



# What leads to official corruption in China? A politico-economic analysis of economic opportunities and government corruption across China's provinces

Feng Yi<sup>a</sup>, Zhijun Gao<sup>a</sup> and Honglie Helen Zhang<sup>b</sup>

<sup>a</sup>Department of International Studies, Claremont Graduate University, Claremont, USA; <sup>b</sup>School of International Business, Yunnan University of Finance and Economics, Kunming, People's Republic of China

## ABSTRACT

This paper investigates the relationship between economic opportunities and official corruption in China. We construct a cross-province sample of corrupted officials to analyse the effects on official corruption of mineral reserve, coal production, real estate and road construction, while including control variables such as population, GDP per capita, economic growth rate, private assets, provincial government capacity, fiscal transparency and distance of the province from Beijing. Spanning from December 2012 to November 2015, our sample contains 526 high-level government officials who worked in various provinces in China. We find through multivariate regression that economic opportunities represented by coal, minerals, real estate and road construction all have a positive and significant effect on official corruption in China at the levels of provincial department director or deputy director; meanwhile, capacity of political extraction, road construction and coal production are better indicators of official corruption at the level of governor or deputy governor.

## ARTICLE HISTORY

Received 26 May 2017

Accepted 14 February 2018

## KEYWORDS

Corruption; rent seeking; economic development; government; China

## Introduction

Since China started its economic reform in 1978, the country has witnessed fast economic growth and general improvement of social welfare. However, corruption has become increasingly a social, economic and political problem for the country. The major reason for China's severe corruption is twofold: on one hand, although economic reform has continued in China for more than 30 years, the country still needs to improve its institutional framework for a law-based market economy. The government plays a dominant role in regulation and intervention; at the same time, institutional loopholes exist that government officials can utilise to pursue self-interest. Some local Chinese government officials act as both a referee and player in the market, and have enormous discretionary power when it comes to licences, taxation, project approvals and budget allocations. The incomplete market reform provides an environment for rent-seeking behaviours. Second, due to deficiency in effective supervision on government officials and lack of transparency of decision-making

by the government, the risk of penalty for corruption was much lower than its benefits, though the cost–benefit ratio started to change after the 18th Party Congress. According to Pei and Kaufmann (2007), the chance of a corrupt official being caught was only 3%. Therefore, some officials would choose to take bribes because of the high returns and low risk of penalty.

In our study, we analyse economic sources of official corruption. Assuming that the political system and structure in China remains the same across the different provinces, we hold that the level of official corruption varies from province to province, responding to the variation in economic activities among the provinces. The provinces where real estate construction is intensive, for example, should find more corrupt government officials than do provinces where real estate activities are lacking, keeping other factors constant. To our knowledge, this study is the first empirical and statistical work that systematically looks into economic opportunities as a source of corruption in China at the province level.<sup>1</sup>

The second section of the paper conducts a review of the theoretical foundation in the study of official corruption. The third section introduces our multivariate regression model and discusses specification. The fourth section analyses the statistical results. The last section provides concluding remarks.

## Theoretical foundation and the Chinese context

Many works have dealt with the theoretical relationships between political institutions and corruption (Aidt, 2003; Alt & Lassen, 2003; Arbetman & Johnson, 2007; Baig & Feng, 2016; Gerring & Thacker, 2004; Jain, 2011; Lambsdorff, 1999; Lambsdorff, Taube, & Schramm, 2005; Lederman, Loayza, & Soares, 2005; Persson & Tabellini, 2001; Rose-Ackerman, 1999; Treisman, 2000, 2007). Some of these works link corruption to development, with development as an intervening variable influencing political institutions which affect the level of corruption (Huntington, 1968; Khan, 2006; Shleifer & Vishny, 1993), while others link corruption with democracy; for example, Alt and Lassen (2003), Baig and Feng (2016), Gerring and Thacker (2004), Lederman et al. (2005), Persson and Tabellini (2001) and Shleifer and Vishny (1993) all suggest that lower corruption is associated with a higher degree of political openness.

We are in agreement with the above theories and evidence that political institutions and culture have an impact on official corruption across countries in the world. In our case study of China, given the same political system across different provinces, our central thesis is that economic factors matter as causes for corruption. Recognising the circumstances of economic reforms, the lack of a legal framework fighting corruption effectively and the enormous power of government officials, we hold that economic opportunities in this context increase incentives for official corruption.

The central theoretic guidance for this paper is the rent-seeking theory. Classic economic theory defines rent as the reward of a production factor (such as land) that has no supply elasticity, while Buchanan (1983) shows that rent seeking is a waste of resources caused by individuals seeking transfer of wealth under government protection. Because rent seeking allows individuals to obtain high benefits at low cost, rent seekers have the motivation to influence government officials through a number of means including bribery and lobbying. In the context of Chinese economic reforms, Wu (1988) argues that the fundamental cause of rent seeking in China is the administrative and executive power of government. Due to the exclusive power by the government in regulating and awarding permits and business

licences, many a business entity in China would choose to bribe the government officials to obtain benefits, and it remains lucrative for the officials to set rents and let the enterprises purchase these rents through bribes.

In addition, some government officials directly transfer public property to their own, utilising the changes of property ownership during the transition of the economy from central planning to a market economy. After the central government decided to reform the state-owned enterprises (transforming them into joint stock companies, for example), many officials tried every means possible to purchase these assets at very cheap prices, when they were responsible for the implementation of the transition. Manion (2004) summarises three common forms of illegal privatisation in China:

the first one is corruption in the process of legally authorized enterprise privatization. The second is fairly direct embezzlement of enterprise profits. The last one is a more complicated form of asset stripping that links state enterprises and other enterprises by fudging organizational boundaries. (Manion, 2004, p. 107)

Liu (1983) argues that some of the corruption, such as appropriation of goods and illegal trade, has its roots in these state-owned enterprises. Chinese government officials above the department level (*tingjuji*) have substantive discretionary power, and their behaviour and practice defy effective supervision. Furthermore, the market economy was not fully established, giving corrupt officials opportunities to make illegal transactions. In addition, according to the rent-seeking theory, one of the most important reasons for official corruption is asymmetric information in the market. Individuals who possess more information than others will take advantage of the information to obtain more benefits, and in China, these individuals tend to be government officials or those close to them.

Gong (1991) finds that corruption is concentrated in the department directors at various local levels in China. In order to obtain business licensing, applicants usually need to bribe the officials because otherwise their applications would be rejected and the chance for a successful re-application would be small. Manion (1996, 2004) also points out that under the context of decentralisation in the 1980s and 1990s, officials responsible for issuing licences had great discretionary power and little supervision by the above, providing favourable conditions for them to set rents to the applicants.

Rose-Ackerman (1996) demonstrates that government procurement creates incentives for contractors to bribe the officials to ensure that their firms would win in the bidding process. In addition, when government allocates subsidies, private firms would also rent seek officials in order to be selected to obtain the benefit. Similarly, when a government imposes regulations, issues taxes and enforces criminal laws, the officials have discretionary power in imposing costs selectively which would affect a firm's competitive position. As a result, firms would have the incentive to bribe officials so as to avoid paying the costs. None of these scenarios are strangers in China.

Several scholars point out the relationship among natural resources, economic development, political rivalry and corruption. Leite and Weidman (1999) postulate that natural resources create opportunities for rent-seeking behaviour and therefore remain a source of corruption. They empirically demonstrate the relationship between natural resources and corruption, finding in a cross-country sample that fuel-related and ore-related natural resources elevate the level of corruption in a country. We find this work highly relevant to our research on official corruption in China's government in the context of Chinese economic reform. First, China's rapid progress of economic restructuring has been powered by construction which demands extraction of raw material such as coal and ores. In light of the

argument and findings in Leite and Weidman (1999), this large demand for natural resources should increase corruption in China, keeping other factors constant. Recently, Baig and Feng (2016) have found a positive effect of natural resources on corruption in a sample of 98 developing countries; the total rents of natural resources, including oil, natural gas, coal, minerals and forests, increase the degree of corruption while keeping other factors such as political systems and economic development constant.

Second, China's governance has been characteristic of a one-party political system of concentration, giving rise to the political monopoly that induces rent-seeking behaviour by reducing the cost of rent seeking. Caselli (2006) models and analyses the nexus of natural resources and rivalries among political opponents. He argues that the benefits from natural resources can be extracted with more ease than the industrial sectors. Therefore, the countries with natural resources tend to find themselves seized in fierce political conflict aiming at the national office through irregular government changes including military coups. In a society of abundance of natural resources and high political instability, political parties have more incentive for gaining office for control of rents of natural resources through force and violence; however, in this context, economic agents have problems using bribery for rent seeking, as those in office may be overthrown in the near future and also as there may be limited economic benefits from rent seeking left to the private sectors as the political elites directly expropriate natural resources. Hodler (2006) presents a similar argument in which the politically fractionalised countries abundant with natural resources tend to have internal conflicts among opponents fighting for natural resources. Our argument is that in an environment of political violence, both incentives and capacity of private agents to seek rent decline, making the option of bribes to government officials less valuable. In China, the one-party system of political power concentration reduces the ambiguity and process of rent seeking. In Chinese officialdom, government officials have a lifetime political career and many of them stay in the same province over many years. The Chinese political structure, characterised by stability and continuity, lowers the transaction costs in rent seeking and makes it easier for individuals and entities to pursue rent seeking, as the target of bribery is clear and the process of interest transfer is relatively well-defined.

Third, the society lacks the mechanisms of transparency resulting from intense competition for political office. For instance, as of now, there is no requirement for government officials to make public their personal wealth and the source of it. The lack of requirements to have personal wealth under public scrutiny results in an increase in the opportunity cost of not accepting bribery.

Fourth, compared to government officials in other places such as Hong Kong, government officials in Mainland China receive relatively low salaries, but have great discretion in making decisions that have consequences for the business opportunities of private citizens. Also, the income of CEOs of state-owned enterprises in China is only a fraction of that of their counterparts in other countries, though the former are in charge of businesses hundreds of times larger than those under the latter. This 'imbalance' between responsibility and remuneration increases the probability of official corruption in China, keeping other factors constant.

The path of corruption in China seems to be common. Where economic opportunities abound, corruption mushrooms. Corrupt officials tend to be involved in the ownership transformation of mineral state-owned companies, real estate construction and urban projects. In other words, for the provinces where mineral resources were abundant, real estate was booming and public construction was on a large scale, the number of corrupted government officials was expected to increase.

## Hypothesis testing and model specification

This section specifies a politico-economic model of official corruption in China. Our dependent variable is the number of corrupt officials in the province. Our central argument is that some particular kinds of economic activities are conducive to official corruption in China. Those activities are related to economic development, for instance, real estate and mining.

Based on the rent-seeking theory and the discussion of the Chinese context in the last section, here we develop a statistical model to test the impact on official corruption in China of economic activities and opportunities including the natural resources and construction sectors.

Specifically, we have the following hypotheses to test:

Hypothesis 1: The more minerals found in the province, the more corrupt officials there are in the province.

Hypothesis 2: The more coal produced in the province, the more corrupt officials there are in the province.

Hypothesis 3: The more houses constructed in the province, the more corrupt officials there are in the province.

Hypothesis 4: The more roads built in the province, the more corrupt officials there are in the province.

Among the control variables we include: population, GDP per capita, the growth rate of GDP per capita, privatisation, provincial relative political extraction, fiscal transparency and the distance the province is from Beijing, the national capital of China. Our regression model is as follows.

$$\text{Officials}_i = \beta_0 + \beta_1(\text{mnl})_i + \beta_2(\text{coal})_i + \beta_3(\text{rlst})_i + \beta_4(\text{road})_i + \beta_5(\text{pop})_i + \beta_6(\text{gdppc})_i \\ + \beta_7(\text{growth})_i + \beta_8(\text{prvt})_i + \beta_9(\text{trn})_i + \beta_{10}(\text{RPE})_i + \beta_{11}(\text{dist})_i + \varepsilon_i$$

where the subscript  $i$  represents the province. The dependent variable (*officials*) is the number of corrupt officials of each province as identified by the Central Commission for Discipline Inspection (CCDI). While this variable does not precisely measure the intensity or magnitude of corruption, for example, the amounts of bribery or of embezzlement, it is the best measure available in the CCDI data, since there are many missing values for the amount of bribery in the data when the investigation was conducted.<sup>2</sup> Among the independent variables, our theoretical variables include mineral reserve (*mnl*), coal output (*coal*), real estate value added (*rlst*) and road construction (*road*). Among the control variables, we have population (*pop*), GDP per capita (*gdppc*), total assets of private industrial enterprises (*prvt*), fiscal transparency (*trn*), relative political extraction (*rpe*) and geographic distance to Beijing (*dist*). Except for road construction, fiscal transparency and distance to Beijing, all independent variables take the average value from 2003 to 2012. We use the 10-year average value to present long-term conditions under which corruption occurs, as official corruption tends to be a practice engaged in over many years. For road construction, we use the difference of road length from 2003 to 2012 adjusted by area as an indicator of the scale of road construction in a province. The data for fiscal transparency are available only from 2009 to 2012 (we calculated the average based on these four years) and, finally, the distance from the provincial capital to Beijing is a constant.

In the following, we discuss each of the independent variables and their expected effect on the number of corrupted officials. We have four theoretical variables that stand for special economic activities and we hypothesise that the provincial variation in these activities differentiates the size of corrupted officials in the province. They are mineral reserve, coal production, real estate and road construction.

### ***Mineral reserve (+)***

Some scholars argue that natural resources can feed corruption. For example, Torvik (2002) finds natural resources increase rent-seeking behaviours and reduce entrepreneurship. In China, several provinces boast large amounts of minerals, such as zinc and tin ore. In order to obtain the mining rights, mining enterprises have to go through the administrative approval process. Since a chain of interests exists between business owners and government officials, it is difficult to prevent corruption when the former applies for administrative approval by the latter. In our measurement, we choose the highest value of the reserve for a mineral over the 10-year period and then we average each of the highest values of the 13 minerals in the data, including bauxite, chromium, copper, iron, kaolin, lead, manganese, manganese ore, phosphorus, pyrite, titanium, vanadium and zinc.<sup>3</sup> We predict a positive sign on mineral reserve.

### ***Coal output (+)***

Coal excavation is another area where rent-seeking activities occur. For quite some time, coal was in great demand in China, increasing the value for rent seeking through bribery. The coal industry required a lot of government action in China, from permits to run mines to permits to transport coal around the country. We use the production of coal in a province as a measure of the magnitude of the economic opportunities for official corruption as provided by coal. The measurement is in 10 million tons. We predict a positive sign on coal output.

### ***Real estate (+)***

Real estate is considered a pillar industry in China's economy in the past decade because construction has acted as the driver for related industries, such as steel, transportation, telecommunications, banking, etc. However, similar to the mining industry, the development of the real estate industry has offered bribing opportunities. Because law enforcement was not fully established, many loopholes remained for secret operations in the real estate industry. Zhu (2012) argues that China's decentralisation reform has provided local governmental officials with much discretionary power in issuing licences, setting prices and selecting winners in the processes of land transfer and open tender, auction and listing of land. In order to make maximum profits in the real estate sector, developers choose to bribe officials in the corresponding departments to obtain benefits in pricing or to accelerate the approval process. The measurement of real estate is value added in 100 billion yuan. We expect to find a positive impact of real estate industry on the frequency of corrupt officials.

### **Road (+)**

According to the *Regulation of Market Entry of Road Construction* released by the Ministry of Transport of China in 2000, the provincial department of transportation is in charge of the roads belonging to its administrative district and oversees the regulations and implementation of local road construction. Kenny (2009) argues that construction tends to be one of the most corrupt industries worldwide because of its complexity and asymmetric information between clients and providers, as well as its close ties with government. The department of transportation at the provincial level is given discretionary power in the bidding process, creating rent-seeking opportunities. In our study, we divide the difference of the road length in the province between 2003 and 2012 by the area of the province, and we predict a positive sign on this variable.

Our control variables include population size, the level and speed of development, fiscal transparency, local government political capacity and distance from the national capital Beijing.

### **Population (+)**

In general, a province with a larger population implies more frequent economic activities and interactions among market entities, creating more opportunities for corruption. Baig and Feng (2016) find that population has a positive and significant effect on corruption. In China, population varies significantly across provinces, providing different environments for corruption while keeping all other factors constant. Provinces of larger population have more personal and business interactions, creating opportunities for corruption, keeping other factors constant. We predict a positive sign on the size of population.

### **GDP per capita (+/-)**

GDP per capita, as a control variable, measures the level of development of a province. In a cross-country analysis, Kaufmann and Kraay (2002) and Treisman (2000) find that richer countries tend to have a lower level of corruption. Mathur, Meyer, and Piergallini (2014) find that the level of development as indexed by GDP per capita has a positive effect on corruption cases across Chinese provinces: a 10% increase in GDP per capita leads to an increase of 0.0667 corruption cases per 100,000 citizens. We believe that development per se may increase corruption because of the increase in economic opportunities or may decrease corruption because of the increase in the opportunity cost of corruption as the society gets richer. In the Chinese context, in the relatively rich provinces, wealth is created more through technology, which is less determined by rent seeking. Poor provinces tend to base their wealth on a low level of productive power and natural resources, encouraging rent-seeking activities. After controlling for those special economic activities that we believe promote official corruption in China, GDP per capita may have little or no effect on official corruption in China.

### **Economic growth (+)**

In the context of the current anti-corruption campaign in China, there is a hypothesis that China's economic growth will slow down because anti-corruption measures take the



incentives away from the government officials to start new projects. While such a hypothesis makes an interesting topic for future study, it implies that in the past, government corruption might be part of the reason for economic growth in China. In other words, there should be a positive correlation between economic growth and corruption, keeping other factors constant. In the cross-country study of corruption, Ali and Isse (2003) and Goel and Nelson (1998) find that economic growth has no impact on future corruption, while N'Zue and N'Guessan (2006) conclude that growth causes corruption and not vice versa. Dreher and Herzfeld (2005) find that corruption has a negative effect on GDP growth. Aidt (2011) demonstrates a negative effect of corruption on sustainable development. In our study, we use the 10-year average of economic growth rate for a province to predict the number of corrupt government officials caught during the period of time from December 2012 to November 2015. If the hypothesis that corruption leads to growth in China is correct, we should find consistent evidence of a positive effect of the average growth of the economy on the number of corrupt officials.

### ***Private assets (-)***

Whether privatisation causes an increase or a decrease in corruption is an interesting hypothesis to test. Privatisation may decrease corruption in China because private companies have relatively more autonomy than state-owned enterprises and are less controlled by the government. On the other side, privatisation may generate those economic opportunities that lead to rent seeking through bribes as we discussed earlier. Vast 'grey areas' exist in China that private enterprises can utilise to undertake rent-seeking activities, though the same can be said of the state-owned enterprises as well. In our study, since we include major economic rent-seeking opportunities such as mining, real estate and construction, we tend to predict that private enterprise has a negative effect on official corruption. For this variable, we use the resources owned or controlled by private enterprises and the measurement is in 100 billion yuan.

### ***Fiscal transparency (-)***

Financial transparency refers to the extent that the government releases financial information. The data come from the *Annual Report on China's Fiscal Transparency at the Provincial Level* published by Shanghai University of Finance and Economics. The researchers obtained budgetary information from public sources including the internet and the press. The score for each province is calculated based on nine dimensions and each dimension is assigned a different weight. Assuming that an increase in disclosure of government financial information reduces the degree of secret operations by government officials and businesspeople, we predict a negative sign on transparency.

### ***Relative political extraction (+)***

A number of scholars argue that government intervention or government size has a positive effect on corruption in society (Goel & Nelson, 1998; Lederman et al., 2005; Tanzi, 1994; Treisman, 2000). In contrast, Mathur et al. (2014) find a negative effect of provincial government capacity on corruption cases in China. In our study, we use the concept and measurement of relative political extraction (Arbetman & Kugler, 1997) to develop our measure of provincial



relative political extraction based on observed tax revenue and estimated tax revenue.<sup>4</sup> Using the same method, Feng (2006) finds significant variation of provincial government capacity in China with relatively stronger provincial governments located in central China. In the context of our study, powerful local government officials have more discretionary power and more control over the resources. Keeping everything else constant, we expect that there will be more corrupt officials in the provinces with higher levels of relative political extraction.

### **Distance from Beijing (+)**

Since China possesses a large territory, geographic distance creates difficulties for the central government to implement its policies in remote regions and to monitor the behaviour of local officials far away. Therefore, we predict a positive effect on the number of corrupt officials of the distance between the provincial capital and Beijing, the national capital: the farther the province is from Beijing, the more corrupt officials the province has, keeping other factors constant.

The data for the dependent variable, the number of corrupt high-ranking officials in the province, are taken from the internet publications of the Central Discipline Inspection Committee. All the independent variables are from *China Statistical Yearbook*, except for Fiscal Transparency, which is from Shanghai University of Finance and Economics, and distance from Beijing, which is from *Baidu*.

In our data, there are a total of 526 corrupt high-ranking government officials in the provinces, including 70 'tigers'<sup>5</sup> and 456 sub-tigers. The word 'tiger' in the language of corruption control in China refers to corrupt officials who rank at the governor or deputy governor level, such as governor or party secretary of the province. The sub-tigers are those at the levels of provincial department director and deputy director.

### **Statistical analysis**

We first examine the bivariate correlations among our variables in Table 1. Surprisingly, the correlation between the 'tigers' and 'sub-tigers' is not very high, barely 30%. This indicates that the determinants for the corruption of tigers can be different from the determinants for the corruption of sub-tigers. This finding leads to our decision to run two subsets of regressions for the corrupt officials: one for the tigers and the other for the sub-tigers, in addition to the regression on the whole sample. Among other bivariate relationships, the greater the population in a province, the more sub-tigers the province has; the correlation stands at 68.3%. The number of sub-tigers is also correlated with real estate at 47.2%. The highest correlation between the tiger and an independent variable is that with coal production at 68.7%.

Among other correlations, population is highly correlated with real estate at 64.5%, which is as expected. A large population is consistent with high housing needs. In addition, population is positively correlated with private assets at 60.1%. GDP per capita by province is correlated with growth at -60.4%, indicating convergence of the level of development in China. This result by itself seems to suggest that in China richer provinces tend to grow more slowly than poor provinces. In addition, GDP per capita is positively correlated with real estate at 53.1% and with political extraction at 34.8%; its relation with the distance from Beijing is negative, at -49.2%. In terms of bivariate statistics, the farther away a province is located from the national capital, the lower the level of development it experiences.



**Table 1.** Correlation coefficients.

Pearson correlation coefficients, N = 31														
Correlation between variables														
	Officials	Tigers	Sub-tigers	mnl	coal	rlst	road	pop	gdppc	growth	prvt	trn	RPE	dist
Officials	1.000	<b>0.401</b>	<b>0.994</b>	0.251	<b>0.321</b>	<b>0.452</b>	0.229	<b>0.678</b>	-0.186	0.083	0.175	0.119	-0.093	0.034
Tigers		1.000	0.296	0.234	<b>0.687</b>	-0.005	0.081	0.201	-0.087	0.120	0.018	0.141	0.158	-0.206
Sub-tigers			1.000	0.233	0.250	<b>0.472</b>	0.229	<b>0.683</b>	-0.183	0.072	0.180	0.107	-0.116	0.061
mnl				1.000	<b>0.318</b>	0.050	0.081	0.264	-0.034	0.091	0.128	0.093	0.100	-0.253
coal					1.000	-0.025	0.016	0.226	-0.082	0.065	0.110	-0.016	-0.089	<b>-0.417</b>
rlst						1.000	0.042	<b>0.645</b>	<b>0.531</b>	<b>-0.419</b>	<b>0.761</b>	0.239	0.021	-0.152
road							1.000	0.241	-0.285	<b>0.371</b>	0.192	-0.002	<b>-0.431</b>	-0.070
pop								1.000	-0.072	0.085	<b>0.601</b>	0.151	-0.101	-0.147
gdppc									1.000	<b>-0.604</b>	<b>0.335</b>	0.265	<b>0.348</b>	<b>-0.492</b>
growth										1.000	-0.185	-0.081	<b>-0.393</b>	-0.027
prvt											1.000	0.147	-0.158	-0.217
trn												1.000	0.067	-0.047
RPE													1.000	0.001
dist														1.000

Note: The correlation coefficients that are statistically significant at or above the 95% confidence level are given in bold.

Economic growth has moderate negative correlation with real estate at  $-41.9\%$ , and with political extraction at  $-39.3\%$ . Private assets are highly correlated with real estate at  $76.1\%$ . Mineral reserve is correlated with coal production at  $31.8\%$ . Coal production is correlated with distance from Beijing at  $-41.7\%$ , and road construction is correlated with political extraction at  $-43.1\%$ .

Our central thesis is that economic opportunities are conducive to official corruption, keeping other factors constant. In multivariate regression, first, we use the entire sample for corrupt officials, including tigers and sub-tigers. Column 1 of Table 2 demonstrates the statistical results in this sample. All of our four theoretical variables are statistically significant and all take the expected sign as we predicted. Mineral reserve, coal production, real estate and road construction all have a positive effect on the number of corrupt officials in the province. Such evidence is consistent with the argument that certain economic activities generate rent-seeking opportunities, resulting in official corruption.

Among our control variables, population appears to be associated with corruption, supporting the earlier cross-country evidence in Baig and Feng (2016). The level of development has a negative sign, but it is statistically insignificant. Economic growth took the expected sign supporting the null hypothesis that growth and corruption were positively correlated in China, but this effect, like economic development, is not statistically significant. After controlling with other variables, there is no evidence in the data that China's rapid economic growth was powered by corruption.

The assets of private businesses are found to have a negative and statistically significant effect on corruption, confirming our prediction. The higher the level of private assets in the province, the smaller the number of corrupt high-ranking officials. This finding is consistent with the scenario that when private companies hold a large accumulation of assets, they may not have to depend on the discretion of government for their business.

Fiscal transparency and relative political extraction are not statistically significant. The former has the wrong sign. Finally, the effect of the distance between the province and Beijing on the number of corrupt government officials is positive, but the parameter estimate is statistically insignificant.

**Table 2.** Regression results.

	Model 1	Model 2	Model 3
	<i>Total</i>	<i>Sub-tiger</i>	<i>Tiger</i>
<i>Constant</i>	-6.63361 (10.67073)	-2.47561 (10.55808)	-4.15800 (2.83203)
<i>mnl</i>	0.00677* (0.00383)	0.00720* (0.00384)	-0.00043 (0.00050)
<i>coal</i>	2.82828*** (0.79411)	2.05666** (0.78915)	0.77161*** (0.08118)
<i>rlst</i>	24.75608*** (5.47622)	23.92750*** (5.55543)	0.82858 (0.63373)
<i>road</i>	0.14278*** (0.14278)	0.12126** (0.04376)	0.02152** (0.01012)
<i>pop</i>	0.00168* (0.00094)	0.00174* (0.00096)	-0.00006 (0.00009)
<i>gdppc</i>	-0.19920 (0.14360)	-0.19374 (0.15126)	-0.00546 (0.01825)
<i>growth</i>	0.51990 (0.49206)	0.39011 (0.46627)	0.12979 (0.12204)
<i>prvt</i>	-3.01088*** (0.62868)	-2.95466*** (0.62459)	-0.05622 (0.03809)
<i>trn</i>	0.03459 (0.18476)	-0.00873 (0.18433)	0.04332 (0.04026)
<i>RPE</i>	0.47150 (3.25100)	-1.80969 (3.41902)	2.28119** (1.04406)
<i>dist</i>	2.94840 (2.21491)	2.68323 (2.28304)	0.26517 (0.40294)
$\bar{R}^2$	0.6294	0.6162	0.4026
$\Sigma$	7.80652	7.61844	1.16313
<i>N</i>	31	31	31

\*Significant at the 0.01 level; \*\*Significant at the 0.05 level; \*\*\*Significant at 0.10 level, all at one tail.

Next, based on the earlier analysis of the bivariate relationships among these variables, we suspect that there exist different conditions under which corruption occurs for the tiger and for the sub-tiger respectively. In the earlier discussion, we noted the low correlation between the number of tigers and the number of sub-tigers in the province, suggesting that the parametric structure for the corruption of the two groups might be different. Those directly in charge of these administrative matters over the projects usually were not tigers, but sub-tigers. Therefore, we predict that our economic opportunity model should explain the behaviour of the sub-tigers better than the tigers.

Based on this reasoning, we next run two regressions: one on the sub-tigers and the other on the tigers. The results are reported in Columns 2 and 3 of Table 2. The statistical model we presented earlier explains the sub-tiger group much better than the tiger group. All four theoretical variables – mineral, coal, real estate and road construction – remain statistically significant and have the expected positive sign. By contrast, in the tiger sample, only ‘coal’ and ‘road’ are statistically significant out of the four theoretical variables. Real estate and mineral reserves are not statistically significant.

Among the control variables, for the sub-tiger group, only two are statistically significant – population and private assets; the magnitude of the parameter, the direction of effect and the level of significance are all similar to those in the whole sample. For the tiger group, only one control variable is statistically significant: this is the relative political extraction of the province, which seems to indicate that for the tigers, an important factor for them to become corrupt is political power; for the sub-tigers, economic benefits are the primary drivers for them to become corrupt, keeping other factors constant.

In sum, when unearthing the relationship between economic opportunities and official corruption, we find that where the link between discretionary power and economic benefit is direct, as in the case of sub-tigers, our model has more explanatory power than where this politico-economic link is not so direct, as in the case of the tigers.

There has been speculation that the current anti-corruption focus in China is a veiled political purge that routinely comes with every new regime. If this were to be the case, then economic variables should not explain the downfall of corrupt officials in China well, since their destiny would have been determined only by political factors. In our study, we find a strong link between economic opportunities and corrupt officials, which is consistent with rent-seeking theory. However, at the tiger level, the economic model does not function as well as at the sub-tiger level, implying that some non-economic factors might be in play.

## Concluding remarks

In this work, we anchor our investigation of the determinants of official corruption in China in the rent-seeking theory. Given the political framework and the context of economic transformation in the country, we posit that certain economic activities in China present opportunities for rent seeking, resulting in official corruption. Due to the principal–agent dilemma, official corruption responds to the incentives to realise personal benefits through illegal transactions, a major facet of which is to accept bribes in exchange for providing benefits to rent seekers. We identified four kinds of economic activities and put them to a multivariate statistical test in the presence of other economic characteristics as well as political control variables. The four theoretical variables – mineral reserve, coal output, real estate and road

construction – all have a positive effect on the number of corrupt officials in the province, particularly at the levels of department director and deputy director.

Such evidence exposes some mechanisms for official corruption. In order to eradicate corruption, systematically, the discretionary power of officials must be reviewed, evaluated and monitored. Government intervention that potentially has official corruption as a by-product must be used with care. Government involvement in industries such as mining, construction and real estate must be rationalised to minimise economic opportunities for official corruption.

Kaufmann (2002) proposes a TIP strategy to fight against official corruption. Among all three components – transparency, incentives and prevention – Kaufmann (2002) emphasises the role of transparency. He dissects transparency into four key characteristics: accessibility, timeliness, relevance and quality<sup>6</sup> and puts forward several types of transparency reforms that have been proved to be effective worldwide: ensuring public access to government information, requiring certain types of meetings to be opened to the public, conducting public hearings for policies, regulations and laws, enhancing freedom of the press, inviting civil society to monitor government performance. The essential idea in Kaufmann's TIP strategy is that a country should focus on reforming the institution to reduce corruption, instead of using campaigns to fight official corruption.

Our statistical investigation demonstrates that economic opportunities accentuated by large demands for products ranging from housing to raw materials result in rent seeking and breed corruption that typically takes the form of government officials accepting bribes in exchange for favourable discretion. Without structural and institutional safeguards against corruption, a political campaign may not be effective in the long run; reformers may win a battle, but may lose the cause in the long haul. Legal requirements for transparency of both the decision process and government officials' personal property will play a deterrent role on rent-seeking behaviour. Regular auditing, clear and consistent penalties, and mechanisms that systematically remove the linkage of quid pro quo will all contribute to the reduction of official corruption. Without fundamental institutional reforms, economic opportunities will continue to give rise to collusion between officials and business, resulting in rent seeking and corruption: the eternal theme of greed and profits since the inception of mankind will not cease.

## Notes

1. In this paper, we use the word 'province' to refer to all three kinds of administrative units.
2. Almost all cases are associated with bribery taking; some were also concurrently about embezzlement, abuse of power, massive wealth without legitimate sources declared and illegal disclosure of classified information. There is a large variance in the announced amounts of bribery, for example, 246.7 million *yuan* (around US\$41.12 million) taken by Bai Enpei, Party Secretary of Yunnan (2001–2011) to 2.43 million *yuan* (around US\$0.41 million) taken by Zhang Lijun, Deputy Minister of Environment Protection.
3. The reason for this measure is that the value mineral reserve tends to change dramatically in the *China Statistical Yearbook*. Instead of taking an average of the reserve of a certain mineral over years, the maximum value is more reliable as an index of the existence of a mineral.
4. In this measure, we predict the tax revenue as a percentage of GDP from the output values in the primary, secondary and export sectors as a percentage of GDP. Then we divide the predicted tax revenue as a percentage of GDP with the observed tax revenue as a percentage of GDP. The ratio is defined as relative political extraction. If the ratio is larger than one, the government

collects more revenue than predicted by the economy, implying a strong government. If the ratio is smaller than one, the government collects less revenue than predicted by the economy, implying a weak government.

5. Since the paper focuses on analysing the corruption at the provincial level, we did not include the tigers who work at the central government and in committees.
6. Some specific examples of information that should be disclosed to the public include: audited accounts of the public sector, budgetary information from the government, macroeconomic statistics by the central bank and voting records of elections.

## Disclosure statement

No potential conflict of interest was reported by the authors.

## References

- Ali, A. M., & Isse, H. S. (2003). Determinants of economic corruption: A cross-country comparison. *Cato Journal*, 22, 449–466. Retrieved from <http://heinonline.org.ccl.idm.oclc.org/HOL/Index?index=journals/catoj&collection=journals>
- Alt, J. E., & Lassen, D. D. (2003). The political economy of institutions and corruptions in American states. *Journal of Theoretical Politics*, 15, 341–365. doi:10.1177/0951692803015003006
- Aidt, T. S. (2003). Economic analysis of corruption: A survey. *Economic Journal*, 113, F632–F652. doi:10.1046/j.0013-0133.2003.00171.x
- Aidt, T. S. (2011). Corruption and sustainability. In S. Rose-Ackerman & T. Søreide (Eds.), *The international handbook on the economics of corruption* (pp. 3–51). Cheltenham, UK: Edward Elgar Publishing.
- Arbetman, M., & Johnson, K. (2007). *Relative political capacity: Empirical and theoretical underpinnings*. Unpublished manuscript, University of Rhode Island, Kingston, Rhode Island.
- Arbetman, M., & Kugler, J. (1997). *Political capacity and economic behavior*. Boulder, CO: Westview Press.
- Baig, S., & Feng, Y. (2016). The democracy-governance-corruption nexus: Evidence from developing countries [Special issue]. *Pakistan Journal of Applied Economics*, 43–70.
- Buchanan, J. M. (1983). Rent seeking, noncompensated transfers, and laws of succession. *The Journal of Law and Economics*, 26(1), 71–85. doi:10.1086/467026
- Caselli, F. (2006). *Power struggles and the natural resource curse* (LSE, CEPR, and NBER working paper). Retrieved from <http://eprints.lse.ac.uk/4926/1>
- Dreher, A., & Herzfeld, T. (2005). *The economic costs of corruption: A survey and new evidence*. Unpublished manuscript, Heidelberg. doi:10.2139
- Feng, Y. (2006). Sources of political capacity: A case study of China. *International Studies Review*, 8, 597–606. doi:10.1111/j.1468-2486.2006.00628.x
- Goel, R. K., & Nelson, M. A. (1998). Corruption and government size: A disaggregated analysis. *Public Choice*, 97(1–2), 107–120. Retrieved from <https://link-springer-com.ccl.idm.oclc.org/journal/11127>
- Gerring, J., & Thacker, S. C. (2004). Political institutions and corruption: The role of unitarism and parliamentarism. *British Journal of Political Science*, 34, 295–330. doi:10.1017/S0007123404000067
- Gong, X. B. (1991). 贪污贿赂犯罪对策论 [On measures to counter criminal corruption and bribery]. Beijing: Law Press.
- Hodler, R. (2006). The curse of natural resources in fractionalized countries. *European Economic Review*, 50, 1367–1386. doi:10.1016/j.eurocorev.2005.05.004
- Huntington, S. (1968). *Political order in changing societies*. New York, NY: Yale University Press.
- Jain, A. K. (2011). Corruption: Theory, evidence and policy. *DICE Report* 9(2), 3–9. Retrieved from [https://search-proquest-com.ccl.idm.oclc.org/publication/publications\\_136135?accountid=10141](https://search-proquest-com.ccl.idm.oclc.org/publication/publications_136135?accountid=10141)
- Kaufmann, D., & Kraay, A. (2002). *Growth without governance*. Retrieved from World Bank website <http://elibrary.worldbank.org/doi/abs/10.1596/1813-9450-2928>
- Kaufmann, D. (2002). *Transparency, Incentives and Protection (TIP) for corruption control and good governance: Empirical findings, practical lessons, and strategies for action based on international*

- experience. *Background paper presented at Tsinghua University-Carnegie Conference on Economic Reform and Good Governance: Fighting Corruption in Transition Economies*, Beijing, China.
- Kenny, C. (2009). Transport construction, corruption and developing countries. *Transport Reviews*, 29(1), 21–41. doi:10.1080/01441640802075760
- Khan, M. (2006). Determinants of corruption in developing countries: The limits of conventional economic analysis. In S. Rose-Ackerman (Ed.), *International handbook on the economics of corruption* (pp. 216–244). Cheltenham: Edward Elgar Publishing.
- Lambsdorff, J. G. (1999). *The transparency international corruption perceptions index 1999 – framework document*. Retrieved from Transparency International website [http://www.icgg.org/downloads/1999\\_CPI\\_FD.pdf](http://www.icgg.org/downloads/1999_CPI_FD.pdf)
- Lambsdorff, J. G., Taube, M., & Schramm, M. (2005). *The new institutional economics of corruption*. London and New York: Routledge Taylor & Francis Group.
- Lederman, D., Loayza, N. V., & Soares, R. R. (2005). Accountability and corruption: political institutions matter. *Economics and Politics*, 17(1), 1–35. doi:10.1111/j.1468-0343.2005.00145.x
- Leite, C., & Weidman, J. (1999). *Does mother nature corrupt? Natural resources, corruption, and economic growth* (Working Paper 99/85). Retrieved from International Monetary Fund website <https://www.imf.org/external/pubs/ft/wp/1999/wp9985.pdf>
- Liu, A. (1983). The politics of corruption in the People's Republic of China. *The American Political Science Review*, 77, 602–623. doi:10.2307/1957262
- Manion, M. (1996). Corruption by design: Bribery in Chinese enterprise licensing. *Journal of Law, Economics and Organization*, 12(7), 167–195. doi:10.1093/oxfordjournals.jleo.a023356
- Manion, M. (2004). *Corruption by design: Building clean government in mainland China and Hong Kong*. Cambridge, MA: Harvard University Press.
- Mathur, N., Meyer, J., & Piergallini, L. (2014). *The effects of China's spatial heterogeneity on corruptions* (Working Paper). United States: Department of Politics and Policy, Claremont Graduate University.
- Ministry of Transport of China. (2000). 公路建设市场准入规定 [Regulation of market entry of road construction]. Retrieved from [http://www.gov.cn/gongbao/content/2001/content\\_61331.htm](http://www.gov.cn/gongbao/content/2001/content_61331.htm)
- N'Zue, F. F., & N'Guessan, C. J. F. (2006). *The causality between corruption, poverty and growth: A panel data analysis* (Working Paper Series 122423). Retrieved from the Secretariat for Institutional Support for Economic Research in Africa website [http://pdf.usaid.gov/pdf\\_docs/PNADH629.pdf](http://pdf.usaid.gov/pdf_docs/PNADH629.pdf)
- Pei, M. X., & Kaufmann, D. (2007). *Corruption in China: How bad it is?* Retrieved from Carnegie Endowments for International Peace website <http://carnegieendowment.org/2007/11/20/corruption-in-china-how-bad-is-it/2028>
- Persson, T., & Tabellini, G. (2001). *Political institutions and policy outcomes: What are the stylized facts?* (Discussion Paper No. 2872). Retrieved from Centre for Economic Policy Research website [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=278115#](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=278115#)
- Rose-Ackerman, S. (1996). *The political economy of corruption – causes and consequences*. Retrieved from World Bank website <https://openknowledge.worldbank.org/handle/10986/11629>
- Rose-Ackerman, S. (1999). Political corruption and democracy. *Connecticut Journal of International Law*, 14, 363–378. Retrieved from <http://heinonline.org.ccl.idm.oclc.org/HOL/Contents?handle=hein.journals/conjil14&id=1&size=2&index=&collection=journals>
- Shleifer, A., & Vishny, R. W. (1993). Corruption. *The Quarterly Journal of Economics*, 108, 599–617. doi:10.2307/2118402
- Tanzi, V. (1994). *Corruption, governmental activities, and markets*. Retrieved from IMF website <https://www.imf.org/en/Publications/WP/Issues/2016/12/30/Corruption-Governmental-Activities-and-Markets-1912>
- Torvik, R. (2002). Natural resources, rent seeking and welfare. *Journal of Development Economics*, 67, 455–470. doi:10.1016/S0304-3878(01)00195-X
- Treisman, D. (2000). The causes of corruption: A cross-national study. *Journal of Public Economics*, 76, 399–457. doi:10.1016/S0047-2727(99)00092-4
- Treisman, D. (2007). What have we learned about the causes of corruption from ten years of cross-national empirical research? *Annual Review of Political Science*, 10, 211–244. doi:10.1146/annurev.polisci.10.081205.095418



Wu, J. L. (1988). '寻租'理论与我国经济中的某些消极现象 [Rent-seeking theory and some negative phenomena in China's economy]. *The Comparison of Economic and Social System*, 5, 1–2. Retrieved from <http://www.cqvip.com/read/read.aspx?id=1002664837>

Zhu, J. N. (2012). The shadow of the skyscrapers: Real estate corruption in China. *Journal of Contemporary China*, 21, 243–260. doi:10.1080/10670564.2012.635929

## Appendix 1. Nomenclature of administrative levels in China

Administrative level	Examples
State	Party General Secretary, State President and Vice President, Members of the Standing Committee of Political Bureau, Chairman of Central Military Commission, Premier Minister, Chairman of Chinese People's Political Consultative Conference (CPPCC)
Deputy State	Member of the Political Bureau of CPC Central Committee, Head of Secretariat of the Central Committee, Head of the CPC Central Commission for Discipline Inspection, Head of Central Political and Legal Committee, Vice Chairman of Central Military Commission, Vice Chairman of the CPPCC National Committee, Vice Chairman of the NPC Standing Committee, Vice Premier of the State Council, State Councillor, General Attorney of the Supreme People's Procuratorate, Chief Justice of Supreme People's Court
Province/Ministry	Provincial level: Provincial Party Secretary and Governor, Chairman of Provincial CPPCC, Chairman of Provincial People's Congress, Chief Executive of the Special Administrative Region, Political Commissar and Commander State level: Head of Ministries and Commissions, Propaganda Minister, Minister of the Central Organization Department, the Minister of the Central United Front Work Department, Head of the Central Party School, Chief of Staff of the CPC Central Committee
Deputy Province/Ministry	City level: Mayor of Sub-Provincial Cities, Secretary of Sub-Provincial Districts Provincial level: Deputy Secretary, Member of Provincial Committee, Deputy Governor, Vice Chairman of CPPCC, Deputy Director of the Provincial People's Congress and the Provincial People's Congress Standing Committee, Deputy Secretary of the Municipality and the National Deputy Ministers
Department/Bureau	State level: Deputy of Ministries and Commissions, Head of National Bureaus City level: Party Secretary, Mayor, Chairman of People's Congress, Chairman of CPPCC, Vice-Mayor of Sub-Provincial City Provincial level: Head of Provincial Subordinate Units
Deputy Department/Bureau	State level: Head of Department under Ministries and Commissions City level: Deputy Party Secretary, Vice-Mayor, Vice Chairman of the Municipal People's Congress, Vice Chairman of Municipal CPPCC, Head of Bureaus of Sub-Provincial Cities Provincial level: Deputy of Provincial Subordinate Units State level: Deputy of Ministries and Commissions Subordinate Units

## Appendix 2. Definition, measurement and data source of variables

Variable	Definition	Measurement	Data source
Corrupt officials ( <i>officials</i> )	The number of corrupt officials published in the official website of China's Central Commission for Discipline and Inspection, with a ranking at or higher than <i>tingjujifuzhi</i>	Person	China's Central Commission for Discipline and Inspection
Tigers	The number of corrupt officials who ranked above <i>tingjujizhengzhi</i>	Person	China's Central Commission for Discipline and Inspection
Sub-tigers	The number of corrupt officials who are appointed and managed by the department of organisation of the province, such as those officials who ranked <i>tingjujizhengzhi</i> and <i>tingjujifuzhi</i>	Person	China's Central Commission for Discipline and Inspection
Mineral ( <i>minl</i> )	It consists of ensured reserves of iron, manganese, titanium ore, chromium ore and vanadium	10 million tons	<i>China Statistical Yearbook</i>
Coal ( <i>coal</i> )	The output of coke produced by each province	10 million tons	<i>China Statistical Yearbook</i>
Real estate ( <i>rlst</i> )	The final results calculated at market prices and produced in a country (or region) during a given period by all resident units engaged in real estate	100 billion yuan	<i>China Statistical Yearbook</i>
Road ( <i>road</i> )	The length of road in 2012 minus the length of road in 2003 of each province, divided by the area of the province	1000 km	<i>China Statistical Yearbook</i>
Population ( <i>pop</i> )	The population refers to the population number at 24 pm, 31 December of each province	10 million persons	<i>China Statistical Yearbook</i>
GDP per capita ( <i>gdppc</i> )	The quotient between nominal GDP and population of each province	1000 yuan	<i>China Statistical Yearbook</i>
GDP per capita growth ( <i>growth</i> )	The growth rate of GDP per capita	Percentage	<i>China Statistical Yearbook</i> and secondary calculation
Private assets ( <i>prvt</i> )	Total assets refer to all resources that are owned or controlled by private enterprises	100 billion yuan	<i>China Statistical Yearbook</i>
Fiscal transparency ( <i>trn</i> )	Measures the comprehensiveness, clarity, reliability, timeliness and relevance of public reporting on the past, present and future state of public finances, which is critical for effective fiscal management and accountability (International Monetary Fund)	Unit	Shanghai University of Finance and Economics
Relative political extraction ( <i>RPE</i> )	Estimates the government's political capacity to extract resources from the society against its expected value based on economic model's estimation. In mathematical form: $RPE = \text{actual government revenue} / \text{predicted government revenue}$	Percentage	<i>China Statistical Yearbook</i>
Distance to Beijing ( <i>dist</i> )	The distance between the capital city of each provincial administrative division and Beijing	1000 km	<i>Baidu</i>