Corruption and Destructive Entrepreneurship

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-Abstract-

The negative effects of corruption at the macro level are well documented. Corruption reduces economic growth, lowers investment, and corrodes trust in government officials creating an institutional environment which pushes entrepreneurs from productive to destructive activities. In corrupt regimes, rent-seeking and cronyism crowd out value-creating entrepreneurship. Corruption also has effects at the micro level because some industries are better situated to profit from corruption than others. Corruption not only lowers economic output but also shifts resources toward some industries and away from others. Using convictions for violations of federal corruption laws in the United States as a measure of corruption, regression results show that increased corruption shifts resources toward the construction industry and away from non-profit firms and education. The evidence also shows that the distance from state capitols and voter turnout moderate the relationship between corruption and firm concentrations.

Keywords: Corruption; entrepreneurship; firm concentration; political distance
JEL codes: D73; L11; L26; P16

1. Introduction

The negative effects of corruption on the overall performance of the economy are well-documented. Many studies show that corruption reduces economic growth (Mauro 1995; Bardhan 1997; Mo 2001; Fisman and Svensson 2007; Dutta and Sobel 2016), investment (Wei 2000; Habib and Zurawicki 2002), and corrodes the social fabric of society by undermining trust in governments, market institutions, and the rule of law (OECD, 2014). The amount of corruption in an economy is closely related to the amount of regulation (Holcombe and Boudreaux 2015). This is because people subject to regulation have an incentive to try to bribe regulators to allow them to bypass regulations and because rent-seekers have an incentive to try to buy regulatory protections that impose a barrier to entry to potential competitors. Given the regulatory constraints that can hamper economic activity (de Soto 1989, 2000; NPR 2015), there is an argument that corruption can help “grease the wheels” of economic activity and allow entrepreneurs to bypass costly regulation to engage in productive activity at lower cost (Dreher and Gassebrier 2013; Dutta and Sobel 2016; Bologna and Ross 2015). Still, because it undermines the rule of law and because of the efforts that must be made to hide the activity, corruption is always more costly to an economy than the government’s above-ground taxing and spending activities (Schliefer and Vishny 1993; Fisman and Svensson 2007).

In addition to these macro level effects on overall productivity, corruption also has micro level effects on the allocation of resources among sectors of the economy. Corruption tends to be associated with higher levels of government spending and shifts spending toward capital projects that are more susceptible to rent-seeking and bribery (Tullock 1967; Krueger 1974) while reducing government expenditures in health care and education (Tanzi and Davoodi 1998; Liu and Mikesell 2014, Kahn 2005; Escaleras, Anbarci, and Register 2007). Corruption shifts the allocation of resources toward more corruptible activities because entrepreneurs recognize the ability for them to profit from those activities.

Entrepreneurs look for profit opportunities, which often come from value-generating production, but with corrupt institutions also come from unproductive rent-seeking (Baumol 1990, 1996; Minniti 2008; Sobel 2008). Aidt (2016) notes the close connection between rent-seeking and corruption. In more corrupt economies one would expect to see a shift of entrepreneurial activity toward less competitive and industries in which connections and cronyism carry more weight, making rents from corruption more readily available. In this context, the goal of this study is to examine how corruption affects the allocation of resources toward firms in the industries the literature has identified as most susceptible to corruption.

Because, as the empirical work below demonstrates, corruption reallocates spending toward capital projects and away from non-profit activities and education, corruption has a direct effect on the allocation of resources at the micro level in addition to its macro effects that lower overall productivity. Corruption increases the returns to the construction industry, where rents are more readily available, and reduces the returns to the non-profit and education sectors of the economy. This study presents evidence that supports this hypothesis using a concrete and objective measure of corruption: the number of federal convictions of public officials for violations of federal corruption laws, from 76 federal districts in the United States. Multi-level regression models show that the number of federal convictions is significantly associated with an increase in the concentration of firms located in the construction industry, particularly the public infrastructure sub-sector (NAICS 237), and that corruption is associated with a reduction in the allocation of firms and non-profit organizations in the education industry (NAICS 611).

This study contributes to the literature in three ways. First, we use a novel dataset that links federal convictions at the district level to the concentration of firms at the county level and use a multi-level (hierarchical) model to test the relationship between the two while controlling for a rich set of covariates such as economic growth and development, social capital, higher education, population density, and others. Second, previous studies have largely focused on examining the relationship between corruption and the allocation of government spending. In this study, we extend this argument by testing how corruption can influence the allocation of resources in the economy by pulling entrepreneurs into certain industries. The findings in this paper help demonstrate that not only does corruption have macro level effects on income, growth, investment, and more generally, the efficiency of economic activity, it also affects the economy at the micro level by redirecting resources from some sectors of the economy to others. More than just reducing economic efficiency, corruption influences the structure of the economy as entrepreneurs find it profitable to shift resources toward those areas that corruption makes more profitable. Finally, we test two additional hypotheses that have not been explored previously by the literature, namely, the extent to which the relationship between corruption and allocation of resources is moderated by the political connectedness and voter turnout. The empirical evidence presented in this paper suggests that the distance from state capitols and voter turnout moderate the relationship between corruption and firm concentrations.

2. Empirical Framework

Previous studies have found that corruption shifts the allocation of expenditures away from health and education and towards capital projects, partly because capital projects provide an easier opportunity to levy larger bribes (Tanzi and Davoodi 1998; Liu and Mikesell 2014). In addition, as Shleifer and Vishny (1993) suggest, the illegal nature of corruption requires secrecy and in that sense large public capital projects may offer a better opportunity for corruption. Furthermore, Hessami (2010) shows that corruption tends to prevail when barriers to entry are high and bribe givers face less competition. Although corruption may increase the concentration of capital projects, some studies find that the quality of these public works is often sub-par as well (Kahn 2005; Escaleras, Anbarci, and Register 2007). The idea that public infrastructure is adversely affected by corruption has led Golden and Picci (2005) to propose measuring corruption by the difference between the value of existing infrastructure and the actual physical infrastructure. This points toward using construction as a prime industry for analysis. The literature also suggests that in more corrupt environments resources shift out of education and non-profit activities since these activities do not provide as many "lucrative" opportunities for profit and are more transparent (Mauro, 1998; Beraldi, 2008). This makes education an economic sector of secondary interest.

The regression results below use firm concentration, *Con*, as the dependent variable, to look at the effect of corruption on both the construction and education sectors. *Con* is measured as the proportion of firms in the selected industry (e.g. construction, health, education, etc.). Data on firm establishments are taken from the U.S. Census Bureau's County Business Patterns database. The unit of observation is 76 federal districts within the United States.

The main independent variable of interest is corruption, *Cor*, measured as the number of convictions in a jurisdiction in U.S. Federal Courts. These data are taken from the U.S. Department of Justice publication, *Reports to Congress on the Activities and Operations of the Public Integrity Section (PIS).* In contrast to most other subjective measures of corruption, which rely on people's perceptions, this measure of corruption is objective, concrete, and consistent (Kiu and Mikesell, 2014). It is based on the number of public officials who were convicted for violations of federal corruption laws. In our panel, there are more than 30,000 instances of convictions with significant variation across districts and over time.

The hypothesis that corruption alters the allocation of resources is examined in the regression equation

$$Con = \alpha + \beta Cor + \varepsilon. \quad (1)$$

Other factors might also affect the degree to which corruption affects resource allocation. Political connections obviously make a difference, and one hypothesis is that firms located closer to state capitols are more likely to have political connections, so distance from the state capitol, designated *Pol,* will affect industry concentration. Data on state zip codes are taken from https://www.census.gov/geo/maps-data/data/gazetteer2010.html to identify the locations of jurisdictions. State capitol latitude and longitudes are found at: http://www.xfront.com/us_states/.

One would expect that an informed citizenry would be in a better position to observe and therefore limit corruption. Freedom of the press appears to have a negative impact on corruption, for example (Brunetti and Weder 2003). One measure of an informed citizenry is voter turnout, *Vot*. Voter turnout should moderate the effects of corruption and be negatively correlated with changes in industry concentration. A more complete empirical specification is

$$Con = \alpha + \beta Cor + \gamma Pol + \delta Vot + \varepsilon. \quad (2)$$

Other county level variables might also affect firm concentrations. As districts become more developed, demand for industries such as education or health care may naturally go up pushing entrepreneurs towards these sectors. Therefore, *GDP* is used to capture the economic development in the community. It is measured as both the level of GDP per capita and the annual growth rate of GDP per capita. Data on GDP are taken from the U.S. Census Bureau. Demographic information might also be an important determinant of business industry concentration. Larger communities will have more businesses and possibly a different concentration of business industries. Therefore, we include the population level, *Population*. We also include *population growth,* the annual change in population. Finally, we include *population density*, which is the population per square mile. Each measure captures a different aspect of the composition of the community. For example, urban areas, as indicated by a higher population density, might have a different composition of business industry concentration.

In addition to demographic information, it is also important to include measures of human and social capital because of the relative importance of each on entrepreneurship at both the cross-country (Knack and Keefer, 1997) and regional levels (Kim and Aldriech, 2005; Westlund and Bolton, 2003). A long tradition in economics regards human capital as one of the most important determinants of economic growth and productive entrepreneurship. Higher level of human capital is also associated with many positive non-pecuniary benefits including less crime and corruption and good citizenry (Lochner, 2010). More educated people may also have greater preferences for goods and services in sectors related to health care and education affecting the concentration of firms in these sectors (Oreopoulus and Salvanes, 2011; Lochner, 2010). As it is common in the literature, *Education* is used to capture the amount of human capital in the community. It reports the percentage of adults with a bachelor's degree or higher. Education data are taken from the U.S. Census Bureau. *Social capital* is included to capture the degree of trust, reciprocity, and social networking within the community. Social capital can contribute to entrepreneurship by enabling collective action that can help promote more efficient allocation of resources, create respect for the rule of law, and limit corruption (OECD, 2015). Communities with high degree of social capital may also invest relatively more resources in non-profit sectors of the economy such as education. Data on social capital are gathered from Rupasingha et al (2006). *Unemployment rate* is included to capture the effect of business cycles on firm concentration. It is measured as the number of unemployed persons between the ages of 16 and 64 divided by the labor force participation rate. Data on unemployment are taken from the U.S. Census Bureau. Table A1 summarize variable descriptions and Table A2 in the Appendix provides summary statistics and a correlation matrix of the data used. A complete specification contains data for the years 2003-2009.

3. Kernel density of firm concentrations

Kernel densities of the concentration of firms are illustrated in Figure 1. These densities illustrate the distribution of firms in both the construction (NAICS 237) and education (NAICS 611) industries. Figure 1 also illustrates how corruption alters the distribution of firms within each industry.

[Figure 1 about here.]

The kernel density on the left in Figure 1 illustrates the distribution of firms located in the construction industry when corruption is at the 75th percentile (solid line) and when corruption is at the 25th percentile (dashed line). As the figure illustrates, increases in corruption are associated with both a shift and a change in the distribution of firms in the construction industry. There is a normal distribution of firms in the construction industry when corruption is below the 25th percentile, and there is a bimodal distribution of firms in the construction industry when corruption is above the 75th percentile. Moreover, there is an increase in the concentration of firms in the presence of higher levels of corruption; the mean increases but the dispersion also increases leading to a wider variance.

Similarly, corruption affects both the concentration and distribution of firms in the education industry. These distributions are illustrated on the right in Figure 1, and although increases in corruption are again associated with a change in the distribution, corruption has the opposite effect on the education industry. When corruption is below the 25th percentile (dashed line) firms and non-profit organizations exhibit a normal distribution in the education industry. In contrast, when corruption is above the 75th percentile (solid line), there is a reduction in the concentration of firms and non-profit organizations in the education industry.

The kernel density distributions in Figure 1 provide a visual demonstration of the effect of corruption in both the construction and education industries. Figure 1 shows that corruption is associated with an increase in the concentration of firms in the construction industry and a decrease in the concentration of firms and non-profits in the education industry. Interestingly, corruption also affects the shape of the distribution. The distribution changes from a standard to bimodal distribution when corruption increases from the 25th to 75th percentile. While these results provide preliminary evidence showing that corruption shifts resources toward the construction industry and away from education, the next section controls for potentially confounding factors in a regression analysis.

4. Regression Analysis

This section reports the results from a number of multi-level mixed regression estimations that examine the relationship between corruption and the distribution of firms into alternative industries. A multi-level model is used primarily because the data are concentrated at two separate hierarchies. First, data on corruption are measured at the U.S. Federal district level. There are anywhere between one and four federal districts for each state, for a total of 72 federal districts. Second, industry level data are measured at the U.S. county level, with a total of 3,044 counties in the United States. A hierarchical model is appropriate for these data because we are interested in examining how corruption is associated with firm distributions, and these two variables are gathered at different hierarchies.

The main results from these multi-level models are reported in Tables 1 and 2, which examine the relationship between corruption and firm concentration in the construction (NAICS 237) and education (NAICS 611) industries, respectively. Model 1 in each table includes the baseline specification that appears in all regressions. Model 2 tests our main hypothesis by adding the main variable of interest—the number of federal convictions—which is our measure of corruption. Consistent with our hypothesis, the coefficient on the corruption variable from Table 1 (model 2) shows a positive and highly statistically significant relationship between corruption and the concentration of firms into the construction industry. In contrast, the coefficient on corruption from Table 2 (model 2) reveals a negative relationship between corruption and the concentration of firms into the education sector.

[Tables 1 and 2 about here.]

In addition to these effects, we also hypothesize that the effect of corruption on the supply of firms into the construction and education industries is moderated by two important variables: voter turnout and political connections, which is defined as the distance to the state capitol. Models 3 and 4 in each of the above tables test these hypotheses by adding political distance and voter turnout as independent variables in addition to their interactive terms with corruption. These results are also consistent with our theoretical predictions from section 2. Corruption increases the proportion of firms in the construction industry and decreases the firm concentration in the education industry, but this relationship is moderated by the distance to state capitols and voter turnout.

[Table 3 about here.]

For easier interpretation of these results, Table 3 reports marginal effects of the interaction terms. The results indicate that voter turnout rates moderate the relationship between corruption and the allocation of firms. For example, in communities with median turnout rate, a one standard deviation increase in corruption is associated with a 9.8 percent increase in the concentration of firms into the construction industry. When fewer voters elect to vote, however, a one standard deviation in corruption is associated with a 10.7 percent increase in the concentration of construction firms. In addition, our results indicate that the distance to the state capitol also plays an important moderating role in determining the effect of corruption on firm supply.

While corruption continues to exert a positive effect on firm allocation into the construction industry, its effect becomes larger for communities located closer to state capitols. For example, in communities located 163 miles away, a one standard deviation increase in corruption is associated with a 6.3 percent increase in the concentration of firms in the construction industry. In contrast, a one standard deviation increase in corruption is associated with a 10.9% increase in the concentration of firms in the construction industry in the state capitol. This finding indicates that political distance is very important and for good reason.

One of the primary reasons that construction is often viewed as one of the more corrupt industries is due to its lack of transparency. Thus, our finding that corruption acts to reallocate firms into less transparent industries like construction in state capitols where there is more political oversight is theoretically sound and consistent with previous findings (Tanzi and Davoodi 1998; Liu and Mikesell 2014). Similarly, the finding that corruption has a stronger effect on the allocation of firms in the construction industry when there is lower voter turnout has important implications. Taken together, these results support the argument that corruption is a dynamic process that responds to public perception and political participation.

Table 3 also reports the relationship between corruption and firm allocation into the education industry, and the results indicate that this relationship is moderated by voter turnout and distance to the state capitol too. More specifically, a one standard deviation increase in corruption is associated with a 3.8 percent decrease of firms in the education industry when voter turnout is above the median rate and a 6.2 percent decrease of firm concentration into the education industry when voter turnout is below the median rate.

We also find that distance to the state capitol moderates the relationship between corruption and firm concentration in the education industry. Near state capitols, a one standard deviation in corruption is associated with a 4.7 percent increase in the concentration of firms into the education industry. This effect decreases as the community moves farther from the state capitol and becomes statistically insignificant at the farthest distance. This finding suggests there is a spillover effect that occurs in communities near the state capitol. Thus, while corruption might be associated with a larger allocation of firms into the construction industry near the state capitol, other industries like education also experience an increase in concentration.

These results should be interpreted with caution due to two methodological limitations of the analysis: (1) omitted variable bias and (2) reverse causality. First, while we try to mitigate problems associated with omitted variable bias by including a rich set of covariates such as the level of economic development, social capital, and education, it is always possible that unobserved district or county characteristics such as the quality of formal institutions are correlated with both the concentration of firms in particular sectors and the level of corruption. In that case, the results will show downward bias and will represent a lower bound of the true causal effect. Second, there are concerns about reverse causality: Is the higher concentration of firms in certain industries more likely to increase the level of corruption or is corruption more likely to affect the allocation of firms to different industries? The finding that firm concentration tends to be higher closer to state capitols suggests that the effect runs from corruption to firm concentration. It is implausible to think that current levels of corruption might have affected where state capitols were located decades or centuries ago. Overall, the results provide strong evidence for a significant relationship between corruption and firm concentration.

5. Conclusion

Much of the academic literature on the effects of corruption focuses on its macro effects, on income, growth, investment and other economy-wide variables. This paper adds to the part of the literature focusing on micro level effects, showing that in addition to reducing economic efficiency overall, corruption alters the allocation of resources. Earlier work has indicated that corruption shifts resources toward capital projects and away from education and healthcare (Tanzi and Davoodi 1998; Liu and Mikesell 2014). The results reported above support that finding. Corruption is associated with an increase in the concentration of firms located in construction industries (NAICS 237) and a decrease in the concentration of firms located in education and healthcare related industries (NAICS 61 and NAICS 62). These relationships are also affected by political connections and the quality of political capital.

Political connections, defined as the distance from state capitols, tends to alter the relationship between corruption and the supply of firms. We find that corruption is associated with an increase in the concentration of construction firms, and the effect is larger when firms are located closer to state capitols. Likewise, corruption is associated with a reduction in the concentration of firms in education industries, and this effect is larger when firms are located closer to state capitols. Lastly, using voter turnout as a measure of citizen awareness, a more politically engaged electorate is associated with a smaller impact on resource allocation, because it is more difficult to engage in corrupt behavior when voters are ready to punish corrupt political behavior.

The paper's empirical results offer some evidence on the effect of corruption on specific industries, showing that corruption tends to shift resources away from education and health care toward construction, supporting some earlier findings. More generally, these results show that not only does corruption produce macro level effects that reduce economic efficiency, it also results in micro level effects, shifting resources from some sectors of the economy to others.

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Figure 1 - Corruption affects the distribution of firms in education and construction industries

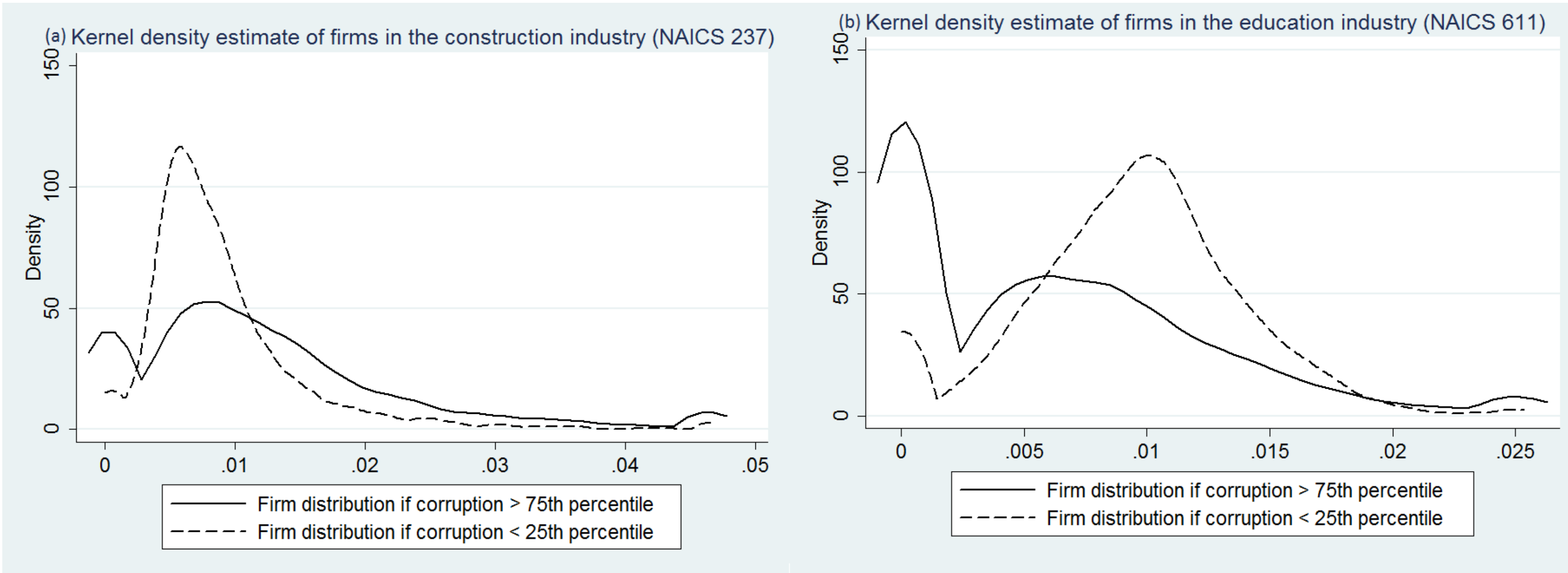

Table 1 - Corruption and firm concentration in the construction industry, 2003-2009

	Model 1		Model 2		Model 3		Model 4	
Control Variables								
GDP growth[a]	-0.00001	(0.58)	-0.00001	(0.49)	-0.00001	(0.45)	-0.000007	(0.71)
GDP[a]	-0.00004*	(0.02)	-0.00004*	(0.04)	-0.00003+	(0.08)	-0.00004+	(0.07)
Population growth	0.0014	(0.87)	0.000002	(0.82)	0.000003	(0.78)	0.000003	(0.77)
Population[a]	-0.000003***	(0.00)	-0.00001***	(0.00)	-0.000005***	(0.00)	-0.000005***	(0.00)
Population density[a]	0.00001	(0.45)	0.00001	(0.17)	0.00001	(0.17)	0.00001	(0.17)
Unemployment rate	-0.00005	(0.11)	-0.00006+	(0.06)	-0.00006+	(0.08)	-0.00006+	(0.08)
Education (%)	-0.00001	(0.69)	-0.00002	(0.52)	-0.000004	(0.88)	-0.00002	(0.44)
Social capital	0.0003**	(0.00)	0.0003**	(0.00)	0.0003*	(0.02)	0.0002	(0.23)
Hypotheses								
Corruption (C)[b]			0.0004***	(0.00)	0.0008***	(0.00)	0.001***	(0.00)
Capitol Distance					0.00001***	(0.00)		
Voter turnout[c]							0.003*	(0.05)
C x Capitol Distance					-0.000002***	(0.00)		
C x Voter turnout[c]							-0.0006***	(0.00)
Constant	0.014***	(0.00)	0.014***	(0.00)	0.012***	(0.00)	0.014***	(0.00)
Log likelihood	72081		65080		65093		65102	
N	18602		16886		16886		16886	

Note: The dependent variable is the concentration of firms in the construction industry (NAICS 237). Modeled using multi-level regression methods (mixed). P-values are in parentheses (two-tailed test). a = denoted in 1,000s. b = indicates a 1 standard deviation increase in corruption. c = mean-centered.

+ p<0.10
* p<0.05
** p<0.01
*** p<0.001

Table 2 - Corruption and firm concentration in the education industry, 2003-2009

	Model 1		Model 2		Model 3		Model 4	
Control Variables								
GDP growth[a]	-0.00007***	(0.00)	-0.00006***	(0.00)	-0.00006***	(0.00)	-0.00005**	(0.00)
GDP[a]	0.00004**	(0.00)	0.00003*	(0.04)	0.00003*	(0.03)	0.00002	(0.18)
Population growth	-0.000006	(0.36)	-0.000007	(0.30)	-0.000007	(0.32)	-0.00001	(0.17)
Population[a]	0.000003***	(0.00)	0.000005***	(0.00)	0.00003***	(0.00)	0.000005***	(0.00)
Population density[a]	0.000004	(0.50)	-0.000001	(0.93)	-0.0000002	(0.97)	-0.000001	(0.87)
Unemployment rate	0.00008***	(0.00)	0.00008**	(0.00)	0.00008**	(0.00)	0.00004	(0.13)
Education (%)	0.00005*	(0.03)	0.00004	(0.11)	0.00003	(0.24)	0.0000008	(0.98)
Social capital	-0.0002*	(0.03)	-0.0001	(0.16)	-0.0001	(0.23)	-0.0007***	(0.00)
Hypotheses								
Corruption (C)[b]			-0.0001+	(0.09)	0.0002+	(0.06)	-0.0003***	(0.00)
Capitol Distance					-0.000008***	(0.00)		
Voter turnout[c]							0.014***	(0.00)
C x Capitol Distance					-0.000002**	(0.00)		
C x Voter turnout[c]							0.0002*	(0.01)
Constant	0.002	(0.21)	0.003+	(0.09)	0.004*	(0.01)	0.006***	(0.00)
Log Likelihood	76010		68509		68520		68561	
N	18602		16886		16886		16886	

Note - The dependent variable is the concentration of firms in the education industry (NAICS 611). Modeled using multi-level regression methods (mixed). P-values are in parentheses (two-tailed test). a = denoted in 1,000s. b = indicates a 1 standard deviation increase in corruption. c = mean-centered.

+ p<0.10
* p<0.05
** p<0.01
*** p<0.001

Table 3 – Estimates of marginal effects, corruption and business concentrations by voter turnout and political distance

	Construction industry		Education industry	
Variables	Margins	p-value	Margins	p-value
Voter Turnout				
-1 Standard deviation	0.107***	(0.00)	-0.062***	(0.00)
Median voter	0.098***	(0.00)	-0.047***	(0.00)
+1 Standard deviation	0.089***	(0.00)	-0.038***	(0.00)
Capitol Distance				
At distance = 0	0.109***	(0.00)	0.047**	(0.01)
At distance = 64	0.089***	(0.00)	0.036*	(0.02)
At distance = 106	0.077***	(0.00)	0.029*	(0.04)
At distance = 163	0.063***	(0.00)	0.017	(0.14)

Note - The dependent variable is either the concentration of firms in the construction industry (NAICS 237) or the concentration of firms in the education industry (NAICS 611). Modeled using multi-level regression methods (mixed). Margins indicates the percentage change in the dependent variable for a one standard deviation change in corruption. This effect is reported at various levels of the moderating variable. P-values are in parentheses (two-tailed test).

+ p<0.10
* p<0.05
** p<0.01
*** p<0.001

APPENDIX

Figure A1 – Corruption and firm concentration in the construction industry (NAICS 237), as moderated by distance to state capital and voter turnout.

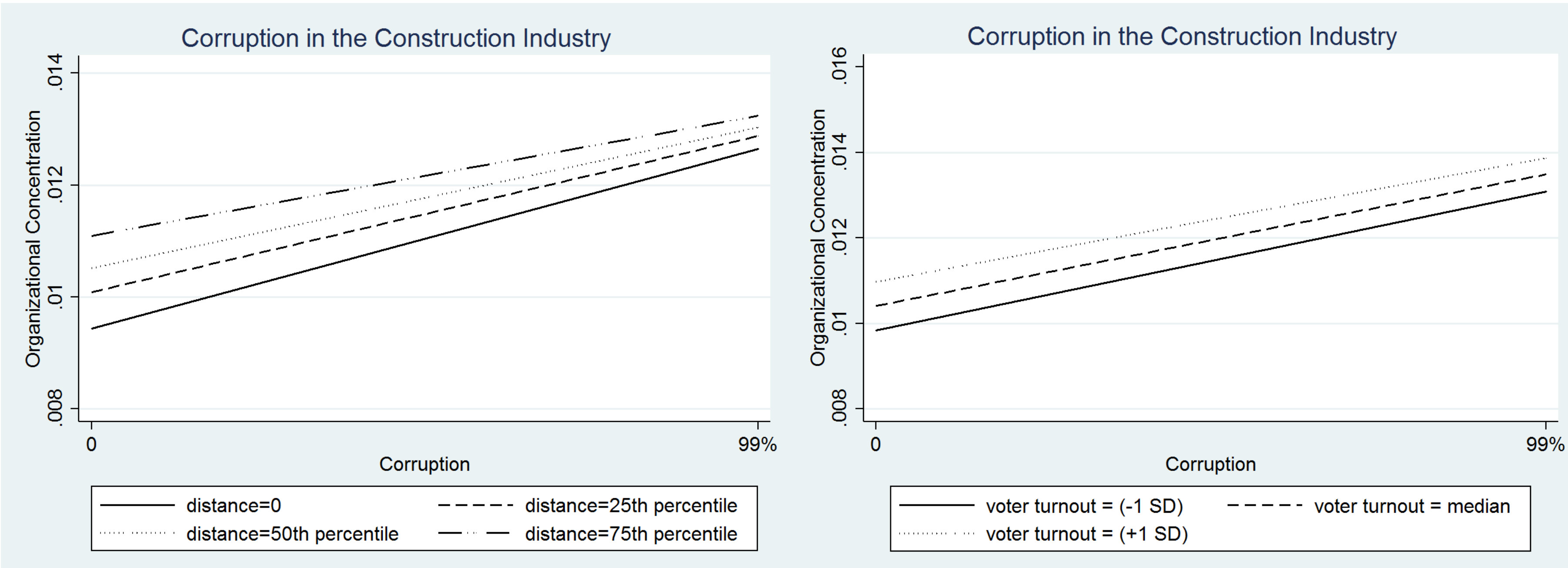

Figure A2 - Corruption and firm concentration in the education industry (NAICS 611), as moderated by distance to state capitol and voter turnout.

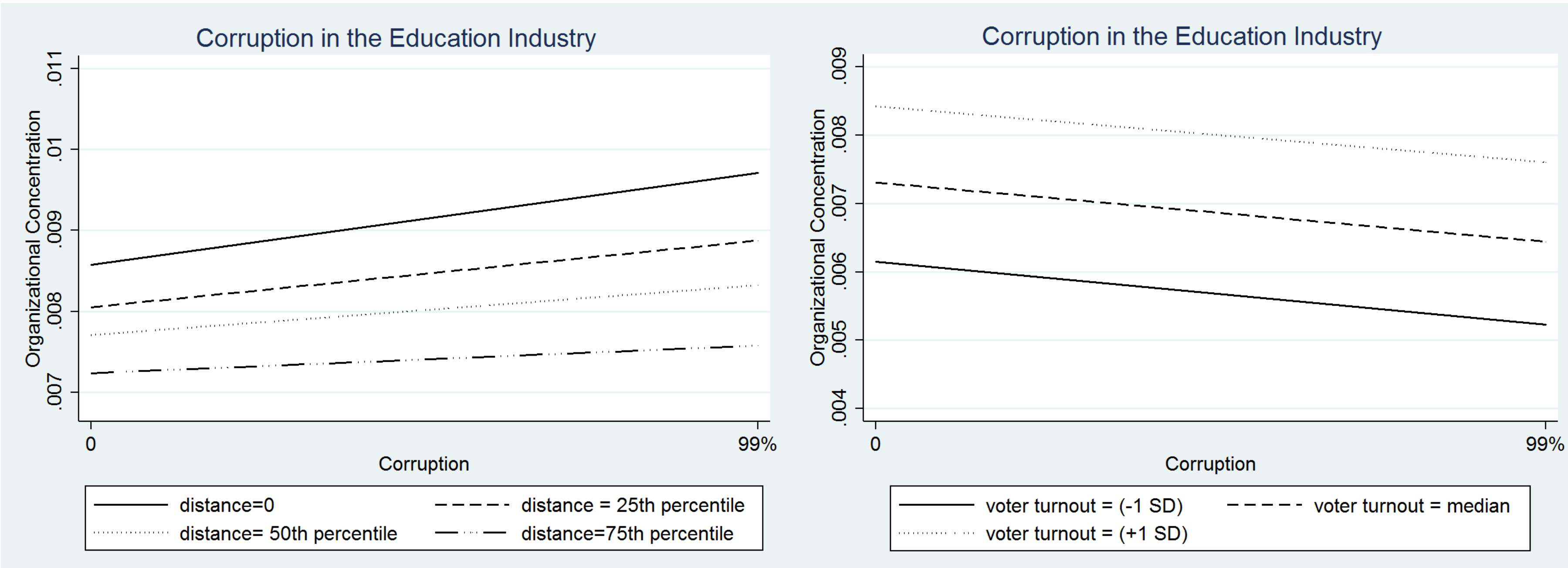

Table A1 – Variable descriptions

Variables	Description	Source
Cluster237	The concentration of firms in the construction industry (NAICS 237). This variable is measured as the total number of firms in the 3-digit industry (NAICS 237) divided by the total number of firms in all industries.	U.S. Census Bureau
Cluster611	The concentration of firms in the construction industry (NAICS 611). This variable is measured as the total number of firms in the 3-digit industry (NAICS 611) divided by the total number of firms in all industries.	U.S. Census Bureau
Corruption	The number of public officials who were convicted for violations of federal corruption laws.	Reports to Congress on the Activities and Operations of the Public Integrity Section (PIS)
Capitol Distance	Distance from the State Capitol measured in miles.	Author calculations based on latitudes and longitudes (http://www.xfront.com/us_states/)
Voter turnout	Voter participation rate measured at the county-level (FIPS).	U.S. Census Bureau
GDP growth	Annual change in Gross domestic product per capita (GDP) measured at the county-level (FIPS).	U.S. Census Bureau
GDP	Gross domestic product per capita (GDP) measured at the county-level (FIPS).	U.S. Census Bureau
Population growth	Annual change in population measured at the county-level (FIPS).	U.S. Census Bureau
Population	Population measured at the county-level (FIPS).	U.S. Census Bureau
Population density	Population per square mile measured at the county-level (FIPS).	U.S. Census Bureau
Social capital	Overall measure of social capital based on measures of civic response rates, voting, and participation in various associations.	Rupasingha et al. (2006)
Education (%)	The percentage of individuals who have a bachelor's degree or higher measured at the county-level (FIPS).	U.S. Census Bureau
Unemployment rate (%)	Unemployment is calculated as the total number of unemployed persons between the ages 16 and 64 divided by the labor participation rate (unemployed persons + employed persons).	U.S. Census Bureau

Table A2 - Summary statistics and correlation matrix

Variable	Mean	SD		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]
Cluster237	0.01	0.01	**[1]**	1												
Cluster611	0.01	0.01	**[2]**	-0.09*	1											
Corruption	113.79	428.81	**[3]**	0.22*	-0.04*	1										
Capitol Distance	123.66	81.38	**[4]**	0.14*	-0.08*	0.15*	1									
Voter turnout	0.59	0.09	**[5]**	0.09*	0.047*	0.31*	-0.08*	1								
GDP growth	1043.20	2116.09	**[6]**	0.00	-0.01	0.01	-0.00	0.02*	1							
GDP	30417.62	7501.90	**[7]**	-0.07*	0.12*	0.07*	-0.06*	0.40*	0.20*	1						
Population growth	0.71	4.02	**[8]**	-0.01	0.02*	-0.08*	-0.04*	-0.04*	-0.24*	0.05*	1					
Population	84558.42	226343.40	**[9]**	-0.15*	0.14*	-0.09*	-0.06*	-0.05*	0.01	0.34*	0.05*	1				
Population density	323.24	5009.25	**[10]**	-0.04*	0.04*	-0.02*	-0.02*	-0.02*	-0.01	0.14*	0.31*	0.20*	1			
Social capital	0.05	1.36	**[11]**	0.08*	-0.07*	0.29*	0.10*	0.68*	0.06*	0.33*	-0.09*	-0.15*	-0.01	1		
High school (%)	81.17	7.85	**[12]**	-0.05*	0.07*	0.08*	-0.12*	0.57*	0.04*	0.55*	0.04*	0.14*	0.02*	0.48*	1	
Unemployment rate (%)	5.89	2.49	**[13]**	-0.10*	0.01	-0.10*	-0.07*	-0.15*	-0.24*	-0.28*	0.05*	-0.01	0.00	-0.28*	-0.27*	1

Note - N = 16,886. Pairwise correlations reported. *p<0.05