100 being the worst possible. In order to make the direction of all study variables consistent and easier to interpret, we used inverse of the world press freedom index. Therefore, in this study higher values reflect relatively greater levels of press freedom and vise versa. As depicted in Table 02, North Korea and Finland were the extremes with North Korea enjoying the least press freedom, while Finland the highest press freedom.

The E-Government Development Index is a composite indicator which measures the extent to which authorities are ready and capable enough in employing information and communication technology (ICT) in delivering public services. The data were obtained from the E-Government Development Survey, 2012 conducted by the UN. The index ranges from zero to one, where zero indicates the least readiness and capability towards e-government applications while one indicates the highest readiness and capability. On average, the countries recorded 0.55 on e-government index, however, the index value varying across countries with a standard deviation of approximately 0.2. Guinea and Libya recorded the lowest readiness and capability in e-government practices while Netherlands the highest readiness and capability.

The data on limited government and open markets are from 2012-Index of Economic Freedom published by the Heritage Foundation and the Wall Street Journal. These indices vary from zero to 100 with higher values signaling relatively stronger performance and vice versa.

The data on limited government captures the extent to which individuals and businesses are free from government control in using their income and wealth for own ends, and the cost of excessive government in terms of public expenditure. Hence, the Limited Government Index is the arithmetic mean of the indices, Fiscal Freedom Index and Government Spending Index. In terms of limited government index, North Korea reported the lowest performance, while Paraguay the highest. The Open Market Index is calculated by taking the simple mean of the indices, Trade Freedom, Investment Freedom, and Financial Freedom Index. Trade freedom is an economy's level of openness to international trade while investment freedom is the level of freedom to capitalize entrepreneurial opportunities. Financial freedom is the level of openness, transparency, accessibility, and fairness of a country's financial system. In terms of open market index, North Korea and Hong Kong reported the lowest and highest scores, respectively.

The data on rule of law were obtained from the World Bank. These data capture the level of confidence of agents in the rules of society, quality of contract enforcement, property rights, the police, and the courts. This index varies from -2.5 to +2.5 with higher positive values indicating higher levels of government performance with regard to rule of law and vice versa. On the index, the countries scored 0.085 on average, however, with significant variations across countries with a standard deviation of one. However, Venezuela and Norway were the weakest and strongest in ensuring rule of law, respectively.

Furthermore, International Country Risk Guide (ICRG) by the Political Risk Service (PRS) provides data on military in politics as an index ranging from zero to six, where higher values reflect lower levels of political militarization of countries and vice versa. The average index value was 4.05. However, Haiti was recorded to be having the highest military intervention in politics while the OECD countries accounted for in the study sample together with Costa-Rica, Namibia, Jamaica, and Malta were recorded to be enjoying the least military intervention in politics.

Baseline Controls and Instruments

As highlighted above, this study uses a wide range of control variables, including urbanization rate, being a landlocked country, Gini index, per capita income, and the major religion of the selected countries. It should be noted that data for all these variables are from CIA World Factbook. The urbanization rate measures the percentage change in a country's urban population over a period of one year. On average, urban population is on the increase at a rate of 1.8 percent. Burkina-Faso reported the highest urbanization rate in 2012. On the contrary, Lithuania recorded a decrease in the size of urban population being the country with the lowest rate of urbanization. Regarding income distribution, we use the inverse of Gini coefficient to account for the distribution of income among people. In 2012, South Africa and Sweden reported the highest and lowest income disparity, respectively. In terms of per capita income, Zimbabwe and Qatar reported the worst and best performance, respectively.

In terms of instrumental variables, of the sample 27.3 percent are former British colonies, 14.9 percent are former Spanish colonies, while 47.1 percent have presidential governments. Table 02 presents summary statistics for these instrumental variables.

4. Empirical Results

Rule of Law and Free Press

Table 03 presents key results of the study: *first*, it shows OLS estimates for three regression equations with three different corruption indices for the dependent variable; and *second*, it reports IV-2SLS estimates. Since IV-2SLS estimates are more consistent than OLS estimates due to the issue of endogeniety, our interpretations are primarily based on IV-2SLS estimates. The coefficient of determination (R-squared value) is satisfactorily high across all the models. Referring to IV-2SLS models, for instance, the variation of the chosen explanatory variables explain 92.5 percent of the variation of the level of corruption

measured in terms of CPI. As indices of corruption, the values reported on WGI and ICRG are 92.4 and 87.3 percent, respectively.

According to Table 03, the coefficients for rule of law are statistically significant in both the OLS and IV-2SLS results confirming that a country's rule of law is a main determinant of its public sector corruption. Further, the positive sign of the coefficients indicates that a higher degree of rule of law leads to higher corruption indices, thus signaling lower corruption levels in the countries. In other words, the countries whose agents are more confident in the rule of society, quality of contracts, property rights, the police, and courts are less corrupt and vice versa. Akano and Ogunseye (2013) argue that a country's rule of law promoted by an independent judiciary and police services would build the confidence level of its citizenry in established institutions lowering the likelihood of public sector corruption. These findings of Akano and Ogunseye are consistent with those of Leite and Weidmann (1999), Fisman and Gatti (2000), and Ali and Isse (2003). Salih (2013) in his estimations uses rule of law as a proxy for the judiciary system and proves that a better judiciary system results in lower probability of perceived corruption. Likewise, using a dynamic general equilibrium model, Croix and Delavallade (2011) estimate that a weak legal system favours public sector corruption.

Resultantly, it is evident that the link between rule of law and corruption is adequately documented. However, this study solves the issue of endogeneity associated with rule of law by employing suitable instrumental variables, namely the legal origin of countries and the fact that whether a country is having a presidential government functions properly.

The coefficients for press freedom are statistically significant and positive even at one percent error level. This clearly indicates that greater freedom of the press is associated with less public sector corruption. This finding is robust across all six models and also consistent with the findings of many studies (for instance see Brunetti and Weder, 2003; Shen and Williamson, 2005; Pellegrini and Gerlagh, 2006; Chaudhry and Glulam, 2007; Altunbas and Thornton, 2011).

E-Governance

In the context of contemporary public sector, ICT plays a significant role in delivering a country's public services to its citizenry. Basically, the objective of the ICT based service system - a core of e-governance - is to integrate economic, social, and environmental goals through an institutional inter-linkage, where e-governance initiatives are expected to bring

about greater efficiency, better service delivery, and higher level of citizen participation. Presenting a case of Fiji, Pathak et al (2009) show that ICT-enabled service delivery can effectively curb public sector corruption. According to their calculations, the correlation coefficient between IT initiatives and corruption reduction is +0.995, which is almost a positive perfect correlation. Further, drawing on data for 208 countries together with instrumental variable regressions, Murillo (2013) notes that web presence of the government reduces the perception of public sector corruption. As a result, Murillo recommends international assistance for web-based service delivery initiatives of the government sector.

This paper's main contribution to corruption literature is that we incorporate the whole idea of e-governance through e-governance development index used as an explanatory variable in the analyses. Online public service delivery is one of the key components of e-governance. However, the degree of online service delivery through means, such as national central portals, e-services portals and e-participation portals and the websites of ministries differ from country to country in terms of their features, content, and the level of services offered. Accordingly, without limiting to government web presence, the e-governance development index encompasses the nature of telecommunication infrastructure in terms of the variables, such as number of internet users, mobile subscribers, fixed broadband facilities and so forth. Moreover, this index recognizes the importance of human capital in successfully implementing a system of e-governance in a country. Therefore, the e-governance index considers adult literacy rate and the combined primary, secondary, and tertiary gross enrollment ratio to account for human development.

Our analyses clearly show that e-governance reduces the level of public sector corruption. As shown in Table 03, the coefficients for e-governance are positive and statistically significant across all six models. However, the results are stronger in IV- 2SLS models, which are also considered to be more consistent estimates. For instance, as Table 03 demonstrates, the coefficients are significant at five percent error level in IV-2SLS estimates as well as 10 percent error level in the majority of OLS estimates. According to IV-2SLS results, one unit increase in e-governance development index will increase CPI by 15.4, WGI by 0.95, and ICRG by 1.26 units.

Results reflected from Baseline Controls

The coefficients for the variable urbanization are statistically significant and positive across all three IV-2SLS models, being a robust determinant of corruption. According to the

results, the countries with higher rates of urbanization are less corrupt. It is likely that with urbanization people become more and more aware of public sector corruption and its nature. Billger and Goel (2009) point out that the concentration of people in urban areas gives way for room for frequent interaction between potential rent-seekers and rent-payers. This connotes that in rural areas people are relatively less aware of and exposed to public sector institutions and service delivery processes and, therefore, more likely to be potential rent-payers. Similarly, using cross-country data for 100 countries, Goel and Nelson (2011) argue that a higher urbanization rate is more likely to reduce the level of public sector corruption, which this study also corroborates based on consistent IV-2SLS estimates for the selected 121 countries.

Moreover, as shown in Table 03, countries with higher per capita income levels are less corrupt in terms of WGI though per capita income is not a robust determinant of corruption. Literature documents that a higher GDP per capita leads to a lower degree of corruption perception (for instance see Kotera et al, 2010; Ata and Arvas, 2011; Altunbas and Thornton, 2012; Salih, 2013). However, our results show that GDP per capita plays a relatively minor role in reducing the perception of public sector corruption. Furthermore, it was interesting to note that landlocked countries are more corrupt than coastal countries. Table 03 shows that the coefficient for "landlocked dummy" is negative and significant only when ICRG is used as the dependent variable. Generally, landlocked developing countries are less involved in international trade when compared with coastal countries due to longer transportation time to reach transit countries and complex local custom procedures and services (Africa Infrastructure Knowledge Program, 2011). This complexity is likely to result in higher levels of public sector corruption in these countries. Yet, being a landlocked country was not found a robust determinant of corruption because it does not generate a significant impact on corruption measured in terms of both CPI and WGI.

It was also evident from our analyses that being a unicameral legislature and its rate of women's participation, being a federal state, size of government, and the openness of markets do not have an impact on the perception of public sector corruption. Finally, it was noted that the main religion of countries, military in politics, and income distribution were also not significant determinants of corruption in the public sector.

Conclusion and Policy Recommendations

This study contributes to the existing body of corruption literature as it proposes suitable instrumental variables to evaluate the impact of rule of law on public sector corruption having recognized the issue of endogeniety. Accordingly, being a former British colony or a Spanish colony together with being a presidential government at present were found to be satisfactory IVs for rule of law. This study did find that rule of law and freedom of press as significant determinants of public sector corruption. Therefore, strengthening rule of law by building people's confidence in the rule of society, improving quality of contracts, ensuring property rights, and making the police and courts independent is recommended as a key policy measure to curb corruption in public sector. It is also recommended that ensuring press freedom as a policy measure can successfully combat public sector corruption.

Further, the study found strong evidence to support the association between e-governance practices and the perception of public sector corruption. Therefore, we propose e-governance practices as effective policy tools for reducing corruption. Increasing the level of government web presence, promoting ICT-enabled public services, and improving related human capital can be listed as some of these policy measures.

Further, based on the finding that increased urbanization is accompanied by decreased public sector corruption, policies that promote urbanization can be suggested as indirect measures to fight corruption. Also, as the analyses show that landlocked countries are more corrupt, we propose that such countries need special attention when formulating global policies to combat public sector corruption.

By challenging traditional literature on corruption, we showed that being a unicameral legislature, women's participation in legislature, being a federal state, size of public sector, openness of markets, military in politics, and the main religion of countries do not have significant impacts on corruption. Likewise, we do not prove that level of corruption is affected by income distribution measured in terms of Gini index. However, this study was based on cross-sectional data for 121 countries for the year 2012. Therefore, it does not account for the dynamics of public sector corruption in countries. Future research is expected to employ more comprehensive panel data to account for the dynamics and structural changes in level of public sector corruption in countries.

References

Africa Infrastructure Knowledge Programme (2011), Key message for transport sector, African Development Bank Group, Tunisia.

Akano, A.Y., Ogunseye, T.O., Bada, O.T., and Agbeyangi, B.A. (2013), The socio-economic determinants of corruption in Nigeria, *European Journal of Humanities and Social Sciences*, 19(1), pp. 923-938.

Ali, A.M. and Isse, H.S. (2003), Determinants of economic corruption: A cross-country comparison, *Cato Journal*, 22(3), pp. 449-466.

Altunbas, Y. and Thornton, J. (2012), Fiscal decentralization and governance, *Public Finance Review*, 40(1), pp. 66-85.

Ata, A.Y. and Arvas, M.A. (2011), Determinants of economic corruption: A cross-country data analysis, *International Journal of Business and Social Science*, 2(13), pp. 161-169.

Billger, S. M. and Goel, R. K. (2009), Do existing corruption levels matter in controlling corruption?: Cross-country quantile regression estimates, *Journal of Development Economics*, 90(2), pp. 299-305.

Brunetti, A. and Weder, B. (2003), A free press is bad news for corruption, *Journal of Public Economics*, 87, pp. 1801-1824.

Cameron, M., Blanaru, A., and Lesley, B. (2006), The separation of powers reconsidered: Presidentialism and the rule of law, Paper presented at the annual meeting of the American political science association, The Pennsylvania Convention Center, Philadelphia.

Chaudhry, Mumtaz Anwar, Shabbir, and Ghulam (2007): Determinants of corruption in developing countries, HWWI Research Paper, No. 2-11.

Committee on legal affairs and human rights (2013), Corruption as a threat to the rule of law, Reference 3915 Third part-session, Parliamentary Assembly, Council of Europe.

Croix, D. de la and Delavallade, C. (2011), Democracy, Rule of Law, Corruption Incentives, and Growth, *Journal of Public Economics Theory*, 13 (2), pp. 155-187.

Dreher, A. and Herzfeld, T. (2005), The Economic Costs of Corruption: A Survey and New Evidence, Available at http://dx.doi.org/10.2139/ssrn.734184

Fedotov, Y (2012), Where corruption flourishes, development and the rule of law fail, Press release, United Nations Office on Drugs and Crime, New York.

Fisman, R. and Gatti, R. (2002), Decentralization and corruption: evidence across countries, *Journal of Public Economics*, 83 (3), Elsevier, pp. 325-345.

Fisman, R. and Svensson, J. (2000), Are corruption and taxation really harmful to growth, Policy research working paper, No. 2485, The World Bank.

Ghura, D. (1998), Tax revenue in Sub-Saharan Africa: Effects of economic policies and corruption, IMF working paper, No. 98/135, International Monetary Fund.

Ginsburg, T. (2011), Pitfalls of measuring the rule of law, *Hague Journal on the Rule of Law*, 3, pp.269-280, doi:10.1017/S187640451120006X

Goel, R. and Nelson, M. (2011), Government fragmentation versus fiscal decentralization and corruption, *Public Choice*, 148(3), pp. 471-490.

Gupta, S., Davoodi, H., and Terme, R.A. (1998), Does corruption affect income inequality and poverty, IMF working paper, No. WP/98/76, International Monetary Fund.

Kotera, G., Okada, K., and Samreth, S. (2010), A study on the relationship between corruption and government size: the role of democracy, MPRA Paper No. 25015 available at http://mpra.ub.uni-muenchen.de/25015/

Leite, C. and Weidmann, J. (1999). Does mother nature corrupt? Natural resources, corruption, and economic growth, IMF Working paper, No. WP/99/85, International Monetary Fund.

Licht, A.N., Goldschmidt, C., and Schwart, S.H. (2003), Culture rules: The foundations of the rule of law and other norms of governance, working paper No. 605, William Davidson Institute, Michigan Business School, USA.

Murillo, M.G. (2013), Does a government web presence reduce perceptions of corruption?, *Information Technology for Development*, 19(2), pp. 151-175.

Pathak, R.D., Naz, R., Rahman, M.H., Smith, R.F.F., and Agarwal, K.N. (2009), E-governance to cut corruption in public service delivery: A case study of Fiji, *International Journal of Public Administration*, 32, pp. 415-437.

Pellegrini, L. and Gerlagh, R. (2007), Causes of corruption: a survey of cross-country analyses and extended results, *Economics of Governance*, 9(3), Springer, pp. 245-263 doi 10.1007/s10101-007-0033-4.

Porta, R. La, Shleifer, R., and Vishny, W. (1998), Law and Finance, *Journal of Political Economy*, 106 (6), pp. 1113-1155.

Salih, M.A.R. (2013), The determinants of economic corruption: A probabilistic approach, *Advances in Management & Applied Economics*, 3(3), pp. 155-169.

Seligson, M.A. (2002), The impact of corruption on regime legitimacy: A comparative study of four Latin American countries, *The Journal of Politics*, 64 (2), pp. 408-433.

Senior, I. 2006. *Corruption - the world's Big C: cases, causes, consequences, cures*. The Institute of Economic Affairs in association with Profile Books, London.

Shabbir, G. and Anwar, M. (2007), Determinants of corruption in developing countries, *Pakistan Development Review*, 46 (4), pp. 751-764.

Shen, C. and Williamson, J.B. (2005), Corruption, Democracy, Economic Freedom, and State Strength: A Cross-National Analysis, International *Journal of Comparative Sociology* 46 (4), pp. 327-345.

Sung, H.E. (2004), Democracy and political corruption: A cross national comparison, *Crime, Law & Social Change*, 41, pp. 179-194.

Tanzi, V. and Davoodi, H. R. (2000), Corruption, Growth, and Public Finances, IMF Working Paper, No. 00/182. Available at SSRN: http://ssrn.com/abstract=880260

Transparency International (2010), Exploring the relationships between corruption and tax revenue, U4 Expert Answers, No. 228.

Treisman, D. (2000), The causes of corruption: A cross-national study, *Journal of Public Economics*, 76 (3), pp. 399-457.

Table 01: Alternative indices for the level of public sector corruption

Corruption Index	Compiler	Range	
		Very clean →	Highly corrupt
Corruption Perception Index (CPI)	Transparency International, Berlin	10	0
International Country Risk Guide (ICRG)-Corruption Index	The Political Risk Services (PRS) Group, New York	6	0
The Worldwide Governance Indicators (WGI)-Corruption control	The World Bank, Washington D.C.	2.5	-2.5

Source: Transparency International, 2012, The PRS Group, 2012, The World Bank, 2012

Table 02: Summary statistics

	N	Mean	SD	Minimum		Maximum	
Corruption Indices							
CPI	121	46.347	19.852	8.000	[N. Korea]	90.000	[Denmark, Finland, New Zealand]
WGI	121	0.067	1.051	-1.400	[Libya]	2.390	[Denmark]
ICRG	121	2.665	1.224	1.000	[Haiti, N. Korea, Libya, Venezuela, Zimbabwe]	5.500	[Denmark, Finland, New Zealand, Norway, Sweden]
Political Environment							
Rule of law	121	0.085	1.000	-1.690	[Venezuela]	1.950	[Norway]
Unicameral legislature	121	0.554	0.499	0		1	
Press freedom index (inv)	121	0.047	0.032	0.012	[N. Korea]	0.157	[Finland]
E-government index	121	0.546	0.208	0.000	[Guinea, Libya]	0.913	[Netherlands]
Limited government	121	67.943	17.168	2.500	[N. Korea]	92.700	[Paraguay]
Open markets	121	62.529	16.025	0.000	[N. Korea]	90.000	[Hong Kong]
Federal state	121	0.149	0.357	0		1	
Women in legislature	121	18.973	10.611	0.000	[Qatar, Saudi Arabia]	44.699	[Sweden]
Military in politics	121	4.050	1.563	0.000	[Haiti]	6.000	[OECD members, Costa-Rica, Namibia, Jamaica, Malta]
Baseline Controls							
Urbanization rate	121	1.820	1.363	-0.500	[Lithuania]	6.200	[Burkina Faso]
Landlocked dummy	121	0.165	0.373	0		1	
Gini index (inv)	121	0.027	0.006	0.016	[South Africa]	0.043	[Sweden]
Log (Per capita income)	121	9.222	1.222	6.215	[Zimbabwe]	11.541	[Qatar]
Major religion (Islam)	121	0.248	0.434	0		1	
Major religion (Christianity)	121	0.488	0.502	0		1	
Instrumental Variables for the Rule of Law							
Former British colony	121	0.273	0.447	0		1	
Former Spanish colony	121	0.149	0.358	0		1	
Presidential government	121	0.471	0.501	0		1	

Source: Own calculations

Table 03: Model estimation results

	OLS estimation			Instrumental Variable [2SLS] estimation		
	CPI	WGI	ICRG	CPI	WGI	ICRG
Political Environment						
Rule of law	18.4113***	0.9801***	1.1516***	12.5671***	0.5538***	0.6987**
	(1.3788)	(0.0655)	(0.1043)	(3.6417)	(0.1997)	(0.2944)
Unicameral legislature	0.5176	0.0129	-0.0399	-0.3173	-0.0479	-0.1046
	(1.0856)	(0.0528)	(0.0916)	(1.3108)	(0.0726)	(0.1113)
Press freedom index (inv)	93.7611***	4.8686***	6.3508***	122.8796***	6.9928***	8.6070***
	(24.3246)	(1.1132)	(1.8267)	(35.5009)	(1.8223)	(2.4966)
E-government index	10.5265*	0.5952**	0.8862*	15.4011**	0.9508**	1.2638**
	(5.9096)	(0.2876)	(0.5098)	(6.9720)	(0.3961)	(0.6062)
Limited government	0.0834	0.0023	0.0009	0.0339	-0.0012	-0.0029
	(0.0541)	(0.0024)	(0.0040)	(0.0616)	(0.0050)	(0.0046)
Open markets	-0.0407	-0.0042	-0.0067	0.0797	0.0046	-0.0026
	(0.0633)	(0.0030)	(0.0044)	(0.0922)	(0.0050)	(0.0074)
Federal states	1.7765	0.0408	0.0712	2.2303	0.0739	0.1063
	(1.5918)	(0.0781)	(0.1162)	(1.6438)	(0.0869)	(0.1216)
Women in Legislature	0.0327	0.0019	0.0049	0.0320	0.0020	0.0048
	(0.0613)	(0.0023)	(0.0050)	(0.0581)	(0.0029)	(0.0046)
Military in politics	-0.8888*	-0.0635***	-0.0998**	-0.2107	-0.0140	-0.0472
	(0.4576)	(0.0229)	(0.0407)	(0.4986)	(0.0279)	(0.0485)
Baseline Controls						
Urbanization rate	0.8087	0.0421	0.0772	1.8322***	0.1168***	0.1565**
	(0.6609)	(0.0347)	(0.0571)	(0.6892)	(0.0391)	(0.0698)
Landlocked dummy	-1.6136	-0.0705	-0.2745**	-1.5441	-0.0654	-0.2692**
	(1.8981)	(0.0851)	(0.1214)	(1.8293)	(0.0839)	(0.1173)
Gini index (inv)	-131.2268	-8.0884	4.7507	-142.4855	-8.9097	3.8784
	(119.7964)	(4.9889)	(9.0631)	(124.0619)	(5.9604)	(9.1776)
Log (Per capita income)	-0.1395	0.0175	-0.0953	1.5525	0.1409*	0.0357
	(1.1054)	(0.0487)	(0.0921)	(1.4041)	(0.0755)	(0.1303)
Major religion (Islam)	0.5998	0.0152	0.0520	-0.6106	-0.0730	-0.0417
	(1.4026)	(0.0735)	(0.1513)	(1.6238)	(0.1004)	(0.1751)
Major religion (Christianity)	-0.0046	0.0119	0.0265	-1.9140	-0.1273	-0.1214
	(1.5885)	(0.0713)	(0.1246)	(1.7713)	(0.0981)	(0.1645)
Constant	37.3704***	-0.2813	3.0915***	11.3989	-2.1759**	1.0791
	(10.0124)	(0.4837)	(0.7468)	(16.1085)	(0.8877)	(1.4526)
Observations	121	121	121	121	121	121
Adjusted R-squared	0.937	0.948	0.892	0.925	0.924	0.873
Wooldridge's test statistics (P-value)				1.7467	1.6600	1.2700
				(0.4175)	(0.4360)	(0.5299)
Durbin-Wu-Hausman test (P-value)				3.5538	7.5023	3.3554
				(0.0594)	(0.0062)	(0.0670)

Note: Robust standard errors are in parentheses below the coefficients. Also, ***, **, * indicate statistical significance at the 1, 5, and 10 percent error levels, respectively.
Source: Own calculations

Figure 01: The level of public sector corruption in the selected countries based on CPI and ICRG, 2012
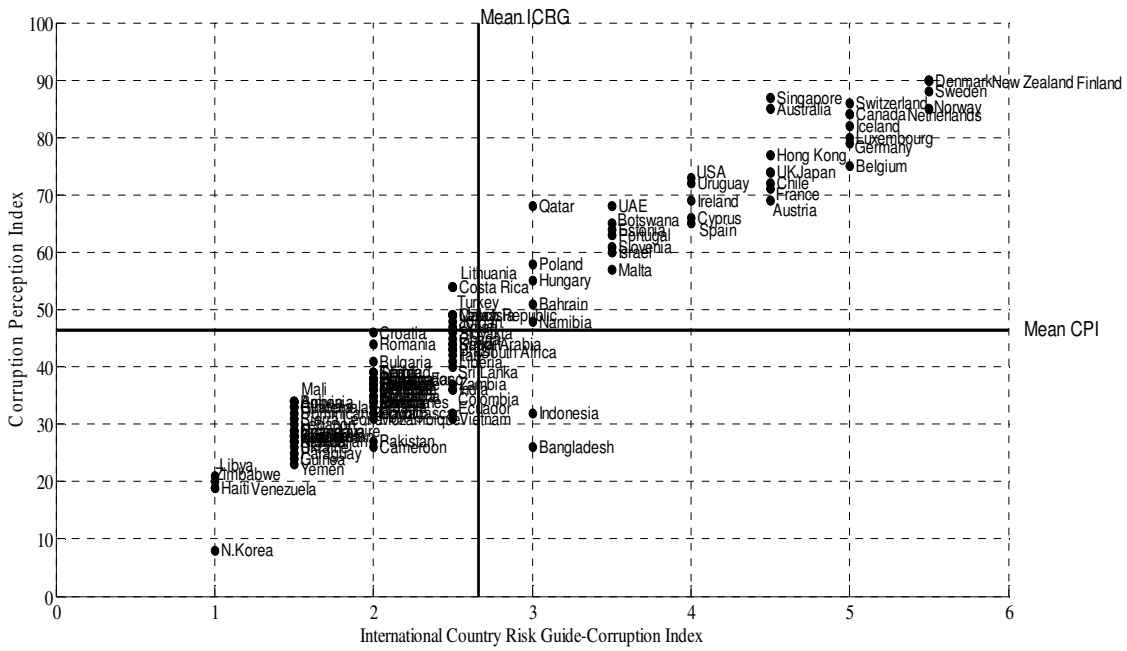
Source: Own calculations based on Transparency International, 2012 and the PRS Group, 2012