



# Causes of corruption: Evidence from China

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## ABSTRACT

This study explores the causes of corruption in China using provincial panel data. Using both fixed effects and instrumental variables approaches, we find that provinces with greater anti-corruption efforts, higher educational attainment, historic influence from Anglo-American church universities, greater openness, more access to media, higher relative wages of government employees and a greater representation of women in the legislature are markedly less corrupt; whereas social heterogeneity, regulation and resources abundance breed substantial corruption. We also find that fiscal decentralization depresses corruption significantly. Finally, we identify a positive relationship between corruption and economic development in China, which is driven primarily by the transition to a market economy.

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## 1. Introduction

Since the establishment of the People's Republic of China in 1949, corruption has vexed the national leadership. Prior to 1978, attempts to control corruption were made primarily through mass movements, and occasionally by severe deterrents such as the 1952 execution of two senior officials, Qingshan Liu and Zishan Zhang. Since the launch of economic reforms, corruption has become even more widespread and exists at every level of China's political system. Even the Chinese government has admitted that corruption “is now worse than during any other period since New China was founded in 1949. It has spread into the Party, into Government administration and into every part of society, including politics, economy, ideology and culture” (Liang, 1994, p. 122). The seriousness of this problem is exemplified by the recent charges against three members of the Politburo, Xitong Chen, Liangyu Chen and Xilai Bo.<sup>1</sup>

Corruption in contemporary China, the largest transitional and developing country, has generated much literature, in sociology, political science and economics (Cai, Fang, & Xu, 2011; Gong, 2006; Wedeman, 2004; White, 1996; Yao, 2002). This research has identified several possible causes of corruption, including political institutions, the judicial system and the cultural environment. However, no empirical study yet exists that comprehensively analyzes the economic underpinnings of corruption in China. Rather, the majority of extant studies on the causes of corruption are cross-national investigations that use subjective survey data (Bertrand &

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<sup>1</sup> It is reported that Bo's wife, Kailai Gu, planned to transfer money overseas, and poisoned the British businessman Neil Heywood after he threatened to expose her plan.

Mullainathan, 2001; Knack, 2006; and Treisman, 2000). As Treisman (2007) admits, however, perception-based data actually reflect impressions of corruption intensity rather than corruption itself, meaning that the data are correlated with survey respondents' beliefs and other social and economic conditions. Moreover, the substantial number of unobservable or unmeasurable differences in institutions and cultures between countries makes it difficult for cross-country analyses to solve the problem of omitted variable bias.

Such disadvantages in cross-country research can be mitigated by the use of an objective within-country data set that eliminates the subjective data bias and, despite some regional differences, also provides a higher level of homogeneity that moderates the omitted variable bias. Surprisingly, few studies on the causes of corruption employ within-country data. Using similar American state-level data sets, Goel and Nelson (1998) and Fisman and Gatti (2002a) investigate the effect on corruption of government size and decentralization respectively. Also using U.S. data, Leeson and Sobel (2008) find that states struck frequently by natural disasters tend to be more corrupt because disaster relief increases resources available for abuse. Svensson (2003) and Cai et al. (2011) use firm-level data to explore the “micro” causes of corruption in Uganda and China respectively. Specifically, Cai et al. (2011) investigate the institutional causes of corruption among Chinese firms, although they mainly focus on the negative effect of corruption on firm productivity.

In this paper, we adopt both fixed-effect and instrumental variable approaches to identify the causes of corruption in China using provincial panel data. Besides confirming most cross-country findings in a more controlled setting, our study makes three important contributions to the literature. First, we identify a positive relationship between corruption and economic development in China, one that stems from the current transition process. Second, we obtain novel within-country evidence on the depressive effect of the Anglo-American colonial heritage, the contributory effect of abundant natural resources, and the depressive effect of female representation in politics on corruption. Third, we find that even in a non-democratic country, access to controlled media keeps corruption in check to some extent.

The paper is organized as follows: Section 2 reviews previous research on the causes of corruption, Section 3 empirically determines the causes of corruption in China, and Section 4 presents our concluding remarks.

## 2. Determinants of corruption

According to Jain (2001), there are three prerequisites for corruption: bureaucratic discretionary power, the association of this power with economic rents, and deterrence as a function of the probability of being caught and penalized. Whereas the first two preconditions determine the benefits of corruption, the third influences the cost of corruption; therefore, regional characteristics that affect these preconditions determine its local incidence (Becker, 1968).

Bureaucratic discretionary power over the allocation of resources is particularly important for the existence of corruption and, according to Rose-Ackerman (1978), frequently arises during the enforcement of regulations. That is, because bureaucrats can assign themselves the discretion to distribute resources when setting and implementing regulations, more regulations mean more discretionary power and thus a higher incidence of corruption. In contrast, levels of corruption can be expected to decrease if controlled economies become more marketized. Governmental discretionary power can also be influenced by decentralization, although the relationship between decentralization and corruption is still being debated. According to Brennan and Buchanan (1980) and Weingast (1995), decentralization introduces competition between local governments, thereby reducing bureaucratic profits from corruption. On the other hand, Shleifer and Vishny (1993) argue that since decentralization causes the dispersion of government power, bureaucrats who are not coordinated will over-extract rents from firms. Treisman (2000), using a dummy variable that reflects whether a state is federal, finds that federal states are seen as more corrupt. Fisman and Gatti (2002b), however, provide cross-country evidence that fiscal decentralization in government expenditure is significantly correlated with lower corruption. Using American data, they also identify a positive relationship between corruption and the proportion of a state's expenditure derived from federal transfers (Fisman & Gatti, 2002a).

Obviously, rational individuals pay bribes to government officials only if they can reap higher benefits from doing so. Hence, economic rents related to discretionary powers are a necessary condition for corruption. Indeed, Ades and Di Tella (1999) show that countries where firms have higher rents tend to be more corrupt. One concentrated and easily expropriable activity of particularly high rents is natural resource exploitation (Sachs & Warner, 2001), which echoes Leite, Weidmann (1999) empirical finding that the incidence of corruption depends positively on natural resource abundance. Treisman (2000), on the other hand, finds no strong evidence that fuel and mineral exports are positively correlated with corruption. Another source of economic rent is a lack of competition: economic rents decrease when economic activities are marked by intensive competition. Ades and Di Tella (1996, 1999) use the country's openness measured by the share of imports in the GDP to indicate firms' external competition, and find that economic openness is negatively correlated with levels of corruption. Treisman (2000) and Gerring and Thacker (2005) also identify a similar relationship between trade openness and corruption.

The deterrence of corruption is a joint function of the probability of detection and punishment once caught, a probability that is affected by several factors. First, higher income levels accelerate the spread of education and democratic institutions, thereby enabling individuals to better identify corrupt behaviors and punish official malfeasance. Regions with richer and more educated citizens are assumedly less corrupt. According to Treisman (2007), the negative relationship between the incidence of corruption and income level is the strongest and most consistent finding of empirical studies on corruption (see also Ades & Di Tella, 1999; La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1999; Treisman, 2000). The probability of being caught also depends on the effectiveness of the country's legal system. For instance, La Porta et al. (1999) argue that the common law systems in Britain and its former colonies are more effective in protecting property rights and enforcement than civil law systems, which would imply that the probabilities of

corruption being exposed are higher in common law countries. Treisman (2000) likewise finds that Britain and its former colonies have substantially lower levels of corruption than other countries; however, Pellegrini and Gerlagh (2008) find no such linkage.

Economic and social heterogeneity may also be indirect determinants of the probability of detection and thereby affect corruption. For example, You and Khagram (2005) argue that “the poor are more vulnerable to extortion and less able to monitor and hold the rich and powerful accountable as income inequality increases” (p. 136). Thus income inequality enables the latter to abuse their power for private gain and, as the authors confirm through cross-country analysis, promotes higher levels of corruption. Husted (1999), on the other hand, finds no such relationship between income inequality and corruption. One social heterogeneity factor with the potential to cause corruption is ethnic fractionalization, which may lead to corrupt officials being protected for political reasons by their own ethnic groups. For example, Glaeser and Saks (2006) find evidence of a positive correlation between corruption levels and racial division in U.S. states, although neither Treisman (2000) nor Pellegrini and Gerlagh (2008) do.

Press freedom also plays an important role in corruption detection because independent journalists have incentives to investigate its presence or absence. Therefore, as a particular mechanism of external control, press freedom appears to reduce corruption: firms and individuals can reveal corrupt behavior to a journalist and this possibility of media reporting increases the costs of corruption for bureaucrats (i.e., increases the probability of detection). In other words, the media can be seen as a platform for voicing complaints (Brunetti & Weder, 2003), and, as Adsera, Boix, and Payne (2003) show, even the “free circulation of a daily newspaper” (their interaction term between a democratic measure and newspaper circulation) is negatively correlated with corruption (p. 455). Likewise, Brunetti and Weder (2003) and Freille, Haque, and Kneller (2007) empirically show that a high level of press freedom is associated with a low incidence of corruption, while Chowdhury (2004) emphasizes that press freedom controls corruption via the channel of democracy.

Several interesting papers also address the effect of gender on corruption. For example, Dollar, Fisman, and Gatti (2001) and Swamy, Knack, Lee, and Azfar (2001) observe that countries with a larger share of women in parliament or government tend to have less corruption, and Swamy et al. (2001) provide micro-evidence that women are less tolerant of bribe acceptance. According to Paternoster and Simpson (1996), women may be more risk averse and hence perceive a larger probability of being caught for being corrupt. Sung (2003), on the other hand, argues that “the observed association between gender and corruption is spurious and mainly caused by its context, liberal democracy — a political system that promotes gender equality and better governance” (p. 703). Torgler and Valev (2010), however, find that women are significantly less likely to agree that corruption is justified even when different time periods are investigated and opportunity factors are controlled for.

The effect of punishment on corruption levels is difficult to test because punishment is not always comparable across countries. However, higher wages imply higher opportunity costs when officials are ousted due to corruption, and van Rijckeghem and Weder (2001) find that in developing countries, a higher ratio of civil service wages to manufacturing wages is significantly correlated with a lower level of corruption. Treisman (2000), however, finds no clear evidence that higher government wages depress corruption.

The determinants of corruption identified in previous studies are summarized in Table 1 to provide a clear lead in to our empirical analysis. Positive and negative signs in the figure represent respectively the positive and negative relationship between corruption and its determinants as suggested by the literature.

**Table 1**  
Determinants of corruption.

Incidence of corruption			
Cost of corruption		Benefit of corruption	
Determinants of corruption	Relationship	Determinants of corruption	Relationship
Income	—	Fiscal decentralization	—
Education	—	Regulation	+
British colonial heritage	—	Trade openness	—
Economic and social heterogeneity	+	Resource abundance	+
Relative wage	—		
Media	—		
Female representation in legislature	—		

### 3. Empirical analysis

#### 3.1. Data and methodology

We explore the causes of corruption in China using a province-level data set composed of information from all provincial areas in mainland China during the period 1998 to 2007. The data set covers 22 provinces, 5 autonomous regions and 4 municipalities but excludes data from Hong Kong, Macao and Taiwan. We derive the corruption measure for this data set – the number of registered cases of corruption per 100,000 people each year – by collecting the number of annual registered cases of corruption in the procurator's office by region (listed in the China Procuratorial Yearbooks) and then dividing this number by the regional

**Table 2**

Average annual registered cases of corruption per 100,000 people across regions in China (1998–2007).

Region	Average annual registered cases per 100,000 pop.	Region	Average annual registered cases per 100,000 pop.	Region	Average annual registered cases per 100,000 pop.
Tianjin	5.01	Shaanxi	3.15	Yunnan	2.61
Heilongjiang	4.77	Qinghai	3.08	Hunan	2.59
Jilin	4.5	Ningxia	3.08	Hainan	2.59
Liaoning	4.12	Hubei	3.05	Beijing	2.59
Shanxi	3.83	Guizhou	2.95	Chongqing	2.49
Hebei	3.67	Zhejiang	2.9	Anhui	2.36
Shandong	3.61	Inner Mongolia	2.77	Sichuan	2.35
Xinjiang	3.41	Shanghai	2.77	Gansu	2.05
Fujian	3.4	Jiangsu	2.71	Guangdong	2.05
Henan	3.35	Guangxi	2.64	Tibet	1.77
Jiangxi	3.29				

population.<sup>2</sup> To ensure comparability of the corruption data, we use only corruption data from 1998 to 2007 because until the Fifth Session of the Eighth National People's Congress of China passed the 1997 Criminal Law (which includes Chapter VIII: Crimes of Embezzlement and Bribery), the definition of corruption-related crimes fluctuated. The resulting average regional corruption data are listed in Table 2. We choose conviction data<sup>3</sup> specifically because they offer a less subjective measure of corruption, enable us to work with longer time spans, and are not subject to problems of sampling error and/or survey non-response (Glaeser & Saks, 2006). On the other hand, the conviction rate is driven by the quality of the detection process; this weakness, however, may not be important for our current study because the quality of local judicial systems in China is basically homogeneous and our regressions control for local anti-corruption efforts.<sup>4</sup>

Our baseline specification for investigating the causes of corruption resembles that of Glaeser and Saks (2006):

$$\text{Registered cases of corruption} = \alpha + \beta \cdot \text{income} + \gamma \cdot \text{education} + \delta \cdot \text{anti} - \text{corruption} + \eta \cdot \text{other regional characteristics} + \text{error term.}$$

This specification measures regional income as the logarithm of real gross regional product (GRP) per capita, and educational levels as the proportion of the regional population over six years of age that has completed a college degree. We also control for anti-corruption efforts because provincial registered cases of corruption may reflect local government efforts to fight corruption (Treisman, 2007); that is, since the legal systems in different Chinese regions are the same, any differences in anti-corruption efforts stem from the individual regions' legal enforcement. Like Goel and Nelson (1998), we proxy regional anti-corruption efforts by the real per capita expenditure by local government on police, procuratorate, court and judiciary.<sup>5</sup> Among the other regional characteristics are media coverage, Anglo-American colonial heritage, income distribution, racial fractionalization, officials' relative wage, women representation in politics, fiscal decentralization, government regulation, natural resource abundance, and trade openness, which we will successively introduce into our regressions as the potential determinants of corruption. The detailed description of these variables is discussed in Table A1. We also control for differences between North and South China by adding a geographic dummy (North)<sup>6</sup> into the pooled OLS regressions and, whenever possible, use one-year lagged values of the explanatory variables in our panel regressions to account for the fact that registered cases of corruption in one year actually reflect the number of corrupt acts committed previously but detected in that year.

To identify the determinants of corruption in China, we must first address two potential problems in our estimations: multicollinearity (see the correlation matrix in Table A2) and the endogeneity problem. To alleviate the multicollinearity in our regressions, we first adopt a basic specification that in our panel analysis controls the condition numbers and variance inflation factors of regressions lower than 100 and 10, respectively. We therefore assume that, as a rule of thumb, there is no serious multicollinearity in these regressions (Hair, Anderson, Tatham, & Black, 1995). In regressions using the full specification in which

<sup>2</sup> We also replicate our provincial analysis using an alternative corruption measure: the provincial number of officials investigated in registered cases on corruption per 100,000 population. Since this corruption measure is only available in the 2003 to 2007 period, we do not report the estimation results here; however, the results are quite similar.

<sup>3</sup> Theoretically, the conviction rate and the number of registered cases of corruption are different. However, in China they are likely to be highly correlated, if not identical. In most cases in China, suspect officials are first investigated by the discipline inspection commission of the Chinese Communist Party and its local branches. Only after they have obtained enough evidence, the discipline inspection commission and its local branches will refer corrupt cases to the procuratorates, and the procuratorates will then register the cases. Furthermore, the courts and the procuratorates are both controlled by the Chinese government. Therefore in only very few circumstances the courts will reject public prosecutions against corrupt cases.

<sup>4</sup> See also Goel and Nelson (1998), Fisman and Gatti (2002a), and Glaeser and Saks (2006).

<sup>5</sup> To validate this proxy, we need to assume that government expenditures on anti-corruption will be high if the expenditures by local government on police, procuratorate, court and judiciary are high, which seems reasonable.

<sup>6</sup> The dummy variable takes into account the cultural difference between North and South China, which may be driven by individualism, one of Hofstede's five cultural dimensions (Hofstede & Hofstede, 2005). People in North China are believed to be more collectivistic than people in South China (Eberhard, 1965). As Banfield (1958) and Hooper (1995) have identified the link between collectivism and official corruption in Spain and Italy respectively, we predict here that the high level of collectivism might lead to more frequent incidences of corruption in North China.

severe multicollinearity is detected, we drop one or more collinear variables<sup>7</sup> while still retaining the baseline specification to minimize specification bias. Admittedly, it may be argued that dropping offending variables may produce a specification bias that is potentially worse than multicollinearity; however, other methods for dealing with multicollinearity – for example, model re-specification, ridge regression or data reduction techniques like principal component analysis – are not applicable in our case. Moreover, our results indicate that removing select collinear variables from the regressions has little effect on the remaining parameter estimates, suggesting that it does not produce significant specification bias and is thus a justifiable method for mitigating multicollinearity.

To address the more important problem of endogeneity, which is the key to our identification of the determinants of corruption in China, we use two strategies. First, we control for unobserved regional characteristics that influence both corruption and its determinants by including regional fixed effects in our panel regressions and second, we adopt an IV approach whenever necessary to identify the causal effects of the corruption determinants. As regards the first, because Mo (2001, p.70) describes corruption as “an institutional problem that lasts for a long period” and since the major source of potential bias in our regressions may be time-invariant historical factors, we choose fixed-effect regressions as the most suitable tool for investigating the relationship between corruption and its determinants. Some corruption determinants, however, as well as several instruments used for them, are themselves historical factors and hence time invariant, so standard fixed-effect regressions do not work in these cases. We thus develop a unified framework for identifying the causality between corruption and its determinants. Specifically, following Li and Hou (2003), we categorize Chinese provinces into eight groups (Northeastern China, Northern Coastal Areas of Seaboard of China, Eastern Coastal Areas of China, Southern Coastal Areas of China, Middle Reaches of the Yellow River, Middle Reaches of the Yangtze River, Southwestern China and Northwestern China) according to their geographic similarity, natural resource endowments, economic development, social structure and cultural traditions. We then perform pooled OLS regressions, which include both regional fixed effects (for the eight areas) and year fixed effects, to identify the causes of corruption in China.<sup>8</sup> Because Chinese provinces, especially neighboring provinces, are to a large extent homogeneous, regional fixed effects can capture most provincial characteristics while still enabling investigation of the time-invariant determinants of corruption in China. In fact, the consistency between the results for the standard fixed-effect regressions (applied when the explanatory variables are all time variant) and those for our regional effects measure validates our approach.<sup>9</sup> Fixed-effect regressions, however, do not necessarily identify the causal effects on corruption of its determinants; that is, they cannot guarantee causality when omitted time-variant factors affect both corruption and its determinants. Therefore, as discussed in more detail below, we adopt an IV approach whenever necessary to identify the causal effects of the corruption determinants.

We first investigate the determinants of corruption in China using a baseline specification that allows for a comparison with the findings of Glaeser and Saks (2006), as well as an assessment of specification robustness. We then further test the specification's robustness with joint estimates that use the full specification.<sup>10</sup> It is worth noting, however, that the multicollinearity problem becomes more serious in our 2SLS estimation (i.e., the standard errors of the estimates become large and there is more inconsistency in the impact of some explanatory variables).<sup>11</sup> Therefore, we again gradually exclude several collinear variables from the full specification to mitigate multicollinearity while retaining important explanatory variables to minimize specification error. Specifically, we first remove the regulation variable, which has the highest correlation coefficient with income of all the explanatory variables (see Table A2). Next, we exclude openness, which is highly correlated with several other explanatory variables, and finally we drop education, which is also highly correlated with some other independent variables. Even such a reduced specification, however, is still among the richest in the causes of corruption literature.

## 3.2. Findings

### 3.2.1. Deterrence and corruption

To empirically test the effect of deterrence on corruption, we first examine the effect of income on corruption. The results for the pooled OLS, fixed-effect OLS and fixed-effect 2SLS are presented in Tables 3, 4 and 5, respectively. In determining the effect of income, to address the potential omitted variable bias and the reverse causality between income and corruption identified by Treisman (2000) and Glaeser and Saks (2006), we must find an instrumental variable for regional income level. Like Hall and Jones (1999), Treisman (2000) and Rappaport and Sachs (2003), we instrument provincial income level using a geographic characteristic, the provincial capital's latitude (latitude), primarily because historically China's developed areas – namely, the middle and lower reaches of the Yellow River since the Han Dynasty, the middle and lower reaches of the Yangtze River since the Song Dynasty, and Northeastern provinces since the end of the Qing Dynasty – are in relatively high latitudes. Similar to Treisman (2000) and You and Khagram (2005), we cannot think of any mechanism by which latitude could directly affect corruption especially when both time-invariant institutional factors and the time-variant variables such as trade openness which might be the potential channels through which latitude affects corruption are controlled in the following regressions; indeed latitude is insignificant when we add it into our main equation as a regressor. We therefore believe that our choice of instrument is valid.

<sup>7</sup> We retain here the condition numbers of those regressions lower than 300, which, as a rule of thumb, indicate only moderate multicollinearity.

<sup>8</sup> For convenience, we refer to this method as the fixed-effect approach throughout the paper (although it is not the standard fixed-effect approach).

<sup>9</sup> To save space, we do not report the results of our standard fixed-effect regressions. These findings are available upon request.

<sup>10</sup> We do not include the income distribution variable, Gini coefficient, in our full specification because the Gini coefficients for Chinese provinces are only available before 2001, so including them would sharply reduce our sample size and aggravate the multicollinearity problem.

<sup>11</sup> We present the full specification results in Column (12) of Table 5 nonetheless.

**Table 3**

Corruption and its determinants in China: pooled OLS estimation.

	Annual cases (1998–2007)											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Income	0.61*** (0.11)	0.54*** (0.11)	0.75*** (0.16)	0.98*** (0.20)	0.57*** (0.13)	0.55*** (0.13)	0.59*** (0.11)	0.60*** (0.11)	1.00*** (0.16)	0.64*** (0.11)	0.62*** (0.11)	1.02*** (0.19)
Education	0.045** (0.018)	0.092*** (0.021)	0.049*** (0.018)	0.019 (0.060)	0.046** (0.019)	0.047*** (0.018)	0.062*** (0.018)	0.046** (0.018)	0.074*** (0.022)	0.050*** (0.017)	0.049*** (0.019)	0.13*** (0.025)
Anticorruption	−0.0070*** (0.00073)	−0.0071*** (0.00069)	−0.0076*** (0.00088)	−0.0077* (0.0043)	−0.0069*** (0.00072)	−0.0069*** (0.00075)	−0.0072*** (0.00076)	−0.0067*** (0.00080)	−0.0095*** (0.0012)	−0.0065*** (0.00075)	−0.0069*** (0.00080)	−0.010*** (0.0013)
North	0.72*** (0.097)	0.69*** (0.096)	0.60*** (0.11)	0.80*** (0.15)	0.72*** (0.098)	0.75*** (0.11)	0.64*** (0.098)	0.72*** (0.097)	0.46*** (0.096)	0.49*** (0.13)	0.71*** (0.10)	0.11 (0.15)
Media		−0.0023*** (0.00059)										−0.0022** (0.00086)
Anglo-American			−0.15* (0.077)									−0.16** (0.079)
Gini				7.62*** (2.55)								
Dissimilarity					−0.16 (0.20)							−0.28 (0.23)
Wage						0.43 (0.39)						0.41 (0.34)
Female							−4.27*** (1.30)					−2.86** (1.40)
Decentralization								−0.015 (0.010)				−0.029*** (0.0046)
Regulation									−0.14*** (0.030)			−0.19*** (0.033)
Resource										0.050** (0.020)		0.045** (0.019)
Openness											−0.0013 (0.0036)	0.011** (0.0043)
Constant	−2.30** (0.98)	−1.80* (0.96)	−3.46*** (1.32)	−7.29*** (1.89)	−1.92* (1.13)	−2.32** (0.99)	−1.29 (0.91)	−2.22** (0.98)	−4.77*** (1.24)	−2.81*** (0.98)	−2.40** (0.96)	−4.49*** (1.45)
R-squared	0.33	0.35	0.34	0.37	0.33	0.33	0.36	0.33	0.37	0.35	0.33	0.46
Observations	310	308	310	120	310	310	310	310	307	310	310	305

Notes: Robust standard errors in parentheses; \*\*\*, \*\* and \* denote significance at 1%, 5% and 10%, respectively.

Unless otherwise noted, hereafter we use the one-year lagged values of the explanatory variables in the panel regressions.



**Table 4**

Corruption and its determinants in China: fixed effects OLS estimation.

	Annual cases (1998–2007)											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Income	0.56** (0.22)	0.55*** (0.20)	0.69*** (0.24)	0.68* (0.35)	0.64*** (0.21)	0.56*** (0.21)	0.39** (0.18)	0.60*** (0.22)	0.62*** (0.21)	0.59*** (0.21)	0.73*** (0.22)	0.76*** (0.17)
Education	0.029 (0.020)	0.10*** (0.017)	0.029 (0.019)	−0.062 (0.057)	0.0073 (0.021)	0.027 (0.020)	0.046*** (0.017)	0.029 (0.020)	0.057** (0.023)	0.023 (0.019)	0.065*** (0.019)	0.088*** (0.023)
Anticorruption	−0.0053*** (0.00081)	−0.0044*** (0.00061)	−0.0056*** (0.00080)	−0.0011 (0.0047)	−0.0047*** (0.00079)	−0.0052*** (0.00079)	−0.0048*** (0.00084)	−0.0049*** (0.00081)	−0.0070*** (0.0011)	−0.0043*** (0.00081)	−0.0029*** (0.00097)	−0.0030** (0.0014)
Media		−0.0048*** (0.00063)										−0.0017** (0.00081)
Anglo-American			−0.21*** (0.078)									−0.066 (0.073)
Gini				7.12** (3.57)								
Dissimilarity					0.82*** (0.23)							0.54** (0.26)
Wage						−0.54* (0.32)						−0.43 (0.32)
Female							−5.66*** (1.32)					−4.66*** (1.29)
Decentralization								−0.019*** (0.0058)				−0.025*** (0.0047)
Regulation									−0.12*** (0.035)			−0.090** (0.039)
Resource										0.054*** (0.013)		0.055*** (0.013)
Openness											−0.020*** (0.0037)	−0.0097** (0.0048)
Constant	−2.17 (1.94)	−2.62 (1.79)	−3.36 (2.10)	−4.51 (2.94)	−3.29* (1.93)	−1.58 (1.95)	0.28 (1.64)	−2.51 (1.95)	−1.96 (1.82)	−2.92 (1.89)	−4.34** (2.01)	−3.21** (1.58)
R-squared	0.56	0.62	0.57	0.60	0.57	0.56	0.60	0.56	0.57	0.58	0.58	0.68
Observations	310	308	310	120	310	310	310	310	307	310	310	305

Note: Robust standard errors in parentheses; \*\*\*, \*\* and \* denote significance at 1%, 5% and 10%, respectively.

**Table 5**

Corruption and its determinants in China: fixed effects 2SLS estimation.

	Annual cases (1998–2007)															
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Income	3.72*** (1.02)	2.50** (1.07)	4.14*** (1.07)	0.77 (1.02)	3.50*** (0.98)	3.11*** (1.04)	4.18*** (1.16)	3.44*** (0.91)	3.14* (1.78)	2.29*** (0.71)	3.52*** (0.99)	0.10 (0.58)	1.62** (0.74)	1.11* (0.65)	0.85*** (0.31)	2.56** (1.03)
Income*period																–1.53** (0.61)
Education	–0.22*** (0.075)	–0.083 (0.090)	–0.21*** (0.071)	– 0.27* (0.15)	–0.22*** (0.074)	–0.17** (0.074)	–0.26*** (0.085)	–0.20*** (0.065)	0.18* (0.10)	–0.15*** (0.055)	–0.013 (0.068)	0.17** (0.072)	–0.039 (0.066)	–0.031 (0.059)		–0.12 (0.11)
Anticorruption	–0.0046*** (0.0018)	–0.0044*** (0.0011)	–0.0063*** (0.0017)	0.013 (0.010)	–0.0040*** (0.0015)	–0.0046*** (0.0015)	–0.0046** (0.0019)	–0.0040** (0.0016)	–0.024*** (0.0088)	–0.0025* (0.0014)	0.0042 (0.0030)	–0.0096 (0.0060)	0.0029* (0.0017)	–0.0017* (0.00097)	–0.0019** (0.00083)	0.0050* (0.0028)
Media		–0.0029*** (0.0011)										–0.0044 (0.0029)	0.0023 (0.0014)	–0.00066 (0.00099)	–0.0011** (0.00054)	–0.00054 (0.0022)
Anglo-American			–0.48*** (0.13)									–0.11 (0.12)	–0.031 (0.084)	–0.10 (0.082)	–0.084 (0.071)	–0.046 (0.11)
Gini				19.3*** (7.08)												
Dissimilarity					1.81*** (0.49)							–0.0087 (0.53)	1.23*** (0.39)	1.12*** (0.34)	0.99*** (0.21)	1.57*** (0.56)
Female						–3.04* (1.59)						–2.61 (2.79)	–7.19*** (1.68)	–5.02*** (1.29)	–4.91*** (1.24)	–5.51*** (1.73)
Wage							–0.78 (0.64)					–0.10 (0.39)	–0.78** (0.34)	–0.59* (0.33)	–0.53* (0.30)	0.13 (0.61)
Decentralization								–0.034* (0.019)				–0.029*** (0.0084)	–0.031*** (0.011)	–0.023*** (0.0070)	–0.021*** (0.0046)	–0.044* (0.025)
Regulation									–1.25*** (0.44)			–0.33** (0.15)				
Resource										0.066*** (0.015)		0.037* (0.021)	0.081*** (0.016)	0.067*** (0.015)	0.063*** (0.012)	0.098*** (0.021)
Openness											–0.075*** (0.018)	0.018 (0.025)	–0.034*** (0.0093)			–0.012 (0.013)
Constant	–30.1*** (9.05)	–19.7** (9.36)	–33.8*** (9.47)	–8.20 (8.03)	–28.9*** (8.77)	–24.2*** (9.38)	–33.3*** (10.0)	–27.6*** (8.00)	–17.0 (13.4)	–18.0*** (6.35)	–30.5*** (8.96)	4.33 (5.54)	–11.4* (6.62)	–6.60 (5.78)	–4.34 (2.89)	–6.94 (8.90)
Hausman test	16.37 [0.63]												1.59 [0.99]			

(continued on next page)



**Table 5** (continued)  
Corruption and its determinants in China: fixed effects 2SLS estimation.

Annual cases (1998–2007)																
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
First stage regressions																
Variables instrumented	Coefficients of corresponding instrumental variables in first stage regressions															
Income	0.037*** (0.0029)	0.037*** (0.0028)	0.035*** (0.0029)	0.035*** (0.0060)	0.037*** (0.0030)	0.036*** (0.0028)	0.038*** [0.0030]	0.037*** (0.0029)	0.025*** (0.0034)	0.045*** (0.0031)	0.037*** (0.0030)	0.027*** (0.0044)	0.043*** (0.0040)	0.043*** (0.0037)	0.045*** (0.0036)	0.043*** (0.0042)
Education	3.76*** (0.37)	3.28*** (0.45)	3.89*** (0.37)	2.40*** (0.49)	3.71*** (0.35)	3.91*** (0.40)	3.83*** (0.39)	3.80*** (0.38)	3.58*** (0.40)	3.69*** (0.38)	3.74*** (0.37)	3.32*** (0.56)	3.29*** (0.45)	3.29*** (0.45)		3.31*** (0.45)
Gini				0.35*** (0.11)												
Regulation									−6.77*** (1.40)			−8.25*** (1.60)				
Openness											4.06*** (0.98)	6.56*** (0.94)	6.85*** (0.97)			6.87*** (0.96)
Income*period																0.018*** (0.0036)
Variables instrumented	F-test of excluded instrumental variables															
Income	163.81 [0.00]	122.92 [0.00]	131.70 [0.00]	12.59 [0.00]	139.81 [0.00]	167.51 [0.00]	164.20 [0.00]	157.77 [0.00]	104.27 [0.00]	195.13 [0.00]	109.05 [0.00]	48.75 [0.00]	54.51 [0.00]	80.34 [0.00]	153.24 [0.00]	40.90 [0.00]
Education	81.02 [0.00]	53.49 [0.00]	86.54 [0.00]	20.79 [0.00]	115.50 [0.00]	79.47 [0.00]	80.47 [0.00]	80.73 [0.00]	44.83 [0.00]	83.67 [0.00]	59.53 [0.00]	34.14 [0.00]	59.08 [0.00]	83.26 [0.00]		44.91 [0.00]
Gini				10.12 [0.00]												
Regulation									13.32 [0.00]			30.72 [0.00]				
Openness											19.44 [0.00]	16.38 [0.00]	18.89 [0.00]			14.64 [0.00]
Income*period																9.60 [0.00]
Variables instrumented	Partial R-squared of excluded instrumental variables															
Income	0.32	0.29	0.28	0.23	0.32	0.34	0.32	0.32	0.38	0.37	0.32	0.33	0.28	0.28	0.26	0.28
Education	0.62	0.48	0.63	0.37	0.65	0.62	0.62	0.62	0.61	0.62	0.63	0.44	0.46	0.46		0.46
Gini				0.24												
Regulation									0.21			0.45				
Openness											0.30	0.26	0.24			0.25
Income*period																0.14
Anderson canon.	19.35	9.33	18.20	17.87	21.53	14.16	20.30	22.23	9.08	28.97	20.73	10.57	17.89	17.58	80.93	13.92
Corr. LM statistic	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Observations	310	308	310	120	310	310	310	310	307	310	310	305	308	308	308	308

Note: Robust standard errors in parentheses; p-values in brackets; \*\*\*, \*\* and \* denote significance at 1%, 5% and 10%, respectively.

The results from the different estimations and specifications indicate that income significantly increases corruption in Chinese provinces<sup>12</sup> and the effect is fairly large. For example, according to the IV estimation using the baseline specification (Column (1) in Table 5), in terms of elasticity, a 1% increase in the GRP logarithm raises regional registered cases of corruption per 100,000 people by about 11.02%.

At first glance, this positive effect of income on corruption seems puzzling because it contradicts previous literature. However, such a result might be driven by the transitional nature of Chinese society; that is, because “the simultaneous processes of developing a market economy, designing new political and social institutions and redistributing social assets [creates] fertile ground for corruption” (World Bank, 2000, p. vii), countries making the transition to a market economy often experience unprecedented corruption (Levin & Satarov, 2000; Paldam & Svendsen, 2000). China began its transitional process when economic reform loosened up its economy; however, political reform has lagged behind. Therefore, in the absence of institutional and legal constraints, government continues to play an extensive role in China's economic environment. One unavoidable consequence of such involvement is corruption, a type of corruption that becomes more pervasive when government power is widened through increased economic activity. As a result, regions with higher income levels may be more corrupt.

On the other hand, Basu and Li (2000) predict theoretically that corruption levels in transitional countries will decrease after these nations establish or improve institutions, effectively checking the abuse of public office as the transition processes move on. Income level would then have a depressing influence on corruption. This prediction has been confirmed in several Eastern European countries (World Bank, 2000). We therefore conjecture that, with the establishment of good institutions, this phenomenon may diminish once the transition is completed. To examine this conjecture, we split the investigation period into two sub-periods – 1998 to 2002 and 2003 to 2007<sup>13</sup> – and create a dummy variable (period) to represent the second sub-period (2003–2007). According to the NERI index of marketization of Chinese provinces during 1998 to 2007, published by Fan, Wang, and Zhu (2010), institutional quality in all Chinese provinces has improved during the period 2003–2007 compared to the period 1998–2002 (see Table A3). Then in the IV regression using the rich specification (see Column (16) in Table 5), the interaction term between income level and the period dummy has a significantly negative effect on corruption, which indicates that the positive effect of income on corruption during the 2003–2007 period is substantially lower than that during the 1998–2002 period. This decrease in the positive effect of income on corruption in China may lead to the emergence of a negative effect of income on corruption in the future, although of course this remains to be seen.

To further determine the direction of causality between income and corruption, we perform a Hausman test. Like Treisman (2007) and Gundlach and Paldam (2009), we find that the main direction in the circular relationship between income and corruption in China is from income to corruption, and, since the Hausman tests (see Columns (1) and (13) in Table 5) show that the IV estimates do not differ systematically from the corresponding OLS estimates in Table 3, there is no significant upward bias caused by reverse causality. This result actually supports our explanation of the positive relationship running in the direction from income to corruption.

As the tables show, we also investigate the effect of education on corruption and, contrary to the literature, find that education has a seemingly positive effect on corruption in both the pooled OLS and fixed-effect regressions. We then instrument provincial education attainment by the middle-school student enrolment per 100 persons in 1952 (Middle). This instrumental variable certainly affects current education levels significantly. It is also exogenous for both historical and econometric reasons. For example, there is a possibility that past levels of educational attainment may directly affect past corruption levels and therefore current corruption levels. This, however, can be excluded in Chinese context. As we know, education is believed to check corruption because of the fact that people with more education are more willing and able to oversee officials and to take action when officials become corrupt. However, in the early decades of the People's Republic of China, less educated workers and peasants had much more political power than intellectuals (teachers and other educated people), the latter even being referred to as the “stinking ninth-class people” during the 1966–1976 Cultural Revolution. Therefore, during this period high education attainments were not likely to be correlated with low corruption levels in Chinese provinces since most educated Chinese were not able to monitor government officials.<sup>14</sup> Following similar logic, we can also exclude the possibility that education levels in 1952 could significantly affect current corruption by influencing past corruption determinants such as political institutions, government regulations and trade openness. To further guarantee the exogeneity of our instrumental variable, we econometrically control the potential factors associating our instrument with corruption in two ways. The observable factors such as regulation and trade openness are directly controlled for in our regressions while the unobservable (unmeasurable) factors such as past corruption and cultural and institutional background are controlled with regional fixed effects.

Our IV results (see Table 5) provide moderate evidence that education lowers corruption in Chinese provinces once income, anticorruption efforts and other variables are controlled for.<sup>15</sup> In effect, according to Column (1) in Table 5, a 1% increase in the

<sup>12</sup> Only in two 2SLS regressions does the income variable lose its significance because of multicollinearity, but it still retains its sign.

<sup>13</sup> We choose the five-year sub-period here mainly because that it is the longest sub-period based on our data structure to be able to capture the improvement of institutions. As we know, it takes time for institutions to evolve.

<sup>14</sup> In effect, many intellectuals were unjustifiably labeled as “Rightist” and lost their original positions in 1957 only because they criticized government policies or government officials.

<sup>15</sup> In several IV regressions, education loses its significance and even its sign (see Table 5) due primarily to the high correlation between education and some other explanatory variables.

proportion of the population over 6 that has completed college is associated with a 0.39% decrease in registered cases of corruption per 100,000 population, a finding that is both reasonable and consistent with the literature (e.g., Glaeser & Saks, 2006).

As shown in Tables 3, 4 and 5, our proxy for provincial anti-corruption efforts is, as expected, negatively correlated with corruption and, in most cases, significantly and robustly. This finding suggests that we may have effectively isolated the anti-corruption effort component from our corruption measure. It is also worth noting that our proxy is most probably exogenous because in China, public security organs, procuratorial organs and people's provincial courts are all directly under central government control. Hence, the budgetary expenditures of these organs must be approved by the central government even though most are actually spent by provincial governments. As a result, despite obvious differences across provinces, provincial expenditures on police, procuratorate, court and judiciary per capita are mainly exogenously decided by the central government.

In terms of the causal effect of media on corruption, mainstream media in China, including newspaper, radio and television, are fully controlled by the state, raising the question of whether media can be expected to act effectively as an external control of corruption in China (cf. the importance of a free press in Brunetti & Weder, 2003). Following Treisman (2007) and Pellegrini and Gerlagh (2008), we therefore investigate the effect of controlled media on corruption in China using the regional newspaper circulation per capita (Media) as a measure. Our results, shown in Tables 3, 4 and 5, are encouraging. We find consistent evidence in the pooled OLS, fixed-effect and IV regressions that media in China significantly depress corruption, although the media variable does lose significance in the IV regression using the full specification, which is not free of multicollinearity issues. However, if we drop the variables that are highly correlated with income – namely, marketization (regulation), education and trade openness – the media exerts a significantly negative effect on corruption (Column (15) in Table 5). As before, the removal of collinear variables from Regression (15) has little impact on the remaining parameter estimates, suggesting the absence of any significant specification bias.

We hence conclude that the media in China, even if controlled by the Chinese government, do exert negative influences on corruption. Though imposing censorship on the press, Chinese government advocates “supervision by public opinion” as its top leaders have realized that corruption, if not prevented, will destroy the party and subjugate a nation. In China, news media are permitted to disclose scandals so long as the disclosures do not substantially jeopardize the government leadership. Our results imply that anti-corruption efforts, as long as they are held within limits, can also be in the interest of non-democratic governments. This contrasts with Adsera et al. (2003) and Chowdhury's (2004) emphasis on the key role of democracy in media's effect on corruption. In terms of media size and its relation to corruption, according to Regression (2) in Table 5, a 1% increase in annual newspaper circulation per capita decreases corruption by about 0.04%.

Now we turn to explore the influence of Western colonialism, and specifically the Anglo-American church university heritage, on corruption in China. After China was beaten in a sequence of wars against foreign colonial powers during the late Qing Dynasty, the powers, headed by Britain, carved spheres of influence in China through a series of unequal treaties. Based on their own values, they influenced or even reconstructed local administration systems, including the legal system, infrastructure and education, within the domains they controlled. The persistence of these influences may be responsible for some of the regional differences in present-day China. Education in particular, as instituted by the British and Americans in China, may be a key channel for this historical influence (see Yang & Ye, 1993),<sup>16</sup> which we therefore proxy by the number of universities founded by British and American churches in each province before 1922 (Anglo-American).<sup>17</sup> According to the 1918–1921 general survey by the Special Committee on Survey and Occupation, China Continuation Committee (The China Continuation Committee, 2007), there were 14 such universities in China before 1922, distributed among Beijing, Shanghai, Shandong Jiangsu, Fujian, Hubei, Hunan, Guangdong and Sichuan provinces. Although forcibly incorporated into public universities in 1952 by the Chinese government, their influence may persist through their faculty members and graduates.

All baseline specification results in Tables 3, 4 and 5 show that, in line with Treisman's (2000) cross-country findings for British influence, provinces influenced by the Anglo-American church university heritage have lower levels of corruption than other provinces in China. Specifically, according to Regression (3) in Table 5, such provinces have 0.16 point fewer registered cases of corruption per 100,000 people on average. However, the Anglo-American variable, although it retains its sign, loses its significance in the full specifications of the fixed-effect and fixed-effect IV regressions. The explanation is that the time-invariant Anglo-American variable is strongly correlated with regional effects in our regressions. This leads to a severe multicollinearity problem causing the Anglo-American variable to lose its significance in full specifications. For this reason, Treisman (2000) and Pellegrini and Gerlagh (2008) both use OLS estimations to examine the relationship between British colonial heritage and corruption to circumvent the multicollinearity issue. We therefore conclude mainly based on our OLS results that the Anglo-American (educational) influence

<sup>16</sup> For example, in 1890, F.L. Hawks Pott, the president of Saint John's University in Shanghai, which was founded by the American Episcopal Church, stated that: “in our school, we trained China's future teachers and propagators, making them the leaders and comperes in the future and casting the greatest influences on the future China” (Yang & Ye, 1993, p. 289).

<sup>17</sup> The proxy is exogenous because, according to Chinese history, before 1922 church universities were primarily located in treaty ports, the port cities that were opened to foreign trade by the unequal treaties between Qing Dynasty and the western powers. It is obvious that foreign powers choose treaty ports mainly according to trade convenience and not the local institutional environment, which may affect local corruption levels.

does affect the level corruption in China, which is the first within-country evidence for the effect of British colonial heritage on corruption.

Next we investigate the role of economic and social heterogeneity in Chinese corruption. First, as shown in the fourth columns of Tables 3 and 4, we find that higher income inequality measured by Gini coefficients (Meng, Gregory, & Wang, 2005) significantly raises the incidence of corruption in China. To address the possibility of reverse causation from corruption to income inequality identified previous literature (Li, Xu, & Zou, 2000), we employ an IV approach using a lagged Gini coefficient: provincial Gini coefficient in 1986 (*Gini86*) as the instrument. This instrumental variable is exogenous since we have controlled both observable and unobservable factors other than current income inequality, which potentially relate past income inequality to current corruption in our regressions. Our IV findings reported in Column (4) of Table 5 indicate that a 1% increase in Gini coefficient increases provincial corruption by about 1.62%. However, as previously mentioned, we do not test the relationship between income inequality and corruption in the full specification because of the sharp decrease in sample size. Nevertheless, the results provide preliminary evidence that income equality substantially increases corruption in China, which is in line with prior cross-country findings.

Second, we test the impact of racial fractionalization on corruption in China, which is home to 56 recognized ethnic groups.<sup>18</sup> Given this diversity, even though Han ethnicity accounted for 92% of China's total population in the 2000 national census, we can examine the influence of racial fractionalization on corruption in the Chinese context. Following Glaeser and Saks (2006), we measure ethnic fractionalization in China using a dissimilarity index, calculated as one minus a Herfindahl concentration index,  $1 - \sum s_i^2$ , where  $s_i$  is the population share of ethnicity  $i$  from the national census in 2000. The fixed effects result in Column (8) supports our prediction: the dissimilarity index is positively associated with the local corruption level, indicating that ethnic fractionalization significantly increases corruption in Chinese provinces. Nevertheless, the effect, although significant, seems quantitatively small in terms of elasticity: a 1% increase in the dissimilarity index raises corruption by only 0.11%, which may reflect the fact that the Han ethnic majority predominates in the majority of Chinese provinces. We attribute this finding of ethnic fractionalization's contributory effect on corruption to two factors not addressed in prevailing interpretations. On the one hand, cadres belonging to ethnic minorities are selected mainly based on their loyalty to the country and ability to control their own ethnic groups rather than their incorruptibility. On the other hand, corrupt officials may be supported by their own ethnic group if they can defend group interests. This type of problem prevails especially in the five autonomous regions and at least three provinces – Yunnan, Guizhou and Qinghai – in which the Han nationality does not predominate.<sup>19</sup>

As regards the effect of the public sector's relative wage, which can be seen as a proxy for public officials' opportunity cost for corrupt behavior, we use the ratio of average government employee' standard wage to the regional average wage to measure the public sector's relative wage in Chinese provinces. Official's standard wages in the Chinese provinces sampled here are set by the central government based on inter-provincial differences in living standards and work conditions. Therefore, our relative wage variable is basically exogenous.<sup>20</sup> Based on the results given in Tables 3, 4 and 5, our evidence for the theoretical prediction that the relative wage is negatively correlated with the incidence of corruption is weak. It may be that in addition to their standard wage, Chinese officials receive various subsidies from the government offices that employ them, subsidies that, being a type of gray income, are not made public. Our relative wage ratios would therefore only partially reflect the officials' opportunity cost for corrupt behavior and consequently would have a weaker effect on corruption than actual relative wage ratios in Chinese provinces.

Next, following Dollar et al. (2001), we investigate the influence on corruption of the representation of women in the National People's Congress (NPC), the only legislative house in China.<sup>21</sup> Using the share of female NPC members in each province as the main explanatory variable, we find robust evidence that, consistent with the literature, Chinese provinces with a greater representation of women in the legislature tend to have lower levels of corruption. In terms of elasticity, a 1% increase in the representation of women in the NPC reduces corruption by about 0.22% (Column (6) of Table 5). Since China's centralized structure means little difference in liberal democracy across Chinese provinces, this finding may provide within-country evidence of a gender effect on corruption that is not driven by the concerns raised by Sung (2003, p. 703). Not only are differences, if any, controlled for by the inclusion of regional fixed effects, but the social status of women, the main determinant of female representation in the NPC, has been established historically in China. Therefore, our fixed-effect regressions, by controlling for

<sup>18</sup> In addition to the Han ethnic majority, 55 ethnic groups in China are recognized as ethnic minorities. Of these, minority groups, which like the Han majority can be found throughout the country, 18 had a population of over one million according to the 2000 national census.

<sup>19</sup> Other Chinese provinces such as Sichuan, Hunan, Hubei, Gansu, Jilin, Guangdong and Heilongjiang also contain autonomous areas of ethnic minorities and therefore to some extent experience the same issue.

<sup>20</sup> In China an official's actual income normally consists of two parts: standard wage and subsidies including post allowance and bonus. The official's standard wage is exogenously set by the central government while subsidies are endogenously determined by the local government. It is therefore possible that official's subsidies may be affected by local corruption level since corrupt officials often pay themselves more. However, we only employ the official's standard wage data here, which is exogenous.

<sup>21</sup> The main functions and powers of the NPC include making laws, delegating authority, policy formulation, and supervision of other governing organs. However, even if it has little real power as some scholars believe, its membership still reflects one's political status. As we can see, most Chinese political elites including top provincial leaders are members of the NPC. The share of female NPC members in Chinese provinces therefore indicates the female involvement in politics there whether the NPC acts as the "rubber stamp" or not.

economic development, educational attainment and regional fixed effects, can identify the causal effect of gender on corruption without any apparent time-variant factor influencing either corruption or female representation in the NPC. In any case, corrupt officials do not necessarily discriminate against women.

### 3.2.2. Discretionary power, economic rents and corruption

Lord Acton, the British 19th century historian, remarked that “Power tends to corrupt, and absolute power corrupts absolutely.”<sup>22</sup> In this subsection we therefore explore the influence of discretionary power and related economic rents on corruption in China. First, to examine the effect of fiscal decentralization on regional corruption levels, we measure fiscal decentralization in China using the ratio of per capita provincial consolidated spending to per capita central consolidated spending (Zhang & Zou, 1998).<sup>23</sup> As Tables 3, 4 and 5 show, like Fisman and Gatti (2002a, b), we provide robust evidence that fiscal decentralization significantly decreases provincial corruption levels in China. In fact, according to Regression (8) in Table 5, a 1% increase in fiscal decentralization reduces corruption in Chinese provinces by about 0.05%. This finding is in line with Montinola, Qian, and Weingast's (1995) contention that China's market-preserving federal system gives local governments strong fiscal incentives to support local economic development and hence restrict their own predation on local enterprises. Jin, Qian, and Weingast (2005) further find that local officials in China implement the protectionist policies mainly for local business development rather than rent seeking. It is therefore plausible that fiscal decentralization in China generally depresses local corruption. Shleifer and Vishny's (1993) observation that decentralization results in “excess” rent extraction because of a lack of coordination among officials may therefore not apply in China.

To measure the effect of government regulation on local corruption levels, we draw on Fan et al.'s (2010) NERI index of marketization of Chinese provinces, constructed to measure the degree of government regulation in Chinese provinces. In effect, this index covers five main aspects of Chinese marketization: the relationship between the market and the government; the growth of the non-state economy; the development of the product market; the development of the factor market; and the market environment, including intermediaries and institutional and jurisdictional arrangements. Based on Fan et al.'s (2010) use of the sub-index on market/government relationship (regulation) to measure provincial progress on deregulation, we assume this sub-index to be negatively correlated with the degree of government regulation in Chinese provinces. In fact, both the pooled OLS (Table 3) and fixed effects (Table 4) evidence show that deregulation is negatively associated with corruption in Chinese provinces.

We then employ the IV approach to deal with potential endogeneity problems. Because provinces with a larger proportion of the state-owned sector tend to have more regulations and to make less progress on deregulation, we use the provincial employment share of the state-owned sector in 1978 to instrument the regulation variable.<sup>24</sup> Our IV regressions provide strong evidence that deregulation reduces provincial corruption. Specifically, as shown in Column (9) of Table 5, a 1% rise in the marketization index decreases corruption by 2.72%.

To assess the role of economic rents, we test the associations between corruption level and several factors that influence the scale of economic rents in China. The first, abundance of natural resources, is supposed to be an inducement to corruption because of the associated economic rents. However, since the export share of natural resources used by Ades and Di Tella (1999) is unsuitable for measuring the regional abundance of natural resource in a within-country analysis, we follow Xu and Wang (2006) and use the fraction of employment in the mining and quarrying sector as a proxy for natural resource abundance in Chinese provinces. As Tables 3, 4 and 5 show, we provide robust evidence that the abundance of natural resources significantly increases corruption in Chinese provinces. In Regression (9) in Table 5, a 1% increase in the fraction of employment in the mining and quarrying sector is associated with about a 0.11% rise in provincial corruption.

Finally, we investigate the effect of trade openness, measured by the share of imports in GRP, on corruption levels in Chinese provinces. As the fixed-effect regression results in Table 4 show, trade openness significantly lowers the provincial corruption level. Nevertheless, to address the potential simultaneity bias (Treisman, 2000), we also perform IV regressions that use provincial population as the instrumental variable for local openness (see Table 5). Imports are positively correlated with population size as a large population means a large market size. Since we have controlled both unobserved factors such as cultural and institutional background and observed variables like income in our regressions, there seems no potential channel other than trade openness via which population influences corruption.<sup>25</sup> Our IV finding clearly supports the fixed effects result: openness substantially reduces corruption in China. In fact, according to the IV regression using the baseline specification in Table 5, a 1% increase in trade openness reduces regional corruption by nearly 0.35%.

Overall, we have completed a detailed evaluation of a substantial set of corruption determinants in Chinese provinces, obtaining insightful findings that are robust to a variety of specifications.

<sup>22</sup> Lord Acton, 1887, Letter to Bishop Mandell Creighton.

<sup>23</sup> For a detailed description of public finance in Chinese provinces, please refer to Zhang and Zou (1998).

<sup>24</sup> Before economic reform China had a planned economy consisting of state-owned sectors and collectively owned sectors in place. The proportion of the state-owned sector in Chinese provinces was then determined by historical conditions and central government's decisions captured by regional fixed effects and are therefore exogenous in our regressions.

<sup>25</sup> We note that the one-child policy, which significantly influences regional populations in China, differs across provinces. However, this inter-provincial policy difference is exogenously determined by the central government and is mostly captured by our regional fixed-effect regressions.



**Table 6**

Determinants of corruption in China.

Incidence of corruption		Benefit of corruption	
Cost of corruption			
Determinants of corruption	Relationship	Determinants of corruption	Relationship
Income	+	Fiscal decentralization	–
Education	–	Regulation	+
Anglo-American church university heritage	–	Trade openness	–
Economic and social heterogeneity	+	Resource abundance	+
Relative wage	–		
Media	–		
Female representation in NPC	–		

#### 4. Concluding remarks

A comprehensive case study of a representative country may prove to be a helpful supplement to cross-country analyses on corruption using subjective survey data because these latter suffer from a number of biases. In this paper, therefore, we presented a detailed investigation of the causes of corruption in China with a set of objective data across Chinese provinces. Because almost no extant studies on the causes of corruption use within-country data and those that do employ U.S. data, our study complements previous cross-country research by isolating possible cultural and institutional differences within a specific country. It also complements U.S. studies such as [Glaeser and Saks \(2006\)](#) by using panel data, addressing omitted variable biases with an IV approach, and exploring a larger set of independent factors.

As shown in [Table 6](#), we find that with the exception of the positive relationship between income and corruption, the Chinese case generally retains the patterns of corruption identified in cross-country analyses. Nevertheless, we also find evidence that in China, the negative effect of income on corruption frequently suggested by literature may be temporarily overwhelmed during the transition process and may only emerge after the transition is completed. Our results also show that, in line with [Treisman \(2007\)](#) and [Gundlach and Paldam \(2009\)](#), the long-run causation between income and corruption runs mainly from income to corruption. We also obtain clear evidence that, taking into account regional income levels, educational attainment reduces corruption in Chinese provinces, which is also significantly depressed by anti-corruption efforts. One novel result is the relatively strong evidence that media, even under government control, does indeed act as a control instrument for corruption in China. Another rather unique finding is that a greater representation of women in the legislature depresses corruption in Chinese regions. As with prior cross-country evidence on the influence of the British colonial tradition, we find that the Anglo-American church university heritage adversely affects corruption. Our findings also support the hypothesis that various social heterogeneities breed corrupt practices; however, we find only weak evidence to support the theory that relatively high relative wages within the public sector deter officials from corruption. We also provide concrete evidence that regions with a higher degree of deregulation appear to be less corrupt in transitional China and that fiscal decentralization tends to discourage local corruption (cf. [Fisman & Gatti, 2002a, b](#)). Finally, we provide clear evidence that openness substantially suppresses the incidence of corruption, whereas an abundance of resources increases it.

Our empirical findings have significant policy implications. First, during China's transitional process, economic development appears to increase corruption. However, given that economic development substantially accelerates the transitional process, it should be encouraged, since it is likely to depress corruption further after the transition is completed. At the same time, because the negative effects of trade openness, deregulation and fiscal decentralization on corruption suggest that competition, either between enterprises or governments, plays an important role in corruption control, policies that induce more competition in either commercial or political markets could help to reduce corruption. Much attention should also be paid to anti-corruption efforts in provinces rich in resources because such abundance provides a breeding ground for corrupt practices. The fight against corruption should also take into account important historical influences. Even in China, media, although government controlled, can act as a watchdog over corruption; however, given [Brunetti and Weder's \(2003\)](#) observation that a freer press controls corruption more effectively, more press freedom would be beneficial. Additionally, although high salary seemingly deters officials from corruption in China, as [Rose-Ackerman \(1999\)](#) argues, high public sector salaries can be justified only if sector productivity increases while its size decreases. Otherwise, high pay in the public sector, although it may decrease individual acts of corruption, is itself a form of corruption. In general, our results imply that a more educated population and a society characterized by more income equality, gender equality and racial equality equates with lower levels of corruption.

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## Appendix A

**Table A1**

Data description.

Variable	Description	Source	Mean	S. D.
Cases	Provincial registered cases on corruption in procurator's office per 100,000 population	China Procuratorial Yearbooks	3.09	0.94
Anti-corruption	Real expenditure on police, procuratorate, court and judiciary per capita	China Statistical Yearbooks	112.43	103.41
Income	Logarithm of per capita real gross regional product	China Statistical Yearbooks	9.15	0.63
Education	Fraction of the population over 6 with college completed	China Statistical Yearbooks	5.44	4.31
Wage	Ratio of average government employee' wage to the regional average wage	China Statistical Yearbooks	1.13	0.13
Openness	Ratio of import to gross regional product	Provincial Statistical Yearbooks	14.45	22.62
Media	Annual newspapers circulation per capita	Provincial Statistical Yearbooks	41.38	88.07
Dissimilarity	The dissimilarity index	The Fifth National Census of China	0.18	0.20
Gini	Gini coefficients	<a href="#">Meng et al. (2005)</a>	0.26	0.03
Resource	Employment share of the mining and quarrying sector	China Statistical Yearbooks	4.93	3.75
Anglo-American	Regional number of church universities founded by Britain and America before 1922	<a href="#">China Continuation Committee (2007)</a>		
Decentralization	Ratio of per capita provincial consolidated spending to per capita central consolidated spending	China Finance Yearbooks	38.20	19.52
Regulation	Relationship between the market and the government	<a href="#">Fan et al. (2010)</a>	6.72	2.04
Female	Female representation in the National People's Congress	Documents of National People's Congress	0.22	0.041
Population	Logarithm of regional population	China Statistical Yearbooks	8.02	0.89
North	Dummy indicating regions in North China	China Statistical Yearbooks		



**Table A2**

Pairwise correlation coefficients between explanatory variables.

	Income	Education	Anticorruption	Media	Openness	Resource	Decentralization	Wage	Dissimilarity	Anglo-American	Female	Regulation	North
Income	1.00												
Education	0.76	1.00											
Anticorruption	0.78	0.79	1.00										
Media	0.49	0.76	0.56	1.00									
Openness	0.73	0.80	0.74	0.75	1.00								
Resource	−0.30	−0.21	−0.37	−0.26	−0.43	1.00							
Decentralization	−0.45	−0.33	−0.15	−0.34	−0.54	0.21	1.00						
Wage	0.38	0.14	0.23	0.068	0.26	−0.31	−0.29	1.00					
Dissimilarity	−0.36	−0.12	−0.13	−0.19	−0.29	0.011	0.51	−0.20	1.00				
Anglo-American	0.47	0.24	0.25	0.22	0.46	−0.44	−0.58	0.38	−0.41	1.00			
Female	0.15	0.24	0.17	0.47	0.27	−0.12	−0.35	0.17	−0.10	0.32	1.00		
Regulation	0.80	0.48	0.56	0.23	0.57	−0.35	−0.58	0.44	−0.44	0.51	0.061	1.00	
North	0.090	0.26	0.0061	0.16	−0.023	0.58	0.16	−0.28	0.086	−0.41	−0.078	−0.24	1.00

**Table A3**

NERI index of marketization of Chinese provinces (five-year average).

Province	1998–2002	2003–2007	Province	1998–2002	2003–2007	Province	1998–2002	2003–2007
Beijing	5.32	8.53	Anhui	4.69	6.64	Chongqing	4.89	7.44
Tianjin	5.66	8.45	Fujian	6.61	8.77	Sichuan	4.64	6.84
Hebei	4.98	6.46	Jiangxi	4.20	6.27	Guizhou	3.16	4.68
Shanxi	3.53	5.42	Shandong	5.50	8.00	Yunnan	3.61	5.24
Inner Mongolia	3.49	5.59	Henan	4.36	6.35	Tibet	0.32	2.43
Liaoning	5.08	7.75	Hubei	4.32	6.59	Shaanxi	3.41	4.77
Jilin	4.02	5.92	Hunan	4.26	6.41	Gansu	3.28	4.43
Heilongjiang	3.68	5.48	Guangdong	7.29	10.03	Qinghai	2.19	3.69
Shanghai	6.29	10.38	Guangxi	4.33	5.79	Ningxia	2.73	4.98
Jiangsu	6.28	9.26	Hainan	4.94	5.86	Xinjiang	2.60	4.96
Zhejiang	6.97	10.26						

Note: The higher the NERI index of marketization, the better the institutional quality.

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