

# RESEARCH ON FRAUDULENT, CORRUPT AND COLLUSIVE PRACTICES IN INFRASTRUCTURE PROJECTS

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Based on the existing research, fraud, corrupt and collusion are serious impediments for infrastructure development. To explain the reasons of fraudulent, corrupt and collusive practices, this paper proposes that the effects of control of corruption (CC) and regulatory quality (RQ). We collected total 146 sanctioned and normal infrastructure projects from World Bank Projects and Operations database and searched the control of corruption and regulatory quality scores of different countries from World Governance Indicators. Logistic regression model is applied in this paper to test the correlation between fraudulent, corrupt and collusive practices and CC and RQ. Based on the regression results, this paper presents that the control of corruption and regulatory quality are both negatively related with fraudulent, corrupt and collusive practices. Besides, the effect of interaction between control of corruption and regulatory quality on fraudulent, corrupt and collusive practices is positive. In other words, the worse control of corruption and regulatory quality results in the higher possibility to cause fraudulent, corrupt and collusive practices. Also, the worse regulatory quality will aggravate control of corruption obviously. This research provides suggestions to World Bank Group (WBG) and other similar organizations that more supervision and investigation is necessary for the firms/individuals with higher possibility of fraudulent, corrupt or collusive practices in infrastructure projects.

Keywords: infrastructure; control of corruption; regulatory quality; fraud; corrupt

## INTRODUCTION

The health and stable development of the infrastructure is very important for every country worldwide, especially for developing countries. Infrastructure is the indispensable foundation to guarantee the basic public demands, ensure the public welfare and improve economic growth in developing countries, such as China, India, Malaysia, Romania, sub-Saharan Africa countries (Sahoo and Dash, 2009; Mbekeani, 2010; Frone, 2014; Yii *et al.*, 2018). The World Bank Group (WBG) also considers that infrastructure is a key vehicle for social and economic transformation, especially for economic growth (World Bank, 2012). Aims to end extreme poverty and to promote shared prosperity, WBG supports a wide range of infrastructure projects (including education, transportation, health, public administration and so on) by

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providing low-interest loans. Until 2020, WBG supports over 20,000 approved infrastructure projects in the worldwide.

Corruption is the obstacle for the development of infrastructure in developing countries. It does not only shorten an infrastructure project's life, but also worsens the time, cost, and quality of every project (Kenny, 2012; Owusu *et al.*, 2020). To ensure the health and sustainable development of infrastructure projects, WBG have fought with corruption behaviours over 20 years and set the World Bank Group Sanctions System since 1998. WBG's policies on fighting corruption in project procurement. The corrupt practices contain rejecting a proposal for award, cancelling loan allocated for contractual arrangements on projects, and imposing ineligibility for a stated period (Aguilar *et al.*, 2000). WBG Sanctions System improved and developed continuously from investigative Integrity Vice Presidency into Compliance Integrity Compliance Officer, which aims to sanction fraudulent, corrupt and collusive practices, and debarred or prohibited companies/individuals from participating WBG-funded projects (World Bank, 2018). Accountability and transparency are important during the development process of infrastructure projects, which contribute to prevent fraudulent and corrupt activities in WBG-funded projects (World Bank, 2004). Until 2011, WBG applied a policy of transparency to publish the sanction decisions. Based on this, the deterrent value of imposed sanctions from WBG have increased significantly (Leroy and Fariello, 2011).

Although WBG improved the sanction system continuously and publish the debarred firms/individuals annually, the reasons of the fraudulent, corrupt and collusive practices in infrastructure projects funded by WBG are still unclear. Based on this situation, this paper aims to explain the fraudulent, corrupt and collusive practices in WBG-funded projects from governance capacities aspect, and provide prevention suggestions for fraudulent, corrupt and collusive practices.

## LITERATURE REVIEW

There are many researches presents that corruption has a significant effect on many aspects, such as economic growth (Park, 2012; Saha and Gounder, 2013; Cieřlik and Goczek, 2018), investment (Robertson and Watson, 2004; Wu, 2006; Javorcik and Wei, 2009), inflation (Al-Marhubi, 2000; Samimi and Abedini, 2012; Akca *et al.*, 2012), business environment (Dutta and Sobel, 2016; Xie *et al.*, 2017; Ojeka *et al.*, 2019), domestic savings (Swaleheen, 2008), energy (Auriol and Blanc, 2009; Ozturk *et al.*, 2019) and public resources (Xiao *et al.*, 2020). Besides, Corruption has a significant effect on regional infrastructure and harms the infrastructure development (Gillanders, 2014). Corrupt practices in infrastructure projects attributed to high risks, caused irregularities, and even resulted into the failure of the infrastructure projects (Le *et al.*, 2014a; Le *et al.*, 2014; Zhang *et al.*, 2017).

### Control of Corruption

To prevent fraudulent, corrupt and collusive practices and promote things run smoothly, the control of corruption is important. Ikola-Norrbacka (2007) researched five factors related with administrative corruption: benefits of good administration, integrity of civil servants, key anti-corruption acts, investigations of Ombudsman and Chancellor, and financial and performance audit. Mungiu-Pippidi (2013) suggested that an explanatory model for control of corruption is described as an equilibrium between opportunities for corruption and deterrents imposed, the opportunities contain power discretion and material resources, the deterrents are combined of legal and

normative. This equilibrium formula has been tested empirically in a large number of countries (Mungiu-Pippidi, 2011). Tiwari (2012) researched the relationship between corruption and democracy/bureaucracy in over 80 different countries. They found that democracy, rule of law and control of corruption decreases the corruption level. Asongu and Nwachukwu (2015) presented that less control of corruption increases the confidence of impunity and fuels corruption practices further. Therefore, control of corruption prevents the illegal behaviours to a certain degree.

### **Regulatory Quality**

Besides good control of corruption, regulatory quality also plays an important role in anti-corruption (Fazekas, 2017; Mungiu-Pippidi, 2018). Fugazza and Jacques (2004) shown that the governmental regulation may affect a firm's corrupt practices with the governmental officials to gain the project approval. Through the research on the relationship between corruption and labour supply. Kaller *et al.*, (2018) assessed the effects of regulatory quality and non-compliance with law on electricity market and figured out that the improvement of regulatory quality and reduction of corruption both influence the electricity prices. Capasso (2019) examined the determinants of corruption and concluded that strengthening regulatory quality to improve institutions has better results than just increasing enforcement employment. Then, the better regulatory quality could reduce the corruption related behaviours.

The interaction between control of corruption and regulatory quality has been explored in many studies. Villarreal (2012) observed the interaction between regulatory quality and control of corruption influence the corruption. Cooray and Dzhumashev (2018) examined the interaction of corruption and regulatory quality and suggested that better regulatory quality weaken the impact of corruption. They proposed that to reduce the negative effect of corruption, corruption control, regulation improvement and policy promotion are all necessary measures. These researches provide abundant theoretical support that the regulatory quality and control of corruption influence the corruption together.

Based on the above analysis, three hypotheses are proposed as follow:

- Hypothesis 1: Control of corruption is negatively related to fraudulent, corrupt and collusive practices in infrastructure projects
- Hypothesis 2: Regulatory quality is negatively related to fraudulent, corrupt and collusive practices in infrastructure projects
- Hypothesis 3: The interaction between control of corruption and regulatory quality is positively related to fraudulent, corrupt and collusive practices in infrastructure projects.

## **METHOD**

*Dependent variable: Fraudulent, corrupt and collusive practices*

First, debarred firms/individuals because of fraudulent, corrupt and collusive practices are announced in World Bank Group Sanction System Annual Report. Fraudulent, corrupt and collusive practices have been defined as "any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation", " offering, giving, receiving, or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party", and " an arrangement between two or more parties designed to achieve an improper purpose, including influencing improperly the actions of another party" (World Bank, 2020). Then, based on the information about

the debarred firms/individuals, we searched World Bank's Chief Suspension and Debarment Officer (SDO) Uncontested Determinations and Sanctions Board Decision to collect the project name corresponding to the debarred firms/individuals. After that, the detailed sanctioned projects information was supplemented through the World Bank Projects and Operations database, and 73 sanctioned project samples were generated. At last, the same number of the normal project samples were randomly selected through World Bank Projects and Operations database. Combining these two kinds of samples, the final project samples were generated.

*Independent variables*

Independent variables in this research are control of corruption and regulatory quality, which are two parts of World Governance Indicators. Control of corruption and regulatory quality are explained as " reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption" and " Reflects perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. "...in World Governance Indicators. The value of the two indicators is estimated and scored from -2.5 to 2.5, which mean the weakest to the strongest.

*Control variables*

For control variables, we select series of economic, population, business environment and other related governance indicators which might influence the fraudulent, corrupt and collusive practices from World Development Indicators, World Bank Doing Business Data and World Governance Indicators, including GDP (current billion US\$), population growth, starting a business score, rule of law, government effectiveness and political stability.

As whether the project is sanctioned because of fraudulent, corrupt and collusive practices is a binary classification problem, we use logistic regression model to examine the above hypotheses. The examination is divided into three parts:

First, a logistic regression model is established to test the effects of control of corruption on fraudulent, corrupt and collusive practices. The model specification is as follows:

$$Sanction = \alpha + \beta_1 CC + \gamma X + \varepsilon \quad (1)$$

Where is dependent variable indicating whether the project was sanctioned because of fraudulent, corrupt and collusive practices by WBG. is an independent variable indicating the scores of control of corruption in different countries.

presents control variables including GDP (current billion US\$), population growth, starting a business score, rule of law, government effectiveness and political stability.

Then, the effect of regulation quality on fraudulent, corrupt and collusive practices is examined in following model:

$$Sanction = \alpha + \beta_1 RQ + \gamma X + \varepsilon \quad (2)$$

In equation (2), also is an independent variable indicating the scores of regulatory quality in different countries. Other variables are the same with equation (1).

At last, the effect of the interaction between control of corruption and regulation quality on fraudulent, corrupt and collusive practices is examined in following model:

$$Sanction = \alpha + \beta_1 CC + \beta_2 RQ + \beta_3 CC \times RQ + \gamma X + \varepsilon \quad (3)$$

In equation (3), is an independent variable indicating the interaction between control of corruption and regulation quality in different countries. Other variables are also the same with equation (1).

Table 1 summarizes the descriptive statistics for variables in equation (1), (2) and (3).

Table 1: Summary statistics

Variable	Definition	Obs.	Mean	Std. dev.	Min	Max
Sanction	Whether the project is sanctioned because of corruption-practices by WBG: 1=yes; 0=no	146	0.5	0.50	0	1
CC	Control of Corruption: ranges from approximately -2.5 (weak) to 2.5 (strong)	146	-0.54	0.53	-1.68	1.62
RQ	Regulatory Quality: ranges from approximately -2.5 (weak) to 2.5 (strong)	146	-0.38	0.50	-1.66	1.12
GE	Government Effectiveness: ranges from approximately -2.5 (weak) to 2.5 (strong)	146	-0.38	0.61	-2.28	0.99
RL	Rule of Law: ranges from approximately -2.5 (weak) to 2.5 (strong)	146	-0.50	0.51	-1.77	1.08
PV	Political Stability and Absence of Violence/Terrorism: ranges from approximately -2.5 (weak) to 2.5 (strong)	146	-0.65	0.84	-2.77	1.12
GDP	Gross Domestic Product (current billion US\$)	146	1375.90	3758.55	0.85	14342.9
POP	Population growth (annual %)	146	1.41	1.03	-1.81	3.56
Start_b	Starting a Business score: ranges from approximately 0 (hard) to 100 (easy)	146	84.97	8.27	36.4	99.6
Interaction	CC*RQ	146	0.40	0.52	-0.53	2.79

## RESULTS

The regression results of equation (1) ~ (3) are presented in Table 2, which are the central estimates of this paper.

### *Fraudulent, corrupt and collusive practices and control of corruption*

In column (1), we present the logistic regression estimation of the effect of control of corruption on fraudulent, corrupt and collusive practices for all samples. The coefficient of control of corruption is negative and statistically significant at 1% level, indicating that the stronger control of corruption reduces the probability of fraudulent, corrupt and collusive practices. This result confirms the first proposed hypothesis: Control of corruption is negatively related to fraudulent, corrupt and collusive practices in infrastructure projects.

Table 2: Regression results

Variable	(1)	(2)	(3)	(4)
CC	-2.62*** (0.81)		-2.51*** (0.81)	-2.50*** (0.82)
RQ		-1.64** (0.74)	-1.64** (0.79)	-1.44* (0.80)
Interaction				1.12* (0.58)
GE	0.31 (0.68)	0.35 (0.75)	1.20 (0.80)	1.67* (0.87)
RL	1.20* (0.72)	0.63 (0.67)	1.56** (0.75)	1.67** (0.77)
PV	0.32 (0.29)	-0.09 (0.27)	0.26 (0.30)	0.36 (0.32)
GDP	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
POP	-0.20 (0.22)	-0.32 (0.21)	-0.27 (0.21)	-0.27 (0.22)
Start_b	-0.01 (0.03)	-0.02 (0.02)	-0.01 (0.03)	-0.01 (0.03)
Obs.	146	146	146	146
R-squared	0.0838	0.0482	0.1054	0.1238

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

#### *Fraudulent, corrupt and collusive practices and regulatory quality*

In column (2), we present the logistic regression estimation of the effect of regulatory quality on fraudulent, corrupt and collusive practices for all samples. The coefficient of regulatory quality is negative and statistically significant at 5% level, indicating that the stronger control of corruption reduces the probability of fraudulent, corrupt and collusive practices. This result confirms the second proposed hypothesis: Regulatory quality is negatively related to fraudulent, corrupt and collusive practices in infrastructure projects. In column (3), the effects of both control of corruption and regulatory quality on fraudulent, corrupt and collusive practices have been estimated, the statistically significant levels of these two variables remain unchanged.

#### *Fraudulent, corrupt and collusive practices and interaction between control of corruption and regulatory quality*

Through column (1) ~ (3), the effects of control of corruption and regulatory quality on fraudulent, corrupt and collusive practices are verified. Considering the joint effect of control of corruption and regulatory quality, the interaction between control of corruption and regulatory quality is involved in column (4) to examine the effect of the interaction on fraudulent, corrupt and collusive practices. The coefficient on the interaction term however is positive suggesting that the negative effects of control of corruption outweigh the negative effects of regulatory quality. From column (4), the interaction is positive and statistically significant at 5~10% level, indicating that the

better regulatory quality, promote better control of corruption, and then reduce the probability of fraudulent, corrupt and collusive practices together. Therefore, the last hypothesis is confirmed: The interaction between control of corruption and regulatory quality is positively related to fraudulent, corrupt and collusive practices in infrastructure projects.

Besides, after involving the interaction of control of corruption and regulatory quality, the statistically significant level of regulatory quality decreases into 5~10% level, but the statistically significant level of control of corruption remains unchanged. Therefore, the regression results are stable and reliable.

## **DISCUSSION**

Based on the results above, the proposed three hypotheses have been confirmed. The results indicate that control of corruption and regulatory quality are two main factors influencing the fraudulent, corrupt and collusive practices in infrastructure projects. For the countries with high control of corruption or regulatory quality scores, it is less probability to happen fraudulent, corrupt and collusive practices in infrastructure funded by WBG. Control of corruption has significant effect on the fraudulent, corrupt and collusive practices as less public power is used or exercised for private gain. Then the cost and difficulty of fraudulent, corrupt and collusive practices are increased significantly. Regulatory quality reflects the government ability to regulate and promote sound policies. As the development of private sectors ensured through the policy implementation, there is less motivations and incentives for private sectors to conduct fraudulent, corrupt and collusive practices. If the government owns the ability to promote the implementation of sound policies and guarantee the development of private sector, then the public power is less used for private gain. Therefore, the better regulatory quality will enhance the control of corruption.

## **CONCLUSIONS**

We argue that fraudulent, corrupt and collusive practices in infrastructure projects funded by WBG can be partly explained through two governance aspects: control of corruption and regulatory quality. Based on the research results, control of corruption and regulatory quality are both negatively related to fraudulent, corrupt and collusive practices in infrastructure projects. Which means that the better control of corruption or greater regulatory quality significantly reduced the possibility of fraudulent, corrupt and collusive practices in infrastructure projects. Besides, we explore the influence of interaction between control of corruption and regulatory quality on fraudulent, corrupt and collusive practices. The results shows that the interaction between control of corruption and regulatory quality is positively related to fraudulent, corrupt and collusive practices in infrastructure projects. Which means, control of corruption and regulatory quality enhance the effect of each other on fraudulent, corrupt and collusive practices. The greater regulatory quality improves the control of corruption, and then promote the restraint of fraudulent, corrupt and collusive practices in infrastructure projects.

Based on the results, when funding or conducting infrastructure projects, WBG could check and inspect the control of corruption and regulatory quality levels of the project countries. Then, for the countries with worse control of corruption and regulatory quality, more supervision and investigation are necessary to prevent fraudulent, corrupt and collusive practices. Also, for developing countries, improve of control of

corruption and regulatory quality are vital to enhance the health development of infrastructure.

There are also some limitations and future expectations of this initial research. First, more control variables which might influence fraudulent, corrupt and collusive practices can be involved in the logistic regression model, to test the hypotheses. Second, more samples of infrastructure project could be collected to conduct the robust test. Finally, the causes of fraudulent, corrupt and collusive practices could be analysed from enterprise aspect and provide more constructive suggestion for participator factor.

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