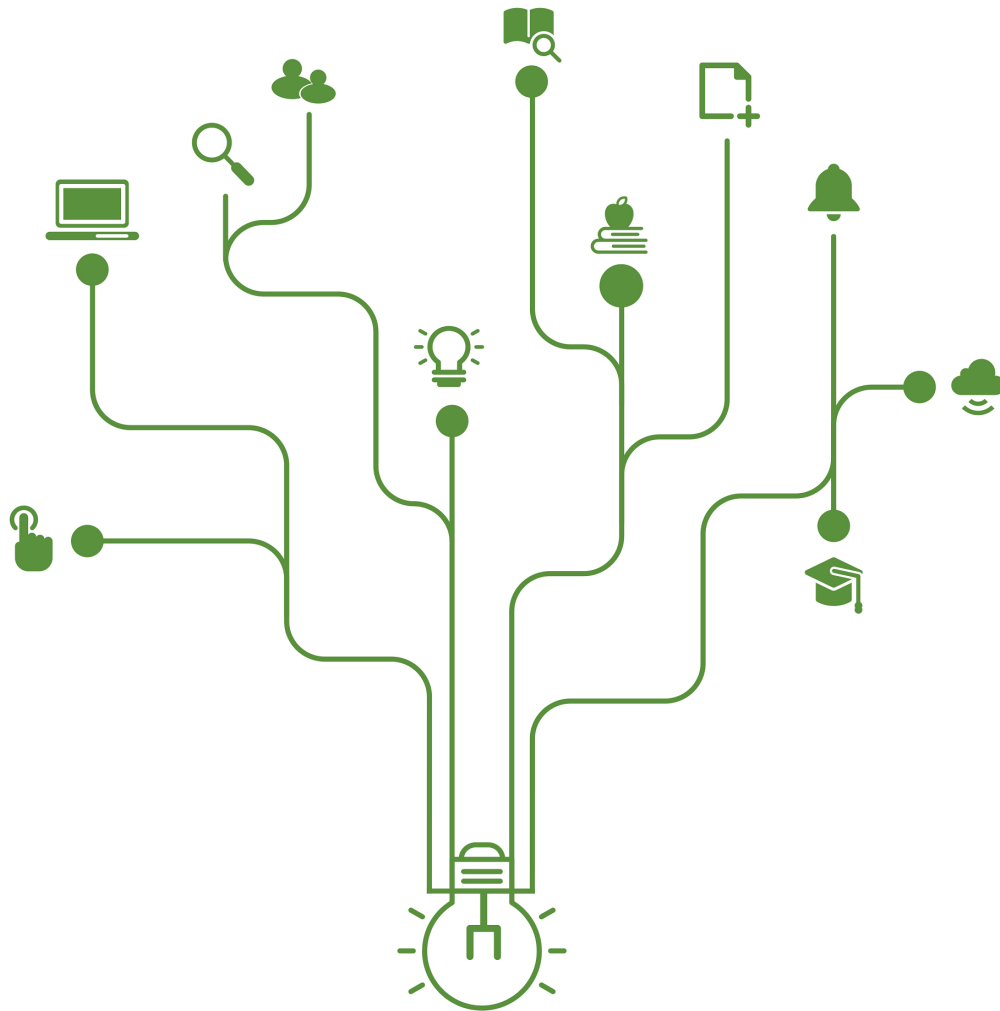


Testing the Determinants of Corruption from Multiple Theoretical Lenses: The Case of the U.S. States

Cheol Liu, Can Chen



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*Cheol Liu, Associate Professor, KDI School of Public Policy and Management
cliu@kdischool.ac.kr*

*Can Chen, Assistant Professor, Florida International University
cchen@fiu.edu*

Abstract

This article compares the determinants of public corruption from multiple theoretical lenses and then tests which ones are more effective in curbing public corruption in the context of the U.S. states. We find that the stringency of state tax and expenditure limits, fiscal transparency, voter turnout rates, unified Democratic control, divided control of state governments, political competitiveness, population with Scandinavian ancestry, and educational attainment are all significantly and negatively associated with the extent of public corruption. Compared with other approaches to curbing corruption (i.e., the lawyer's approach, the businessman's approach, and the economist's approach), those that restrict public officials' discretionary power and encourage educated citizens' participation appear to be more effective in reducing corruption in the U.S. states.

Keywords

Corruption; Comparison of multiple theories; Determinants and cures for corruption

INTRODUCTION

This article compares various theoretical determinants of public corruption from the perspective of their effectiveness in curbing corruption. For this comparison, we review the existing literature related to the determinants and cures for corruption across countries, and test which among those suggested by multiple theoretical approaches are the more effective ones for reducing public corruption in the context of the U.S. states. Lopez-Iturriaga and Sanz (2018) find that most existing corruption studies discussing the causes of corruption tend to focus on cross-country comparisons and, therefore, call for further studies employing within-country data and contexts.

One of the major challenges of corruption-related studies is the difficulty in defining corruption and choosing practical measures of corruption for quantitative research with a large N. Corruption is broadly understood as deviation from the rational-legal Max Weberian bureaucracy. Lancaster and Montinola (1997) categorize various definitions of corruption according to six broad meanings: 1) corruption implies public officials' behaviors deviating from the public interest (public interest-centered definition), 2) corruption means public officials' behaviors that are different from legal norms (public office-centered definition), 3) corruption involves public officials' behaviors deviating not only from legal norms but also from moral norms (public norm-based definition), 4) patrimonialism implies "a form of domination with an administrative apparatus whose members are recruited from personal dependents of the ruler", 5) corrupt public officials regard their public office as their private business (market-oriented definition), and 6) all public officials' behaviors deviating from the ideal principal-agent relationship are defined as corruption. A long debate on the definition of corruption has led to a consensus that corruption refers to public officials who engage in behaviors that use their public office, authority, and power for their personal gain. Corruption also involves various elements of nepotism, clientelism, favoritism, misuse of public power, patronage appointment, and moral decay. Among the various definitions, the strictest one defines corruption as deviation from formal rules regulating public workers' behaviors. Because corruption occurs clandestinely, it cannot be openly measured. Thus, most empirical studies capture the extent of corruption by measuring the perceived degree of corruption instead of the actual level of corruption (Lancaster and Montinola, 1997, 188-191).

The existing literature on corruption generally concurs that it is not possible to specify a complete and comprehensive definition of corruption. It is also impossible to develop a

comprehensive list of corruption practices that is universally applicable to all societies over a long period of time. Different societies have different perceptions, cultures, and rules in relation to corruption, which also change over time even within a society. The term definitional quagmire expresses the difficulty in seeking a complete and universal definition of corruption and constructing a comprehensive measure of the actual level of corruption (Johnston, 1994). Thus, it is suggested that researchers might apply a useful definition and a practically available measurement of corruption that are appropriate for their specific research concerns and contexts, rather than becoming stalled in a quagmire of seeking perfect definitions and measurements of corruption (Collier, 1999; Kaufmann, 1998).

Following in the tradition of corruption studies, this article limits the category of corruption to its strictest definitional sense, namely, deviation from formal rules regulating public officials' behaviors. We capture the extent of corruption through the number of public officials who are convicted of the violations of the corruption-related laws within a country. Additionally, we argue that the number of convictions should be a better indicator of corruption than the number of indictments and caseloads. This is because it is possible that a number of indictments and accusations will eventually be dismissed by the courts and not convicted as corruption. We thus assume that convicted cases correspond to corruption cases.

This article proceeds as follows. The next section reviews relevant literature on corruption and establishes the theoretical framework of the study. We then present the data and develop empirical models to test the explanatory power of multiple theoretical lens related to corruption. Next, we report the empirical results of the models and conclude by discussing the implications of our research findings.

MULTIPLE THEORETICAL LENSES FOR EXPLAINING CORRUPTION

This study makes use of a comprehensive review of the literature on corruption¹). Most of the research reviewed involved cross-country studies. Amongst them, this article focuses on the theories that are applicable to a within-country study, particularly in the context of the U.S. states.

Public choice theorists argue that public officials, like private individuals, make choices

1) We tabulate the comprehensive list of the existing literature in the Appendix (Tables A1~A4) for brevity.

to maximize their private self-interest (Buchanan and Tullock 1962; Niskanen 1971). A public official is portrayed as a rational utility maximizer who could engage in corruption when the potential benefit from corruption exceeds its potential cost (Rose-Ackerman and Palifka 2016; De Graaf 2007). The theorists presume that maximizing the cost of corruption and minimizing its potential benefit should deter or at least reduce unethical behavior. We summarize discussions of the determinants of corruption from multiple theoretical lenses and from the perspective of this benefit/cost comparison approach.

Bureaucratic Determinants of Corruption

Public bureaucrats are susceptible to corruption when “there is a lot of money lying around loose and no one is watching” (Wilson 1966, 31). Bureaucratic explanations of corruption are related to opportunities for corruption, including the following five key factors: bureaucratic regulation, size of bureaucracy, bureaucratic structure (fragmentation and decentralization), wages, and fiscal institutions to constrain the power of public officials.

With reference to the first factor, the public interest model of bureaucratic regulation assumes that regulation counteracts market failures and is instituted by government officials to maximize the general welfare (Pigou 1938). However, the public choice literature on bureaucratic regulation suggests that regulations are captured by the regulated industries and usually benefit existing larger firms (Stigler 1971; Tullock 1967). Similarly, politicians and bureaucrats cater to business interest in order to maximize their private self-interests and use excessive bureaucratic regulations as a tool to extract larger bribes. Shleifer and Vishny (1993) argue that many regulations exist to give public officials “the power to deny them and to collect bribes in return for providing the permits” (601). When regulation is stricter and license approval processes are slower, private businesses are more likely to bribe government officials to avoid regulatory cost. Djankov et al. (2002) find that various measures of firm entry regulation are positively associated with the level of corruption in a cross-country sample.

For the second factor, as the size of government (bureaucracy) increases, opportunity for corruption also increases. In addition, the size of government associates positively with the size of rent from corruption. A larger size of government means a greater amount of bureaucratic delay and induces rent-seekers to offer larger bribes (Goel and Nelson 1998). As Scully (1991) asserts, “The increase in the size and scope of government expenditure represents an enormous rise in the opportunities for rent-seeking through budgetary

reallocations” (91). Goel and Nelson (1998) also find that government size, in particular, spending by the U.S. state governments, does indeed have a strong positive association with corruption.

The third factor, namely, the structure of bureaucracy, is also perceived to affect corruption. A more fragmented structure of government makes corruption less visible, which reduces the chance of corrupt officials being detected. Fragmentation also impedes coordination among public officials and incentivizes them to overgraze the common bribe base (Goel and Nelson 2011). Henriques (1986) argues that the fragmentation of government resulting from the proliferation of single purpose special districts stimulates corruption. On the contrary, the decentralization of government brings public officials closer to the people and stimulates inter-jurisdictional competition among governments for mobile resources, which enhances government accountability and discipline and, as a consequence, reduces corruption (Klitgaard 1988).

Concerning the fourth factor, Becker and Stigler (1974) maintain that bureaucratic wages should be related to corruption. If public employees earn less than they could earn in the private sector, the probability of their committing corruption increases. However, a wage increase in the public sector reduces the need for corruption and makes bribe taking less attractive. Moreover, higher pay in the public sector makes it possible to attract and retain better qualified, more professional, and less corrupt public employees (Cornell and Sundell 2019).

For the fifth factor, most fiscal institutions intend to constrain public officials’ fiscal discretion and reduce corruption. The Leviathan model argues that government officials are self-interested and maximize discretionary budget slack for private gains (Niskanen 1971, 1975). Fiscal institutions serve as ex-ante rules that limit the policy choices of government officials and bind Leviathan because they prescribe what politicians can and cannot do (e.g., Chan and Mestelman 1988; Moene 1986). A harder budget constraint will lower budgetary slack (Borge et al. 2008). Tax and expenditure limitations (TEs) and balanced budget requirements of the state and local governments in the U.S. aim to limit the growth of government and impose fiscal discipline on public officials. TEs are expected to reduce opportunities for corruption by constraining government expenditure and revenue.

Budgetary institutions aiming for transparency are also likely to reduce corruption. Transparency increases the chance that corruption will be detected. If budgets and other financial documents are transparent and available for all to see, it is more difficult for public officials to distort information and conceal their corruption (Anechiarico and Jacobs

1996; De Graaf 2007). From the perspective of the principal-agent theory, transparent environments reduce information asymmetries between public officials and voters, and help align the interests of agents with those of principals. Transparency induces governments to report both their planned budgets and their actual execution to citizens so that the public (and its watchdogs) can monitor the budget process more effectively. This enhances public oversight on the allocation and spending of public resources, and leaves less room for agents to abuse public resources for their private gain (Blinded 2019).

Political Determinants of Corruption

Political explanations of corruption contend that politics can curb corruption if political actions raise the cost of corruption by increasing the probability that corruption will be detected and penalized. In this regard, the key factors discussed in the existing literature are political competition, citizen voting, gubernatorial term limit, and political ideology.

Rose-Ackerman (1978) presents one of the most influential theories about the effect of political competition on corruption. When the level of political competition is low, political incumbents are more confident of their re-election and less motivated to hold accountability for their behaviors. It is possible for them to seek rent without being voted out of their office. However, a higher level of political competition (e.g., closely contested political elections) mobilizes critical voters and intensifies the need to scrutinize current government by opposing parties. This restricts elected officials' incentives to use their office for private gain. Likewise, divided government is associated with a lower level of corruption because power sharing among political incumbents represents a variation of political competition.

The political agency model posits that citizens (the principals) delegate authority to elected officials (the agents) to act on their behalf and in their interest (Barro 1973; Ferejohn 1986; Persson et al. 1997). Yet voters and politicians face conflicting motivations and incentives. Voters pay taxes to finance the provision of public goods and services. Politicians can extract rent from tax revenue collected, thus leaving fewer funds for public good provision. If voters perceive the current level of rent as too high, they vote the incumbent out of office (retrospective voting). However, this kind of vertical accountability works only if voters are actively involved in elections. An informed and active electorate enhances the probability that corrupt politicians will be punished for their corruption. Ferejohn (1986) states that achieving vertical accountability becomes harder in a multidimensional policy space because various voters would use their one vote to decide issues in different policy dimensions. Institutions such as citizen initiatives that reduce the

dimensionality of policy space help voters hold politicians more accountable, which results in a lower level of rent and corruption (Alt and Lassen 2003).

Gubernatorial term limits are expected to associate negatively with corruption. Given that governors in office are banned from holding their office again due to term limits, they are more likely to fight corruption to preserve not only their parties' reputation but also their individual reputation (Escaleras and Calcagno 2009).

Finally, Meier and Holbrook (1992) underline the effect of political ideology on corruption, although conflicting arguments for the association are possible. Conservative citizens often perceive politics as means of seeking self-interest of public officials, so they tend to be more tolerant of officials' unethical behaviors. This encourages public officials to believe that the probability of being penalized for their corruption might be low. In contrast, conservatives who are strongly against larger governments tend to favor policies and laws to fight against waste, inefficiency, and corruption in public programs.

Economic and Demographic Determinants of Corruption

Economic and demographic determinants of corruption are dominant factors according to the existing literature on corruption. These include level of income, income inequality, ethnic diversity, and female population. As the level of income increases in a society, the demand for corruption falls. In addition, a rise in income will make more resources available to curb corruption. It has been found that a high level of income has a significantly negative effect on corruption (e.g., Damania et al. 2004; Persson et al. 2003).

On the contrary, a higher extent of income inequality is positively associated corruption for two reasons. First, the chance of being caught for a corrupt behavior is lower with a higher extent of income inequality because people who are at the lower end of the income spectrum are largely unaware and incapable of monitoring public officials. Second, when income inequality is higher, the benefit of corruption becomes greater for wealthy persons. However, the cost of corruption becomes lower because resources available for the masses of poor people to hold public officials accountable are constrained (Jong-Sung and Khagram 2005). Paldam (2002) argues that "a skewed income distribution may increase the temptation to make illicit gains" (224).

Ethnic diversity is associated with a higher level of corruption. Members of a certain ethnic group often favor their group members over non-members (Vanhanen 1999). When there are multiple ethnic groups in a society, public officials tend to allocate resources towards supporters of their own ethnicity. Ethnic groups are more likely to support public

officials of their own ethnicity even if they are known to be corrupt (Glaeser and Saks 2006, 8). Ethnic diversity “rationalizes corruption extraction from others unlike self” (Maxwell and Winter 2004, 18).

Finally, it is argued that the share of women in total population correlates with a lower level of corruption. Women are more trustworthy and more risk averse than men. Thus, they are willing to follow rules and feel there is a greater probability of being caught for corruption, which results in a lower level of corruption (Swamy et al. 2001).

Historical and Cultural Determinants of Corruption

Historical and cultural explanations of corruption point out that historical and cultural traditions might affect the perceived cost of corruption. The key determinants of corruption from this perspective include urbanization, education, social capital, and immigration.

Historically, urban environments foster conditions that are conducive to corruption. The social control of family and religion becomes weaker in urbanized areas, and government programs and resources are concentrated more in urbanized areas. In an urbanized environment, moreover, political machines tend to be established to “benefit individuals who supported the urban political machine, and corruption was used to compensate machine operators for their efforts” (Meier and Holbrook 1992, 138). Cities provide more opportunities for corruption than rural areas.

The cultural explanations of corruption center on popular psychology. As Wilson (1966) asserts, “There is a particular political ethos or style which attaches a relatively low value to probity and impersonal efficiency and relatively high value to favors, personal loyalty, and private gain” (30). The middle-class reformers seek to eliminate the traditional political ethos and fight for a clean government. Meier and Holbrook (1992) argue that the middle-class preference opposing corruption can be captured by the education levels of the population. Well-educated citizens are less tolerant of corruption and more likely to push public officials to be more accountable.

Corruption thrives in an environment where pro-social norms such as trust and altruism are absent (Banerjee 2016). The lack of social trust may diminish the sense of wrongdoing and neglect corruption in the society (Rotondi and Stanca 2015), which in turn breeds even more corruption (Banerjee 2016). According to Persson et al. (2013), citizens’ willingness to control corruption depends largely on their expectation of how many people in their society are engaged in corruption. If the majority perceives corruption as a widespread social norm, citizens are less likely to monitor and sanction corruption. Thus, a

higher level of social capital can increase citizens' willingness and cooperation to control corruption.

Lastly, immigration is often associated with a higher level of corruption. Immigrants from a society with a higher level of corruption may import their culturally corrupt baggage and provide more opportunities for corruption in the destination society. They also have fewer economic resources to lose and might perceive the cost of corruption as lower (Meier and Holbrook 1992).

DATA, MODEL, & METHODOLOGY

Model Specification

Based on the multiple theories of corruption discussed in the previous section, we construct a regression model of the determinants of corruption in the context of the U.S. states as follows:

$$\begin{aligned} \text{Corruption}_{it} = & \beta_0 + \beta_1(\text{Bureaucratic_Regulatory})_{it} + \beta_2(\text{Political})_{it} \\ & + \beta_3(\text{Economic_Demographic})_{it} + \beta_4(\text{Historical_Cultural})_{it} + \gamma\theta_i + \\ & \psi\omega_t + \varepsilon_{it} \end{aligned}$$

In our model, Corruption_{it} is the observed level of corruption at state i in year t . The extent of corruption across the 50 states is captured both by the number of convictions per 10,000 public employees and the number of convictions per 100,000 people of state population. The U.S. Department of Justice annually publishes the number of federal, state, and local employees who are convicted of federal corruption-related laws in a document entitled Report to the Congress on the Activities and Operations of the Public Integrity Section. The reliability, relevance, and validity of the conviction measures have been discussed by many scholars and studies (e.g., Butler, Fauver, and Mortal 2009; Cordis and Milyo 2016; Glaeser and Saks 2006; Meier and Holbrook 1992; Zhang and Kim 2017). We estimate the extent of corruption in year t in three ways: the number of convictions in year t , the number of convictions in year $(t+1)$, and the average number of convictions in years $(t+1)$, $(t+2)$, and $(t+3)$. We use the lead values of the numbers of convictions, or those in years $(t+1)$, $(t+2)$, and $(t+3)$ to capture the extent of corruption in year t , as it is possible that corruption cases convicted in year t actually took place in the previous years, not in year t .

*Bureaucratic_Regulatory*_{it} is a vector of variables capturing state bureaucratic and regulatory determinants of corruption. They include the degree of bureaucratic regulation, the number of state public employees, the average level of state public employees' wages, the extent of fiscal decentralization, the degree of state government fragmentation, the stringency of TELs, the stringency of state balanced budget rules, and the degree of state budget transparency.

*Political*_{it} represents a set of political factors assumed to affect state corruption. These include voter turnout rates, the extent of state political competition, political ideology of citizens, political ideology of state governments, a dummy of term limit for governors, a dummy of citizen initiatives, a dummy of unified Democratic control of state governments, a dummy of unified Republican control of state governments, and a dummy of politically divided control of state governments.

*Economic_Demographic*_{it} is a vector of economic and socio-demographic drivers of state corruption. This determinant captures the level of personal income per capita, the extent of income inequality, the degree of ethnic diversity, and the percentage of female citizens in state population.

*Historical_Cultural*_{it} denotes the factors related to historical, cultural, and religious explanations of state corruption. These include the extent of educational attainment, social capital index, Scandinavian ancestry (%), and the percentage of urban population.

θ_i implies state fixed effect to control for unobservable state attributes, is the time-specific effect to control for yearly changes in state external environment over 23 years in the period 1986-2008, and is the random error term. Table I displays the detailed descriptive statistics of all variables, shows how to capture them, and where we collected the data.

Table I. Descriptive Statistics: Variable Definition, Summary Statistics, and Data Sources

Variable	Definition	Mean	SD	Min	Max	Data Source
Corruptemp	Number of state corruption-related convictions per 10,000 public employees	0.51	0.42	0	2.7	U.S. Department of Justice
Corruptpop	Number of state corruption-related convictions per 1,000,000 residents	0.33	0.30	0	2.5	U.S. Department of Justice
Bureaucratic Regulation	The regulation sub-index of state economic freedom index	4.81	1.33	0.7	8.7	The Fraser Institutions
Number Gov't Employees	Number of state government full-time employees	11.51	1.63	8.1	16.9	U.S. Bureau of Economic Analysis
Gov't Employee Wages	Average payroll for state full-time employees	3.46	0.11	3.2	3.8	U.S. Bureau of Economic Analysis
Fiscal Decentralization	The ratio of state expenditures to the sum of state and local government expenditures.	0.32	0.07	0.1	0.7	U.S. Census Bureau State and Local Government Finance
Gov't Fragmentation	The number of general-purpose local governments (counties, cities, township) per 1,000,000 residents	271.66	457.28	3.0	2797.2	U.S. Census Bureau State and Local Government Finance
TELS Stringency	An index that measures the restrictiveness of state tax and expenditure limits (TEL)	24.13	8.08	0	32	Amiel et al. (2009)
Balance Budgets Stringency	A variable that measures the stringency of state balanced budget rules (BBR). It ranges from 0 to 10, with higher values indicating stricter rules.	7.35	2.97	0	10	Krause and Melusky (2012)
Fiscal Transparency	An index that measures the degree of fiscal transparency of state budgeting processes	0.51	0.19	0.1	1	Alt, Lassen, and Rose (2006)
Voter Turnout Rates	Percentage of the voting-eligible population turnout rate for the highest office election	12.42	12.57	1.0	74	U.S. Election Project
Political Competition	The folded Ranney index measures interparty competition of governmental partisan control, ranging from 0.5 to 1. The larger the value is, the greater the interparty competition.	0.88	0.10	0.6	1	Klarner (2012)
Citizen Liberal Ideology	Berry et al. (1998) measure U.S. states' political ideology.	50.53	15.11	8.4	96	Berry et al. (1998)
Gov't Liberal Ideology	Berry et al. (1998) compute a weighted average of the ideology scores to measure state government's political ideology.	50.74	25.58	0	98	Berry et al. (1998)
Governor's Term Limits	A dummy variable that indicates whether a governor is subject to term limits	0.72	0.45	0	1	The Book of States
Citizen Initiative Dummy	A dummy variable that indicates whether a state allows for citizen initiative	0.53	0.50	0	1	The Correlates of State Policy Projects
Unified Demo Control	A dummy variable that indicates unified Democratic control of state governments	0.23	0.42	0	1	Klarner (2012)
Unified Republican Control	A dummy variable that indicates unified Republican control of state governments	0.18	0.39	0	1	Klarner (2012)

Variable	Definition	Mean	SD	Min	Max	Data Source
Divided Gov't	A dummy variable indicating that the control of the executive branch and the legislative branch is split between two parties	0.58	0.49	0	1	The Book of States
Real Personal Income	Natural log of real per capita personal income	10.11	0.33	9.2	10.9	U.S. Bureau of Economic Analysis
Income Inequality (Gini)	Measure of income inequality ranging from 0 (perfect equality) to 1 (perfect inequality)	0.43	0.04	0.3	0.5	The Correlates of State Policy Projects
Ethnic Diversity	An index measure of racial diversity that varies over time and across states	0.23	0.13	0.0	0.7	Hawes, Rocha, and Meier (2013)
Female Pop (%)	Percentage of females in state population	0.51	0.02	0.5	0.7	U.S. Census Bureau
Educational Attainment	Percentage of bachelor's degrees or higher for persons 25 years or over	22.82	5.08	11.6	38.1	U.S. Bureau of Economic Analysis
Social Capital	An index measure of social capital that varies over time and across states	0.14	0.98	-2.9	2.7	Hawes, Rocha, and Meier (2013)
Scandinavian Ancestry (%)	Percentage of population with Scandinavian ancestry	9	3.39	2.9	19.7	U.S. Census Bureau
Urban Population (%)	Percentage of population residing in urban areas	70.49	14.68	32.2	94.9	U.S. Census Bureau

Estimation Method

Due to the panel data structure, we employ a two-way panel estimator with state and year dummies to control both state and year-invariant unobserved heterogeneity. The variance inflation factor (VIF) test finds that the mean value of the VIF test is 3.63. VIFs for all variables are less than 10, which implies that multicollinearity is not a serious problem for this study. A series of panel unit root tests show that the dependent variables are panel stationary, and thus fixed effect or random effect models are applicable to our analysis and their results are not spurious. It is known that if a panel is stationary, then a static panel data method should be applied; otherwise, a dynamic specification should be used. We use two kinds of tests, namely, the Augmented Dickey-Fuller test and the Phillips-Perron test, with different specifications on lags, a linear trend, or a drift for all three dependent variables. All specifications reject the null hypothesis of unit root. Hausman tests are performed to test the specification of fixed-effect versus random-effect model. The null hypothesis, which states that the difference of the coefficients estimated by the two specifications is not systematic, is rejected, thus indicating the choice of a fixed-effect model is suitable.

We also conduct some conventional initial diagnostic tests before running the regressions. First, the Breusch-Pagan/Cook-Weisberg test confirms that the estimated

residuals are heteroskedastic. Second, the Wooldridge test confirms the existence of serial correlation in error terms. Third, the Pesaran's cross-sectional dependence (CD) test confirms the existence of cross-sectional dependence. Heteroskedasticity, serial correlation, and cross-sectional dependence will yield biased standard errors of estimated coefficients. To correct the above issues, we use the Driscoll and Kraay standard errors as Driscoll and Kraay (1998) suggest.

EMPIRICAL FINDINGS

We run two rounds of regressions of the determinants of public corruption in the U.S. states. In the first round, our regression models separately include each set of the determinants of corruption one by one. We have four sets of the public corruption determinants: bureaucratic and regulatory determinants, political determinants, economic and demographic determinants, and geographical, cultural, and religious determinants. The second round of regressions includes all four sets of the determinants together. For brevity, we do not report the regression results of the first round in detail,²⁾ but summarize which determinants are statistically significant in what follows. We only report the regression results of the second round in the body of this article and discuss the main findings.

The results of the first round of regressions are summarized as follows. The positive (+) and negative (-) signs in parentheses imply the directions of the association between each determinant and the dependent variable (i.e., public corruption). Among the bureaucratic and regulatory determinants of corruption, the number of state public employees (+), the stringency of TELs (-), and the stringency of BBRs (-) are statistically significantly associated with corruption in the context of the U.S. states. Among the political determinants of corruption, voter turnout rates (-), political competition (-), the liberal ideology of state governments (+), the existence of a term limit for governors (-), unified control of state governments by Democrats (-), and divided controls of state governments (-) are significant factors of corruption. Among the economic and demographic determinants of public corruption, only income inequality (+) is significantly associated with corruption. Finally, educational attainment (-) and Scandinavian ancestry (-) are statistically significant and negatively associated with the extent of corruption.

At the second round of regressions, we combine all four sets of the determinants of

2) Tables A.5~A.0 in the Appendix display the regression results in greater detail.

public corruption, not separating them. Table II summarizes the regression result of our benchmark models, which show that the regression results are consistent with those of the first round of regressions. We have six different models (Models I~XI) in Table II with different dependent variables (i.e., the measurements of the extent of corruption across the states). The first three models capture the extent of public corruption by the number of convictions per 10,000 state public employees (Corruptemp) at year t (Model I), at year $t+1$ (Model II), and average numbers over future three years (Model III). The last three models capture the level of public corruption by the number of convictions per 100,000 state population (Corruptpop) at year t (Model IV), at year $t+1$ (Model V), and average numbers over the future three years (Model VI). We use shading to emphasize determinants that show statistically significant associations with corruption. The result of estimation looks consistent over all six models, as we summarize below.

There is a positive association between the number of public employees and the extent of public corruption in the context of the U.S. states, which is statistically significant at the 0.1% significance level. Public corruption is likely to be higher in a state with a larger number of public employees. We may also interpret this result as providing evidence supporting a theoretical argument that corruption should tend to increase as the size of the public sector increases, as we use the number of public employees as a proxy for the size of the public sector, following Dimant and Tosato (2018) and Kotera et al. (2012).

A U.S. state with a tighter stringency of state TELs is likely to have a lower degree of corruption, which is statistically significant at the 1% and/or 0.1% significance levels. A negative association between BBRs and corruption does not seem significant. Although the impacts of regulation on corruption are controversial across the existing studies, we find that state TELs reduce the extent of corruption by constraining public employees' discretion on resource allocation in the context of the U.S. states. Likewise, it seems that a U.S. state government with a higher level of fiscal transparency is likely to have a lower level of corruption.

There is a negative association between voter turnout rates and corruption in the context of the U.S. states, which is statistically significant at the 0.1% significance level. We use voter turnout rates as proxies for the development of democracy or/and degree of citizens' participation in politics. Public corruption tends to become lower in a state with a higher level of democracy and/or a higher degree of citizens' participation because corrupt politicians are removed by elections (e.g., Bhattacharyya and Hodler 2015).

Citizens' liberal political ideology and unified Democratic controls tend to have a

negative association with the extent of corruption. Moreover, a U.S. state with a stronger degree of political competition is likely to have a lower level of corruption, which is statistically significant at the 0.1% significance level. This finding is consistent with the result from the variable of divided control of state governments. Competition for political positions helps politicians to avoid self-seeking behavior and, as a consequence, reduce corruption (Brown et al. 2005; Sharafutdinova 2010).

A state with a higher level of income inequality tends to have a higher level of corruption. In contrast, a state with a higher extent of educational attainment and a higher percentage of population with Scandinavian ancestry is likely to have a lower extent of corruption. We capture the level of educational attainment across the states by calculating the percentages of state population acquiring a bachelor's degree or higher for people who are 25 years of age or older. The role of education matters in reducing public corruption in the context of the U.S. states (Brunetti and Weder 2003; Truex 2011).

Table II. Determinants of Public Corruption in the U.S. States (50 states, 1986–2008)

Variables	Model I	Model II	Model III	Model IV	Model V	Model VI
	Corruptemp	Corruptemp (year $t+1$)	Corruptemp (avg. future 3yrs)	Corruptpop	Corruptpop (year $t+1$)	Corruptpop (avg. future 3yrs)
Bureaucratic Regulation	0.039 (0.042)	0.013 (0.038)	0.032 (0.036)	0.030 (0.029)	0.0138 (0.025)	0.025 (0.023)
Gov't Size Employees	0.108*** (0.029)	0.060* (0.031)	0.078*** (0.023)	0.094*** (0.022)	0.056** (0.022)	0.068*** (0.016)
Ln Gov't Employee Wage	0.124 (0.530)	0.004 (0.423)	0.012 (0.347)	0.180 (0.317)	0.109 (0.254)	0.107 (0.196)
Fiscal Decentralization	-0.727 (0.532)	-0.061 (0.364)	-0.263 (0.334)	-0.469 (0.338)	0.035 (0.239)	-0.108 (0.213)
Gov't Fragmentation	0.0006 (0.001)	-0.0009 (0.0009)	-0.0005 (0.0009)	0.0005 (0.001)	-0.0006 (0.0008)	-0.0003 (0.0007)
TEL Stringency	-0.009** (0.004)	-0.009** (0.004)	-0.009** (0.003)	-0.006** (0.002)	-0.006** (0.002)	-0.006*** (0.002)
Balance Budgets Stringency	-0.015 (0.021)	-0.014 (0.019)	-0.014 (0.016)	-0.007 (0.012)	-0.005 (0.011)	-0.006 (0.009)
Fiscal Transparency	-0.063 (0.162)	-0.273* (0.157)	-0.213** (0.081)	-0.060 (0.099)	-0.198* (0.103)	-0.158** (0.061)
Voter Turnout (%)	-0.018** (0.008)	-0.021*** (0.006)	-0.020*** (0.006)	-0.013*** (0.005)	-0.015*** (0.004)	-0.014*** (0.004)
Political Competition	-0.583** (0.273)	-0.228 (0.321)	-0.199 (0.277)	-0.408** (0.177)	-0.147 (0.202)	-0.145 (0.177)
Citizen Liberal Ideology	-0.003 (0.003)	-0.004** (0.002)	-0.004* (0.002)	-0.002 (0.002)	-0.003* (0.001)	-0.002* (0.001)
Gov't Liberal Ideology	0.001* (0.0007)	0.001 (0.001)	0.001 (0.001)	0.0007 (0.0004)	0.0005 (0.0005)	0.0005 (0.0004)
Governor's Term Limits	-0.066 (0.046)	-0.045 (0.057)	-0.039 (0.037)	-0.055* (0.030)	-0.039 (0.039)	-0.038 (0.025)
Citizen Initiative Dummy	-0.188	-0.128	-0.115	-0.088	-0.046	-0.041

Variables	Model I	Model II	Model III	Model IV	Model V	Model VI
	Corruptemp (0.193)	Corruptemp (year $t+1$) (0.166)	Corruptemp (avg. future 3yrs) (0.104)	Corruptpop (0.132)	Corruptpop (year $t+1$) (0.118)	Corruptpop (avg. future 3yrs) (0.077)
Unified Demo Control	-0.143*** (0.037)	-0.149** (0.056)	-0.111*** (0.036)	-0.095*** (0.025)	-0.089** (0.038)	-0.068*** (0.024)
Unified Republican Control	-0.026 (0.036)	-0.091 (0.068)	-0.053 (0.039)	-0.025 (0.026)	-0.071 (0.046)	-0.044* (0.024)
Divided Gov't	-0.078** (0.035)	-0.141** (0.066)	-0.104*** (0.037)	-0.054** (0.021)	-0.093** (0.045)	-0.068** (0.025)
Ln Real Personal Income	-0.055 (0.409)	-0.329 (0.342)	-0.067 (0.320)	0.088 (0.289)	-0.206 (0.223)	0.014 (0.218)
Income Inequality (Gini)	1.388* (0.704)	1.526** (0.631)	1.551*** (0.347)	1.049** (0.445)	1.026** (0.390)	1.070*** (0.193)
Ethnic Diversity	0.087 (0.069)	0.051 (0.066)	0.027 (0.034)	0.074 (0.045)	0.038 (0.049)	0.022 (0.024)
Female Pop (%)	0.121 (0.547)	-0.314 (0.782)	-0.610 (0.510)	0.358 (0.394)	0.037 (0.551)	-0.171 (0.365)
Educational Attainment	-0.038*** (0.014)	-0.048*** (0.013)	-0.040*** (0.008)	-0.027** (0.010)	-0.032*** (0.010)	-0.027*** (0.006)
Social Capital Index	-0.004 (0.034)	0.019 (0.034)	0.0155 (0.022)	2.39e-05 (0.022)	0.013 (0.024)	0.011 (0.015)
Scandinavian Ancestry (%)	-0.040** (0.019)	-0.025 (0.019)	-0.030*** (0.009)	-0.025** (0.012)	-0.016 (0.013)	-0.020*** (0.006)
Urban Population (%)	-0.003 (0.006)	-0.001 (0.005)	-0.0003 (0.004)	-0.001 (0.004)	-0.0003 (0.003)	7.48e-05 (0.00276)
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
N	1,150	1,150	1,150	1,150	1,150	1,150
R-squares	0.1035	0.1046	0.1584	0.0982	0.0956	0.146

DISCUSSION AND CONCLUSION

Table III summarizes the regression results of our benchmark models (Models I~VI in Table II) and compares the determinants of public corruption suggested from multiple theoretical lenses. In the context of the U.S. states, the number of public employees and the degree of income inequality are positively associated with the level of state corruption. On the contrary, the stringency of state TELs, the degree of fiscal transparency, voter turnout rates, unified Democratic control, politically-divided control of state governments, the extent of political competitiveness, the percentage of population with Scandinavian ancestry, and the level of educational attainment are negatively associated with the extent of state corruption. We do not find statistically significant associations between the level of state public corruption and multiple variables suggested as significant determinants of public corruption from multiple theoretical lenses. These include the level of public employees' wages, fiscal decentralization, the degree of government fragmentation, index of

BBRs, citizens' liberal ideology, government's liberal ideology, existence of term limits for governors, citizen initiatives, unified Republican control of state government, per capita personal income, ethnic diversity, percentage of female population, social capital index, and the percentage of population residing in urban areas.

Table III. Comparison of the Determinants of Corruption in the Context of the U.S. States

Theoretical Approach	Positive (+)	Negative (-)	Insignificant
Bureaucratic and regulatory determinants	Size of public employees* (government size)	Stringency index of state TELs* Fiscal transparency	Gov't employee wage Fiscal decentralization Gov't fragmentation BBR index
Political determinants	N.A.	Voter's turnout rates* Unified democratic control* Divided government* Political competition	Citizen liberal ideology Gov't liberal Ideology Governor's term limits Citizen initiatives Unified Republic control
Economic and demographic determinants	Income Inequality*	N.A.	Real personal income Ethnic diversity Female population (%)
Historical, cultural, and religious determinants	N.A.	Educational attainment* Scandinavian ancestry (%)	Social capital index Urban population (%)

* Significant across all the six benchmark models displayed in Table II.

A discussion of the cures for corruption (i.e., how to reduce corruption) should start from understanding the determinants of corruption because controlling the causes of corruption eventually leads its prevention (Jain 2001). In this regard, multiple approaches to reduce public corruption can be divided into three categories: the lawyer's approach, the businessman's approach, and the economist's approach. The lawyer's approach stems from the work of Becker (1968) and emphasizes the role of law enforcement to increase the cost of corruption, while reducing its benefit. This approach emphasizes efforts to increase the extent of penalties and monitoring to reduce corruption. The businessman's approach provides public employees with sufficient wages, incentives, and compensations so that they might not engage in corruption. It also includes a provision of non-monetary and informal incentives, such as career development opportunities and reputation building. Finally, the economist's approach focuses on reducing the discretionary power of public officials, which can be abused for their personal gain and corruption (Ades and Di Tella 1997; Andvig and Fjeldstad 2001).

Most existing studies fail to find a statistically significant effect of the lawyer's approach to reducing public corruption in the context of the U.S. states. For example, a higher extent of law enforcement, captured by the number of state judges, the amount of

caseloads and the pending rates of state courts, working hours of the U.S. attorneys, and the amount of state judiciary expenditures is not significantly associated with a lower level of public corruption in the U.S. states (BLINDED, 2014). It would be worthwhile to perform an in-depth analysis of the ineffectiveness of the lawyer's approach to reducing corruption in the context of the U.S.

We fail to find a statistically significant effect of the businessman's approach in decreasing corruption in the context of the U.S. states. As seen in Table III, the association between the level of public employees' wages and the extent of corruption is insignificant. However, we should not come to the hasty conclusion that the businessman's approach is never effective in reducing public corruption before we make further endeavors to investigate other possible policy instruments in line with this approach.

Compared to the former two approaches, the economist's approach works better in reducing corruption in the context of the U.S. states. A higher stringency of state TELs, a higher extent of fiscal transparency, a higher degree of political competition, and politically divided control of state governments can contribute to restricting the discretionary power of public officials and politicians. We find that all of them are statistically significantly associated with a lower level of public corruption in the U.S. states.

Additionally, it is noteworthy that the roles of citizens are very important in reducing public corruption in the context of the U.S. states. We find that a U.S. state with a higher rate of voter turnout and a higher level of educational attainment is likely to have a lower level of corruption. Citizens' participation in elections and their role in watching over public officials and politicians should not be overlooked, but rather highly promoted to reduce public corruption. Likewise, education matters in preparing citizens as active participants of democracy.

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