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Abstract

This paper investigates the links between corruption and compliance with social distancing during COVID-19 pandemic in America. Both theory and empirical evidence point to a corrosive effect of corruption on trust/social capital which in turn determine people's behavior towards compliance with public health policies. Using data from 50 states we find that people who live in more corrupt states are less likely to comply with so called *shelter in place/stay at home* orders.
Keywords: Corruption; COVID-19; Social Distancing; Trust; Social Capital; American States
JEL Codes: D70, D73, H75, I18,

1 Introduction

Social distancing is the main policy in the global public health and policy response to the COVID-19 pandemic. Understanding the determinants of compliance with this policy is important as the virus spreads to ever more vulnerable communities which are less able to handle large numbers of critically ill patients. Many of these communities lack not only the physical and social infrastructure needed to fight the COVID-19 pandemic but are also often viewed as having endemic corruption.

Motivated by several related literatures ranging from sociology, to political science, to economics, this research note investigates the role of corruption in determining compliance with social distancing using data from 50 American states. Using a corruption measure based on corruption convictions and a measure of compliance based on cell phone activity constructed by *SafeGraph*, we find that states with higher corruption convictions have lower levels of compliance.

Our findings suggest that communities in which corruption is endemic will find it difficult to employ effective containment and mitigation strategies based on social distancing. As such communities typically already suffering from poor health infrastructures and outcomes (Azfar and Gurgur, 2008; Friedman, 2018; Dincer and Teoman, 2019) will face this crisis with very few effective weapons in their arsenal. An implication of this is that additional funding will have to be directed towards fighting the virus. While there are valid concerns that corruption will prevent such funds reach the intended targets and beneficiaries (Suryadarma and Yamauchi, 2013; Briggs 2014), there is some evidence that aid for public health aid can be effective even in corrupt states (Dietrich, 2011).

The rest of the paper is organized as follows. In the next section, we will discuss the channels through which corruption affects compliance with social distancing. In section 3, we describe the data. In section 4, we discuss the estimation method and present the results. In section 5, we conclude.

2 Corruption, Social Capital, and *Shelter in Place*

Starting with California in mid-March, the majority of American states instituted *shelter in place/stay at home* orders as part of their greater social distancing policies. Schools, restaurants, and bars were closed, and all nonessential businesses were ordered to keep workers home and let them work remotely. People were asked not to leave their homes unless necessary. Penalties for the violators varied significantly across the states. While in some states, there were no penalties, in most of the states, violation of the orders was considered a misdemeanor punishable with a small fine, albeit never enforced. In states such as Kentucky, Maryland, Michigan, and Pennsylvania, protesters, sometimes armed with assault rifles, packed state capitols and streets violating the states' orders, while in London, police arrested people protesting social distancing orders in Hyde Park. In other words, although it was mandated in theory, in practice, states depended heavily on voluntary social distancing. This resulted in a significant variation in social distancing behavior across the states.

There are several variables that can plausibly explain the variation in compliance with *shelter in place/stay at home* orders across American states including corruption. Corruption affects how people behave through its effects on trust in government and legitimacy of government.

Trust in government is an important determinant of social capital which is defined as a set of norms shared among people that allows cooperation to help solve collective action problems. Social capital manifests itself in communities as a reciprocal relationship between levels of civic participation and interpersonal trust. The more that people participate in their communities, the more that they trust others; the greater trust that people hold for others, the more likely they are to participate (Brehm and Rahn 1997 and Fukuyama 1995). Interpersonal trust depends heavily on trust in government (Levi 1998, Levi and Stoker 2000, Rothstein 2000, 2005). According to Rothstein and Eek (2009), when forming their beliefs about the other people in a community, people make inferences from the behavior of government officials. In other words, they simply form their beliefs based on the following way of thinking: ''if it proves that I cannot trust the local policemen and judges, then whom in the society can I trust?'' (Rothstein and Eek 2009, 90). Several studies in political science literature find negative effects of corruption on trust in government (Anderson and Tverdova, 2003, Chang and Chu, 2006, Rothstein and Eek, 2009). Because trust in government and interpersonal trust are positively related, corruption affects interpersonal trust negatively. As Rothstein and Eek (2009) argue,

- if government officials in a society are known to be corrupt, people will believe that they cannot be trusted. They will therefore think that most other people cannot be trusted;
- if government officials in a society are known to be corrupt, people will believe that other people engage in corruption as well. They will therefore think that most other people cannot be trusted.

Lower interpersonal trust means lower civic participation, and lower civic participation means lower social capital. Since social distancing can be considered as a collective action problem, we expect people not to comply with the *shelter in place/stay at home* orders in corrupt states with low social capital.

Gilson (2003) argues the production of health and health care requires cooperation within health systems which in turn requires trust. Several empirical studies present persuasive evidence regarding the effects of trust in government in particular, and social capital in general on compliance with public health policies. Blair et al. (2017), for example, investigate the behavior of Liberians during the 2014-2015 outbreak of Ebola, and they find that people with lower trust in government took fewer steps to protect themselves and were less likely to comply with the government's social distancing orders. Vinck et al. (2019) in the context of a later outbreak in the Democratic Republic of Congo find similar results. They find that low trust in government explains lower willingness to adopt preventative behavior and accept a vaccine.[1] Trust/social capital have been found, in some contexts, to be determinants of mental and physical health (Lochner et al. 2003; Yip et al. 2007; Ahnquist et al. 2012).

The second channel through which corruption affects social distancing is *legitimacy of government*. As Christensen and Laegreid (2016) argue, legitimacy affects how people behave toward government in crises such as the one we are experiencing today. Government legitimacy is defined as a force that increases compliance with the law even when the threat of punishment is low (Tyler 2006). Levi and Sacks (2009), using survey data from Sub-Saharan Africa, find that tax compliance is positively related to government legitimacy. Several experimental and empirical studies such as Seligson (2002) and Boly et al. (2019), find a negative relationship between corruption and government legitimacy, and Ali et al. (2014) find evidence that corruption weakens tax compliance in South Africa and Uganda. In other words, to the extent that corruption weakens the legitimacy of government, we expect that it will also reduce compliance with *shelter in place/stay at home* orders.

3 Data

Investigating the relationship between corruption and social distancing presents several challenges, perhaps the most important one being the measurement of people's compliance with social distancing. We use the *Shelter in Place Index* constructed by SafeGraph. SafeGraph measures people's *stay at home* behavior as the percentage of people staying home all day compared to a baseline based on population movement data representing 45 million smartphone devices. The index ranges from -100 to 100, where 0 indicates no change from the baseline. Baseline is defined as the average percentage of people staying home all day and every day across the seven days ending February 12, 2020. Home is defined as the most common nighttime location of the smartphone device in recent months identified to a precision of about 100 square meters. As an example, if the baseline percentage of people staying home for a state is 20, and 30 percent of the population is staying home on March 27th, then the index for March 27th is 10.[2] Our sample covers four consecutive Saturdays starting from April 11. Over the last three weeks of April and the first week of May, *shelter in place/stay at home* orders were in place in all states but seven, and the infections peaked in a majority of the states.

[1] See Yaqub et al. (2014) for a more general study covering European countries regarding the relationship between trust and vaccine hesitancy.

[2] See safegraph.com for details.

We measure corruption using data from the Justice Department's "Report to Congress on the Activities and Operations of the Public Integrity Section." In response to Watergate and growing concerns about corruption, the Public Integrity Section was established in the Justice Department in 1976 to prosecute corrupt officials. This unit reports the total convictions for crimes related to corruption annually. The data are available starting from 1976. These data cover a broad range of crimes from election fraud to wire fraud. This Corruption Convictions Index (*CCI*) is used in several studies such as Glaeser and Saks (2006), Dincer (2008), and Alt and Lassen (2012) to measure corruption across states. To construct *CCI*, following Glaeser and Saks (2006) and Alt and Lassen (2012) we deflate the number of convictions by state population. Since the data cover convictions of both private individuals and public officials, deflating the number of convictions by population instead of the number of government employees is more appropriate. Because it takes time for corruption to affects people's level of trust (both interpersonal and government) and level of civic participation, we use *CCI* averaged over the last decade in our empirical analysis.

We also control for several economic and demographic variables in our empirical analysis to minimize the omitted variable bias. We first control for how generous and pro-social people in each state are in terms of charitable giving and volunteering. We use the State Generosity Index constructed by WalletHub which ranges from 0 to 100.[3] Charitable giving and volunteering are the most relevant components of social capital in the context of this paper.[4] We construct a dummy variable, SGI, which is equal to 1 if a state falls into the highest quartile of WalletHub's State Generosity Index. Figure 1 shows how people respond to *shelter in place/stay at home* orders in five most/least charitable/corrupt states which fall into lowest quartile of generosity and highest quartile of corruption. Second, we control for the percentage of people tested positive for COVID-19 in each state on four consecutive Thursdays starting from April 9 (*COVID*-19 *Positive*). The third control variable is the percentage of the votes that Donald Trump received in 2016 presidential elections (*Trump*). Donald Trump showed his support loudly and repeatedly over both traditional and social media to people protesting (and violating) the *shelter in place/stay at home* orders issued by the governors of several states. The data are from electproject.org. The next two control variables are per capita personal income (*Income*), and unionization (*Union*). Social distancing is costlier for some than others. People living paycheck to paycheck with little to no savings may not comply with social distancing. Regarding unionization, the pandemic resulted in job losses across the country, but many union workers had various protections due to their collective bargaining agreements. As NBC News reports, approximately 150,000 United Auto Workers members at Ford, General Motors, and Fiat Chrysler lost their jobs, but continued to receive supplemental unemployment benefits payments from the automakers. Their contract gives members at least six months of extra pay on top of unemployment insurance that adds up to being 85 percent of their hourly wages. Our *Income* data are from the Bureau of Economic Analysis and *Union* data are from unionstats.com. Finally, we control for population density. In densely populated urban communities, the risk of infection is higher. The data are from the Census Bureau. All control variables except *Trump* are from last year. Summary statistics are presented in Table 1.

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[3] See wallethub.com for details.

[4] Unfortunately, we are not able to control for trust in government and interpersonal trust. Two frequently used surveys, American National Election Study (ANES) and General Social Survey (GSS) which ask questions regarding trust, are both nationally representative surveys. In other words, sampling is not done at the state level.

4 Estimation Method and Results

We estimate a system of four equations with seemingly unrelated regressions (SUR) in which the dependent variables are the *Shelter in Place Indices* for April 11, April 18, April 25, and May 2. Each Saturday forms one fourth of the system. Estimating a system with SUR has several advantages over estimating each equation individually with Ordinary Least Squares (OLS). First, SUR is more efficient because it allows errors to be correlated across the equations. Second, because each equation has the same set of independent variables, it allows us to conduct joint tests. The maximum likelihood estimates with robust standard errors clustered at the state level are presented in Table 2.[5]

The estimated coefficient of *CCI* is negative and statistically significant in all four equations indicating that in corrupt states people are less likely to comply with *shelter in place/stay at home* orders. The magnitude of the effect is significant as well. Based on the estimated coefficients in Equation 4, a one standard deviation increase in *CCI* causes the *Shelter in Place Index* to decrease by approximately 10 percent. The standardized effect of *COVID*-19 *Positive* is only slightly greater than 10 percent. Perhaps more interestingly, the magnitude of the effect increases each week. The estimated coefficient of *CCI* in Equation 4 (*Shelter in Place Index* on May 2) is 2.5 times greater than the one in Equation 1 (*Shelter in Place Index* on April 11). As what many call "quarantine fatigue" developed, people stayed home less and less during the time period that our sample covers. Across all states, on average, the *Shelter in Place Index* decreased by 30 percent from April 11 to May 2. On the other hand, in states such as Mississippi, Montana, Oklahoma, and South Dakota which fall into the highest quartile of *CCI*, it decreased more than 50 percent even though the risk of infection was still high, and the percentage of people tested positive for COVID-19 stayed the same or increased. Our results show that "quarantine fatigue" makes the collective action problem even more difficult to solve in states in which corruption is high.

The signs of the estimated coefficients of the control variables are also statistically significant and their signs are in line with our expectations. People respond to *shelter in place/stay at home* orders if more people tested positive for COVID-19. In densely populated charitable states, they stay at home more as well. The estimated coefficient of *Trump* is not only negative, but its magnitude is also greater than that of *CCI*. Based on the estimated coefficients in Equation 4, a one standard deviation increase in *Trump* reduces the *Shelter in Place Index* by 20 percent. Finally, in richer states and the states in which workers are unionized people comply with social distancing policies more.

Several economic and demographic control variables which we think are relevant are omitted in our regressions because of multicollinearity. When we included variables controlling for income inequality, poverty, race, gender, and age in our regressions, their coefficients were estimated to be statistically insignificant with very high *p* values. Inclusion of these variables in the estimation did not change the estimated coefficient of *CCI* either. We do not report the results for the sake of brevity, but they are available on request.

[5] For correlation matrix of residuals see Table 3.

5 Conclusion

Studies from across the social sciences have pointed to corruption as corrosive to trust/social capital which are vital to compliance with public health orders. Using data from American states, we show that more corrupt states are likely to have lower compliance with *shelter in place/stay at home* orders.

The findings of this paper, which we believe hold beyond America given that the mechanisms linking corruption to trust/social capital, and trust/social capital to public health have been found to hold in variety of contexts, suggest that countries with endemic corruption will find it more difficult to contain the virus through public health orders. Many developing countries suffer from poor health infrastructure and endemic corruption.

In terms of policy, our findings and the literatures on which they are built suggest that corrupt countries may need the help of external, and trusted agencies to legitimize public health orders. Because they may find that compliance is lower than in other places, they will need additional resources to fight the COVID-19 crisis.

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Figure 1. Most/Least Charitable/Corrupt States

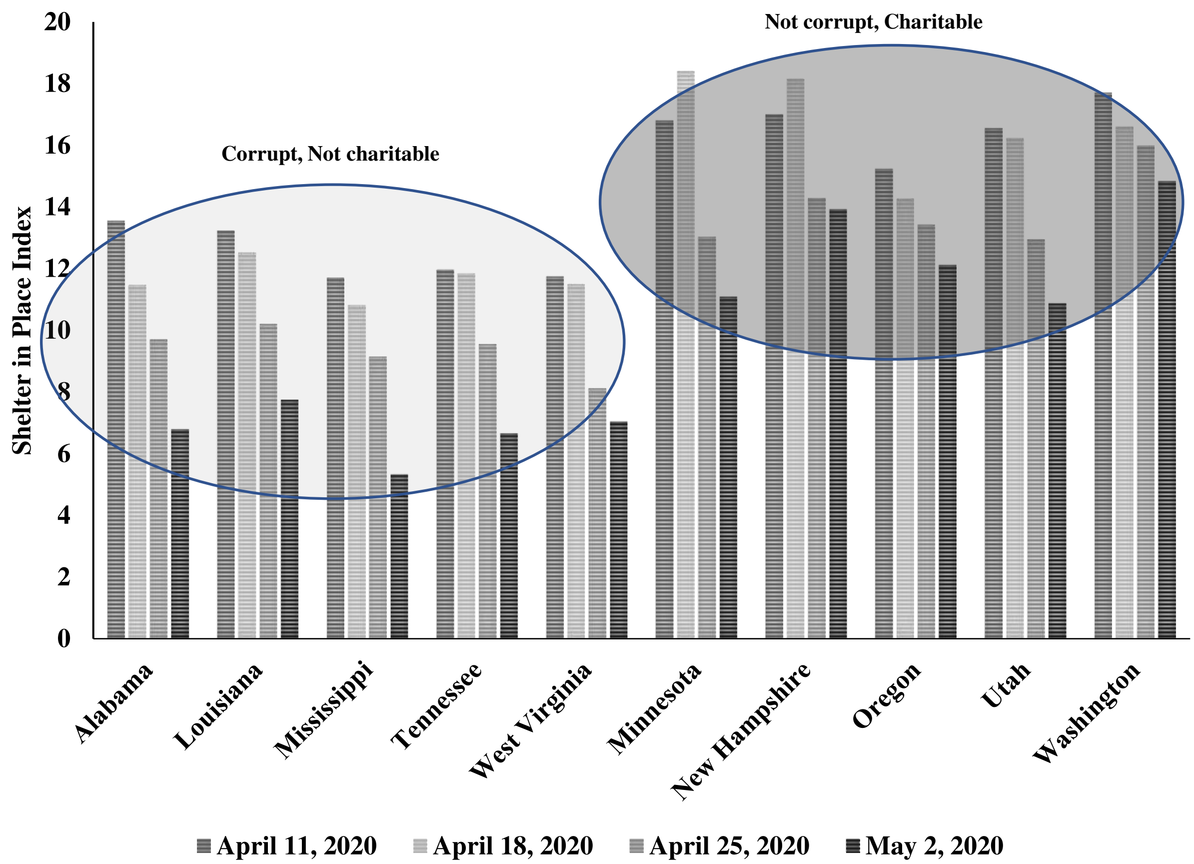

Table 1. Summary Statistics

	Mean	Std. Dev.	Min.	Max.
Shelter in Place Index				
***April* 11, 2020**	15.782	4.017	9.06	27.62
***April* 18, 2020**	16.035	4.237	9.89	29.05
***April* 25, 2020**	12.854	4.249	6.48	26.08
***May* 2, 2020**	11.107	4.623	4.22	24.26
COVID*-19 *Positive				
***April* 9, 2020**	0.122	0.093	0.028	0.476
***April* 16, 2020**	0.126	0.094	0.026	0.496
***April* 23, 2020**	0.129	0.093	0.023	0.499
***April* 30, 2020**	0.124	0.088	0.019	0.479
CCI	2.996	2.071	0.301	10.784
SGI	0.260	0.443	0	1
Trump	49.241	10.220	30.030	68.500
Income	83,686	16,537	32,044	124,946
Union	11.274	5.152	3.600	24.400
Population Density	0.202	0.264	0.001	1.197

Table 2. Maximum Likelihood SUR Estimation
Dependent Variable: Log *Shelter in Place Index*

	Equation 1 **April 11, 2020**	**Equation 2** **April 18, 2020**	**Equation 3** **April 25, 2020**	**Equation 4** **May 2, 2020**
COVID*-19 *Positive	0.804	0.847	1.248	1.260
	(0.147)***	(0.194)***	(0.184)***	(0.274)***
CCI	-0.016	-0.017	-0.030	-0.043
	(0.007)**	(0.006)***	(0.006)***	(0.012)***
SGI	0.101	0.095	0.090	0.140
	(0.039)**	(0.038)**	(0.048)*	(0.053)***
Trump	-0.009	-0.007	-0.012	-0.018
	(0.002)***	(0.002)***	(0.002)***	(0.003)***
Log *Income*	0.122	0.134	0.106	0.218
	(0.065)*	(0.068)**	(0.073)	(0.105)**
Union	0.009	0.007	0.010	0.012
	(0.004)**	(0.003)**	(0.004)**	(0.006)**
Population Density	0.035	0.041	0.043	0.046
	(0.008)***	(0.008)***	(0.011)***	(0.012)***
Constant	1.406	1.206	1.403	0.328
	(0.712)**	(0.779)	(0.853)*	(1.221)

Robust standard errors (clustered at the state level) in parentheses. All models control for region fixed effects. ***, **, and * represent statistical significance at 1%, 5%, and 10% levels, respectively.

Table 3. Correlation Matrix of Residuals

	April 11	April 18	April 25	May 2
April 11	1			
April 18	0.806	1		
April 25	0.871	0.794	1	
May 2	0.847	0.763	0.846	1