

Weathering Corruption

Peter T. Leeson *George Mason University*

Russell S. Sobel *West Virginia University*

Abstract

Could bad weather be responsible for U.S. corruption? Natural disasters create resource windfalls in the states they strike by triggering federally provided natural-disaster relief. By increasing the benefit of fraudulent appropriation and creating new opportunities for such theft, disaster-relief windfalls may also increase corruption. We investigate this hypothesis by exploring the effect of disaster relief provided by the Federal Emergency Management Agency (FEMA) on public corruption. The results support our hypothesis. Each additional \$100 per capita in FEMA relief increases the average state's corruption by nearly 102 percent. Our findings suggest notoriously corrupt regions of the United States, such as the Gulf Coast, are in part notoriously corrupt because natural disasters frequently strike them. They attract more disaster relief, which makes them more corrupt.

1. Introduction

Between 1990 and 2002 the United States convicted more than 10,000 public officials of corruption-related crimes. The geographic distribution of corrupt politicians and bureaucrats was far from even, however. The United States as a whole averaged four corruption-related convictions per 100,000 residents. Mississippi, Florida, and South Dakota averaged 7.5 per 100,000 residents, while Utah, Arizona, and Nebraska had less than half the U.S. average.

Over the same period 599 natural disasters struck the United States. Like corruption, these too were unevenly distributed. Oddly, the geography of natural disasters maps the geography of corruption extremely well. Fifty-six of these natural disasters occurred in Mississippi, Florida, and South Dakota. Only 13 occurred in Utah, Arizona, and Nebraska.

The positive connection between public corruption and natural disasters holds throughout the United States. Consider Figure 1, which uses raw data to plot the prevalence of natural disasters and public corruption for each of the 50 states.

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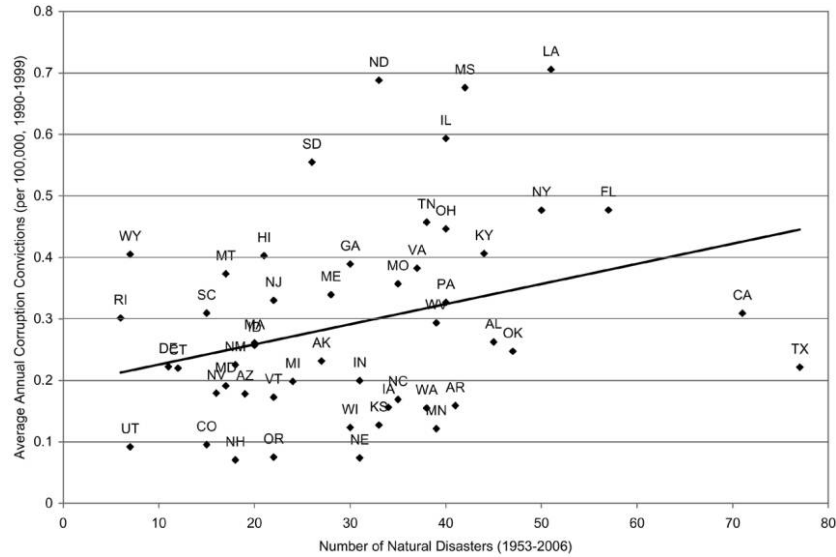


Figure 1. Natural disasters and corruption

The relationship is clearly positive: states hit by more natural disasters are more corrupt.

What accounts for this peculiar relationship? It is as though some parts of the United States are cursed with bad weather and dirty politicians while others are blessed with good weather and more scrupulous government officials. Could bad weather be responsible for corruption?

Strange as it may seem, indirectly, the answer may be yes. Bad weather by itself is unlikely to impact corruption. However, the windfall of federally provided resources that follow bad weather is not so innocent.¹ By increasing the benefit of fraudulent appropriation and creating new opportunities for such theft, disaster-relief windfalls may also increase corruption.²

Following flooding in Buchanan County (Virginia) in 2002, for example, county officials embarked on a frenzy of bribe solicitation for relief-related reconstruction contracts that ended in 16 indictments for public corruption. As the lead federal prosecutor of the case described it, "From Day One that [Federal Emergency Management Agency] FEMA money showed up, bribes were being

¹ A growing body of research documents that disaster relief provided by the Federal Emergency Management Agency (FEMA) often follows political concerns rather than humanitarian ones. See, for instance, Garrett and Sobel (2003), Sobel and Leeson (2006), and Shughart (2006).

² Recent work in development economics shows that resource windfalls generated by rich natural resource endowments or foreign aid can lead to a similar effect. See, for instance, Djankov, Montalvo, and Reynal-Querol (2005), Ades and Di Tella (1999), Leite and Weidmann (1999), and Svensson (2000).

taken” (Lakin 2004). The chaotic and confused atmosphere typically created in the wake of a major natural disaster facilitates public officials’ ability to do this.

The other forms corruption may take in the context of natural-disaster relief are equally familiar. Public officials may directly steal relief resources through embezzlement. In 2005, for example, an employee of Florida’s Department of Health and Rehabilitative Services attempted to steal \$48,000 in FEMA relief following a 1998 hurricane in Florida (*Insurance Journal* 2005).

Public officials may also indirectly transfer government-provided relief funds to private parties for their own gain. For instance, in 1997 FEMA provided \$1.2 million in relief to Guam to replace bus shelters decimated by Super Typhoon Paka. The governor of Guam’s chief of staff illegally awarded the hefty contract to the governor’s primary business rival in return for the rival’s support of the governor in the 1998 gubernatorial campaign (Office of Inspector General 2004, p. 42).

This paper explores the effect of FEMA-provided disaster relief on public corruption. We find each additional \$100 per capita in FEMA relief increases the average state’s corruption by nearly 102 percent. Our findings suggest that notoriously corrupt regions of the United States, such as the Gulf Coast, are in part notoriously corrupt because natural disasters frequently strike them. They attract more disaster relief, which makes them more corrupt.

2. Data

Our analysis uses panel data covering the U.S. states between 1990 and 1999. Our corruption data are from U.S. Department of Justice (1999). We divide annual corruption-related crime convictions in each state by the state’s population in that year to derive annual corruption-related crime convictions per 100,000 residents for each state in each year over our period.³

These data include all federal, state, and local public officials convicted of federal crimes related to corruption, as well as private citizens involved in what the Department of Justice defines as “public corruption offenses.” Roughly half of all federal corruption-related convictions are federal employees. About a quarter are state and local employees; the remaining quarter are private citizens.

Corruption-related crimes include, in part, theft from the government, embezzlement, or other abuse of government resources by a public official; bribery of or by a public official; extortion or other “political shakedowns” by a public official; kickback payments to or from a public official; election-related crimes (such as vote fraud or campaign finance violations) by a public official; unlawful insider deals (such as negotiating a contract with a private vendor in whose firm the negotiator or his or her family have a financial interest) by a public official;

³ In a few cases, corruption data are not reported for various years in certain states. Our empirical analysis excludes these observations.

and other violations of the federal criminal code by public officials in their capacity as agents of government.

State-level corruption rates display considerable variation across states and over time. They range from .71 average annual corruption-related convictions per 100,000 residents in Louisiana, the most corrupt state in the country, to .07 average annual corruption-related convictions per 100,000 residents in New Hampshire, the least corrupt state. The average state in our sample has .28 average annual corruption-related convictions per 100,000 residents, with a standard deviation of .25.

Our corruption data correspond well to intuition about which states are most corrupt and which states are least corrupt. Hurricane-prone Gulf Coast states, such as Louisiana, Mississippi, and Florida, are among the most corrupt states. Western Great Plains states, which suffer far fewer and less severe natural disasters, such as Nebraska, Colorado and Utah, are among the least corrupt states.

Data for our variable of interest, FEMA disaster relief payments, are from Garrett and Sobel (2003). These data identify FEMA relief received by each state in each year from 1990 to 1999. We divide these data by each state's population in each year to create each state's annual FEMA relief per capita. The three largest FEMA relief recipients are North Dakota, California, and Hawaii. Since 1953, 125 major natural disasters have struck these three states. Utah, Wyoming, and New Mexico received the least FEMA relief. Only 33 natural disasters hit these three states over this period.

Our goal is to explore how FEMA relief may lead to surges in political corruption in recipient states. We are therefore interested in the timing of FEMA disbursements and corresponding movements in corruption, not in the permanent differences in cross-state political culture that drive variation in states' underlying or "natural" levels of corruption. Thus the only variables we are interested in are those that might vary enough over time within a state to help explain a state's corruption time series.

These include variables that measure average personal income and population, which may change enough to partially determine such variations. They also include a variable that measures the share of public (federal and state) employees in each state, which may also change sufficiently. We collect data for the former variables from the Census Bureau and data for the latter variable from the Bureau of Labor Statistics. Descriptive statistics and definitions for all of our variables are reported in Tables A1 and A2.

Although institutional variables that do not change over time within a state, or change only very slowly, are important for studies, such as Glaeser and Saks (2006), that seek to explain the permanent differences in corruption across states, they are not useful for our analysis. Thus we do not separately consider states' anticorruption laws, political variables, judiciary arrangements, educational attainment, income inequality, racial fractionalization, and so on. Instead, as we discuss, we control for these time-invariant features that contribute to states' baseline levels of corruption using a fixed effects model.

3. The Evidence at a Glance

It is interesting to see how large influxes of FEMA relief windfalls affect state corruption in the raw data. Figure 2 does this by examining the Great Flood of 1993, one of the largest and most devastating natural disasters in U.S. history. The Great Flood affected nine states—Illinois, Iowa, Kansas, Missouri, Nebraska, North Dakota, South Dakota, Minnesota, and Wisconsin—each of which received some influx of FEMA relief the year of the flood. Collectively these states received close to \$1.2 billion in FEMA windfalls in 1993.

The top curve in Figure 2 plots time-series data on collective corruption in these states between 1991 and 2000. The vertical line in 1993 indicates the Great Flood and year of resulting FEMA inflows. The pattern is clear. Corruption begins relatively low in 1991, jumps in 1993 when FEMA windfalls arrive, and then rises again 2 years after the influx of FEMA relief. After 1995, when the relief windfalls have been dissipated, corruption gradually declines over time until it approximates its pre-flood level.

Although nine states received FEMA relief for the Great Flood, three states in particular—Iowa, Illinois, and Missouri—received by far the largest amounts. Federal Emergency Management Agency windfalls in these three states account for nearly 70 percent of total FEMA relief dispersed to the nine states affected by the flood. Figure 2 indicates that the pattern for the top three FEMA relief recipients is identical to the pattern for the Great Flood victims overall. The timing of FEMA windfalls is clearly linked to large spikes in corruption in the largest windfall-receiving states between 1993, when relief was distributed, and 1995. Corruption declines to its natural level after this.

Figure 2 also plots the same information for the six remaining Great Flood, FEMA-windfall recipients. The pattern for these states is nearly identical to the patterns considered above. There are only two notable differences. First, although corruption in these states increases following FEMA relief influxes in 1993 and then starts to return to its natural level 2 years later, corruption increases less dramatically following FEMA windfalls for the bottom six relief recipients than for the top three FEMA-relief-receiving states. This fact is consistent with the reasoning that larger FEMA windfalls tend to generate larger surges in corruption and vice versa.

Second, in 1998 there is a blip in the corruption trend among the aggregated bottom six states, which is otherwise returning to its normal level. What accounts for this? To see, consider Figure 3, which illustrates time-series data for corruption and FEMA relief in Minnesota between 1991 and 2000. The bars depict how much FEMA relief Minnesota received each year and the dots depict the number of corruption convictions in Minnesota each year.

Minnesota is one of the six states that make up the bottom trend curve in Figure 2. But look at what happens in Minnesota in 1997. As Figure 3 illustrates, in 1997 Minnesota received a large influx of FEMA relief. The following year corruption spiked dramatically. This spike is responsible for the 1998 blip in the

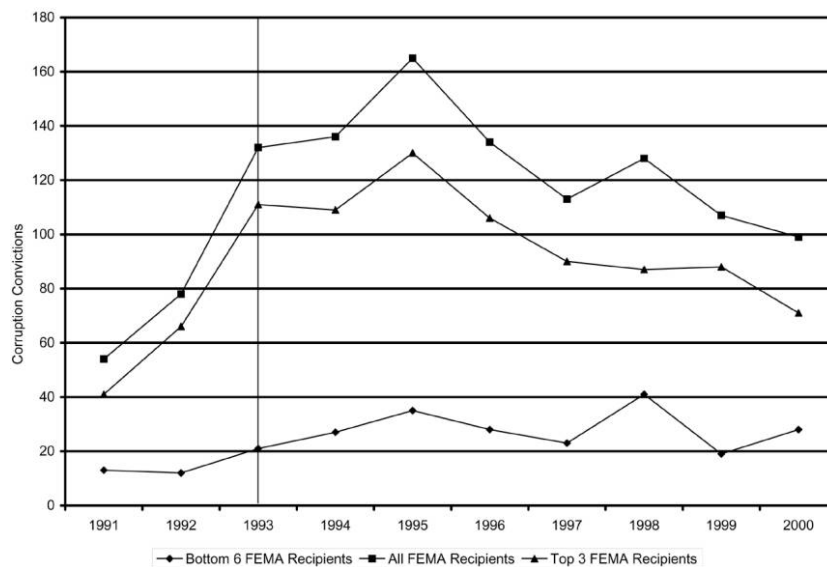


Figure 2. Federal Emergency Management Agency relief and corruption in the Great Flood of 1993.

bottom curve in Figure 2. Thus even the apparent anomaly in Figure 2 is driven by FEMA relief windfalls.

We use this same method to analyze the timing of and relationship between FEMA relief influxes and corruption for several other states in Figures 4, 5, 6, and 7. The states all received sudden FEMA windfalls owing to some natural disaster. For example, Hawaii received a large influx of FEMA relief in 1992 for Hurricane Iniki. Louisiana received large inflows of FEMA relief in 1992 for Hurricane Andrew and again in 1995 for storms and flooding. In each case, the spike in FEMA money is followed by increases in corruption.

4. Federal Emergency Management Agency Relief and Corruption

Figure 1 depicts the positive relationship between the number of natural disasters and public corruption in the 50 states. The number of natural disasters in a state proxies for the amount of FEMA disaster relief it receives because states hit by natural disasters more frequently tend to receive more FEMA disaster relief. This relationship does not control for the severity of natural disasters, however. A state that is hit by a larger number of smaller disasters will receive less FEMA relief than one that is hit by a smaller number of more severe disasters.

Therefore, a more direct way to examine our hypothesis graphically is to look at the raw relationship between corruption and FEMA relief itself. Figure 8⁴ does

⁴ North Dakota does not fit the scale for Figure 8, so we exclude it from the figure.

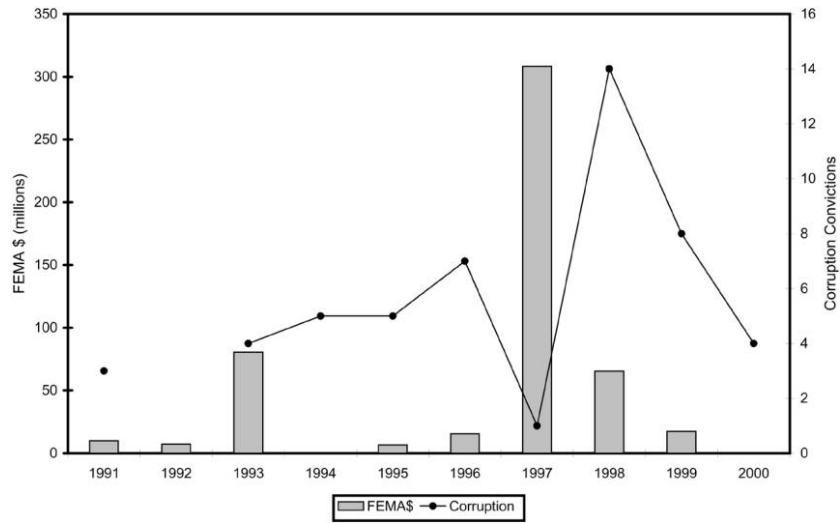


Figure 3. Timing of Federal Emergency Management Agency relief influxes and corruption in Minnesota.

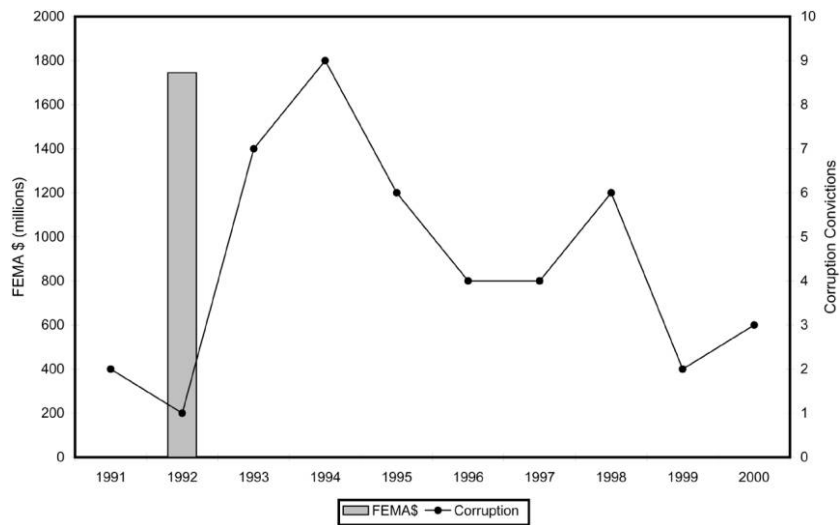


Figure 4. Timing of Federal Emergency Management Agency relief influxes and corruption in Hawaii.

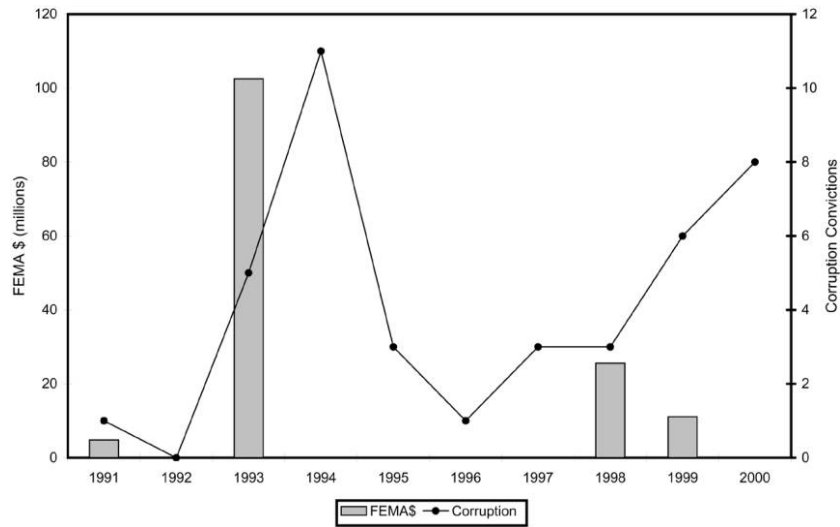


Figure 5. Timing of Federal Emergency Management Agency relief influses and corruption in Kansas.

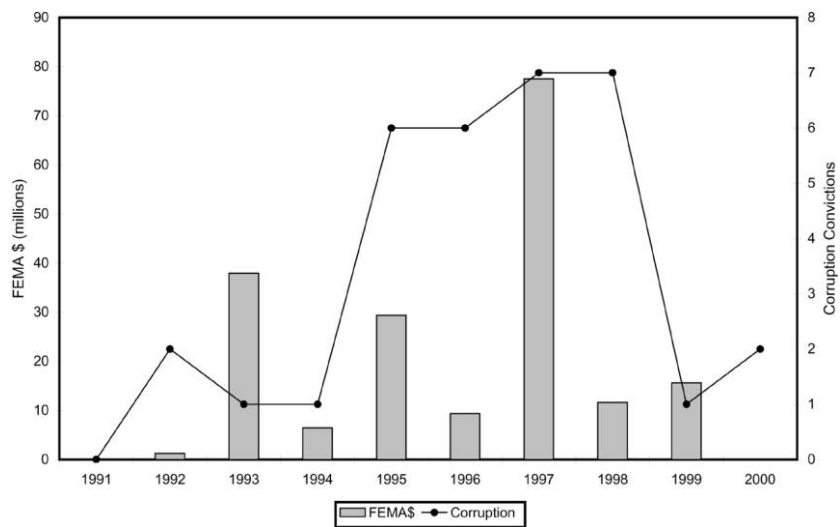


Figure 6. Timing of Federal Emergency Management Agency relief influses and corruption in South Dakota.

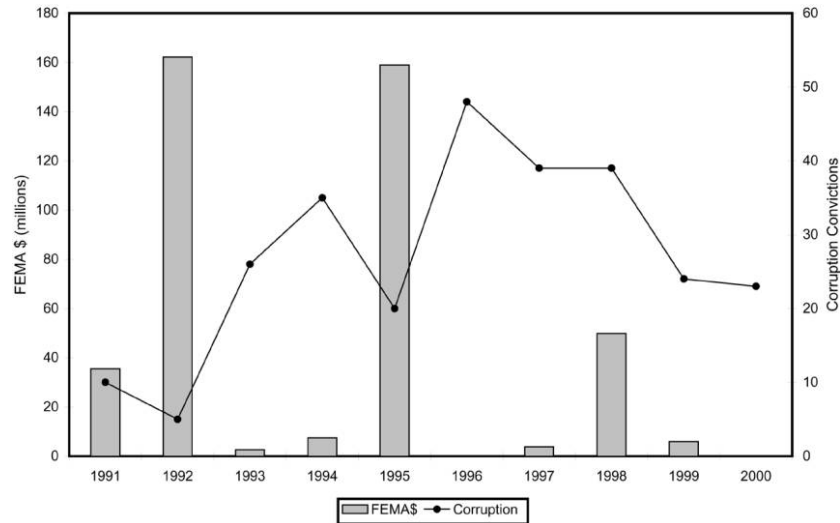


Figure 7. Timing of Federal Emergency Management Agency relief influxes and corruption in Louisiana.

this and illustrates the same pattern as Figure 1: states that receive more FEMA relief are more corrupt.

To isolate this relationship econometrically, our benchmark specification estimates the following two-way fixed effects model with standard errors clustered by state: $Corruption_{i,t} = \alpha + \sum_{j=1}^n (\beta_j \times FEMA_{i,t-j}) + \mathbf{Z}\gamma + \varepsilon_{i,t}$, where $Corruption_{i,t}$ is the number of corruption-related crime convictions in state i per 100,000 residents in year t ; β , our coefficient of interest, measures the effect of FEMA-provided disaster relief (in hundreds of dollars) per capita in state i in year $t - j$ on public corruption in state i in year t ; and \mathbf{Z} is a vector of control variables containing our fixed effects. We include a comprehensive set of year-specific fixed effects to capture any factors that might contribute to state corruption and are constant across states but vary across time. We also include a comprehensive set of state-specific fixed effects to capture any permanent differences across states that might contribute to their levels of corruption, such as institutional factors, their political cultures, and so on.

It is important to lag $FEMA_{i,t-j}$ because public officials who engage in FEMA-relief-related corruption are rarely convicted at the moment FEMA relief arrives and they corruptly appropriate these resources. This is especially so given the chaotic environment created by natural disasters. Since corruption convictions stemming from a particular burst of FEMA relief may occur in multiple years following the inflow, our model does not impose a specific lag structure on the relationship between FEMA money and corruption. Instead we let the data tell us about this lag structure. Summing the coefficients on FEMA relief for different

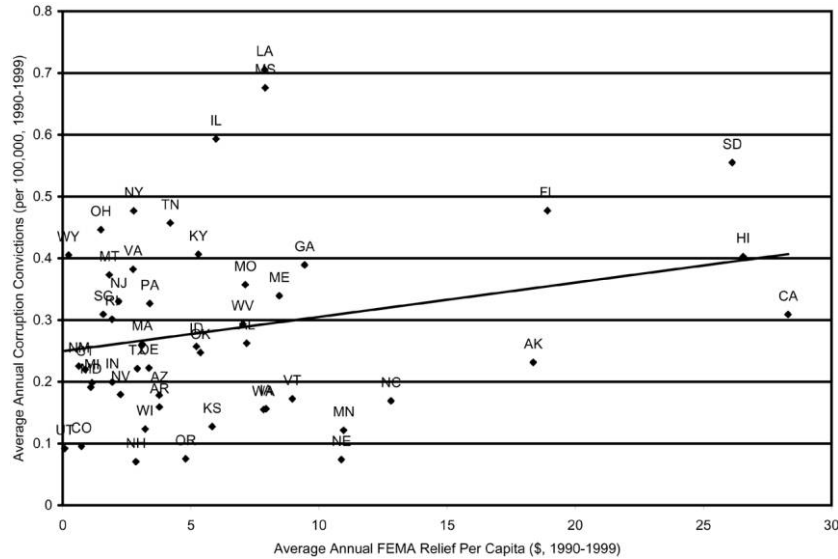


Figure 8. Federal Emergency Management Agency relief and corruption

lag intervals allows us to measure the full impact of FEMA relief on corruption over multiple years.

Table 1 presents our benchmark results. Column 1 contains our simplest specification, which includes only a 1-year lag for FEMA relief. Federal Emergency Management Agency relief has a large, positive impact on public corruption and is significant at the 5.4 percent level. Counting only the corruption convictions that FEMA relief generates in the first year following its disbursement, a \$100 per capita increase in FEMA disaster relief results in a $[(.055/0.28) \times 100 \approx] 19.6$ percent increase in the average state's corruption. The Federal Emergency Management Agency does not require Hurricane Katrina-level disasters to trigger relief disbursements of this size. In the spring of 1997, for example, South Dakota received \$78.8 million, or approximately \$106 per capita, in FEMA relief for snow storms. In the fall of 1994 Alaska received similar FEMA relief, \$74.5 million, or about \$124 per capita, for a severe storm and flooding.

Correlating the state fixed effects coefficient estimates in this regression with the number of natural disasters in each state over the period that our sample considers reveals a positive relationship. Even after accounting for FEMA relief's impact on corruption, the relationship in Figure 1 partly remains. Federal Emergency Management Agency relief, then, is an important part of, but not the entire story in terms of explaining, the variation in state corruption.

Column 2 includes lagged FEMA terms for 1 and 2 years. Unlike our specification in column 1, adding this extra lag term makes this specification sensitive

Table 1
Benchmark Results: Federal Emergency Management
Agency (FEMA) Relief and Corruption

| | (1) | (2) | (3) |
|-------------|--------------------------|--------------|--------------------------|
| FEMA, $t-1$ | .055 ⁺ (.029) | .095* (.042) | .101* (.044) |
| FEMA, $t-2$ | | .087* (.043) | .097* (.044) |
| FEMA, $t-3$ | | | .087 ⁺ (.046) |
| N | 446 | 364 | 319 |
| R^2 | .42 | .40 | .42 |

Note. Ordinary least squares with state and year fixed effects are shown. Standard errors clustered by state are in parentheses. Columns 2 and 3 exclude Louisiana, Mississippi, North Dakota, and Illinois. FEMA spending is in hundreds of dollars.

⁺ Statistically significant at the 10% level.

* Statistically significant at the 5% level.

to outliers. Thus in column 2 we exclude the four most corrupt states in the country: Louisiana, Mississippi, North Dakota, and Illinois. When we do this, both lag variables have sizeable, positive, and significant coefficients. Summing these coefficients delivers the combined effect of FEMA money on corruption 2 years after an inflow of relief. Here a \$100 per capita increase in FEMA disaster relief results in a $\{[(.095 + .087)/.28] \times 100\} \approx 65$ percent increase in the average state's corruption.

Finally, in column 3 we include lagged FEMA relief variables for 1, 2, and 3 years, excluding the four most corrupt states. All are again statistically and economically significant. In total, 3 years following disbursement, an additional \$100 per capita in FEMA disaster relief results in $(.101 + .097 + .087) = .285$ additional corruption convictions per 100,000 residents, a $(.285/.28) \approx 101.8$ increase in the average state's corruption.

Table 2 contains robustness tests. We experiment with adding controls and dropping year fixed effects.⁵ In each case a significant effect of FEMA dollars on corruption is evident. We report our results using only the 1-year FEMA lag but find nearly the same results using the more elaborate lag structures in columns 2 and 3 of Table 1. We also experiment with a different measure for our dependent variable, which divides each state's annual corruption convictions by its number of federal and state employees rather than by total citizens. When we do this, FEMA relief retains its size and sign, although its significance falls somewhat to the 13.5 percent level.

5. Concluding Remarks

Is bad weather responsible for U.S. corruption? Our results indicate that, indirectly at least, the answer may be yes. States that experience more frequent and severe natural disasters attract larger quantities of FEMA disaster relief. This

⁵ Because FEMA dollars spike in a few years across several states when a natural disaster affects multiple states simultaneously, the time fixed effects may pick up FEMA effects.

Table 2
Sensitivity Analysis

| | (1) | (2) | (3) |
|----------------------------|--------------------------|--------------|-------------|
| FEMA, $t-1$ | .053 ⁺ (.029) | .067* (.029) | .090 (.060) |
| Population Inverse | -1.15* (.56) | | |
| Share Government Employees | -.015 (.025) | | |
| Log Income | .51 (.57) | | |
| R^2 | .42 | .38 | .86 |

Note. Ordinary least squares with year and state fixed effects are shown, except for column 2, which includes only state fixed effects. Column 1 includes controls for Population Inverse, Share Government Employees, and Log Income in each state. Column 2 excludes year fixed effects. Column 3 uses Corruption/Government Employees as the dependent variable and FEMA/Government Employees as the independent variable. Standard errors clustered by state are in parentheses. Federal Emergency Management Agency (FEMA) spending is in hundreds of dollars. $N = 446$.

⁺ Statistically significant at the 10% level.

* Statistically significant at the 5% level.

relief creates a resource windfall that increases public corruption. Our findings suggest that every additional \$100 per capita in FEMA relief increases the average state's corruption by nearly 102 percent.

One interesting implication of these results is what they suggest about why some states, such as Louisiana and Mississippi, have long and notorious histories of corruption, while others, such as Nebraska and Colorado, do not. Louisiana and Mississippi's disadvantageous location in the Gulf Coast where hurricanes and other bad weather are commonplace may be a large part of the reason why they have historically been more corrupt than states in the Great Plains. In this sense, geography may play an important role in determining corruption in the United States.

Our key finding also helps to shed light on the costliest natural disaster in U.S. history, Hurricane Katrina, which struck the Gulf Coast in August 2005. Although it is still too early to permit a formal analysis, the evidence to date suggests the massive inflow of FEMA relief to Louisiana and surrounding states has led to precisely the surge in corruption our study predicts.

Since September 2005 FEMA has supplied more than \$33 billion in disaster relief for Hurricanes Katrina and Rita, generating a multitude of new avenues for abuse. Federal prosecutors have charged nearly 700 individuals with abusing FEMA relief, including public employees accused of soliciting bribes from relief-funded contractors and overbilling the government (Yen 2006; Heath 2007). In April 2006, for example, a federal court convicted two FEMA Disaster Assistance employees in Louisiana of taking bribes from a food supplier in return for falsely reporting the number of meals he provided. A number of hurricane victims have also accused public officials in Louisiana of stealing relief supplies intended for disaster victims after Katrina (Rubinkam 2005).

Similarly, in 2006 Louisiana police caught a FEMA contractor red-handed trying to sell a stolen FEMA-supplied temporary housing trailer for victims of Hurricane Katrina on the black market (CNN.com 2006). A police chief in the

Louisiana city of Independence has also pleaded guilty to charges of Katrina-relief-related fraud (Heath 2007). Post-Katrina public corruption has run so rampant that the Federal Bureau of Investigation has set up a Public Corruption and Government Fraud hotline to help monitor FEMA-relief-related political corruption.

An astonishing 1,700 criminal cases of FEMA-relief-related fraud and corruption connected to Hurricanes Katrina and Rita remain open. More ominous yet, a backlog of 11,000 potential cases identified by the Hurricane Katrina Fraud Task Force and Government Accountability Office have only just entered the early stages of investigation (Heath 2007). Only time will tell the full magnitude of the effect of FEMA-provided Katrina relief on Gulf Coast corruption. However, the magnitude of Katrina-related disbursements, coupled with the results of our analysis, suggest a considerable spike in this region's already significant corruption level.

Appendix A

Table A1
Descriptive Statistics

| Variable | Mean | SD | Min | Max |
|---------------------------------|--------|--------|-------|---------|
| Corruption | .282 | .253 | 0 | 2.131 |
| FEMA | .087 | .374 | 0 | 6.530 |
| Population Inverse | .504 | .511 | .031 | 2.206 |
| Log Income | 9.965 | .175 | 9.480 | 10.514 |
| Share Government Employees | 7.587 | 2.810 | 2.016 | 17.926 |
| Corruption/Government Employees | 15.228 | 35.603 | 0 | 324.022 |
| FEMA/Government Employees | 2.999 | 12.143 | 0 | 199.990 |

Note. Descriptive statistics are for the full sample. FEMA = Federal Emergency Management Agency.

Table A2
Variable Definitions

| Variable | Definition | Source |
|---|---|---|
| Corruption _{<i>i,t</i>} | Number of corruption-related crime convictions per 100,000 residents in state <i>i</i> in year <i>t</i> | Report to Congress on the Activities and Operations of the Public Integrity Section |
| FEMA _{<i>i,t-j</i>} | Hundreds of dollars of FEMA relief per capita received by state <i>i</i> in year <i>t-j</i> | Garrett and Sobel (2003) |
| Population Inverse _{<i>i,t</i>} | One divided by the population of state <i>i</i> in year <i>t</i> (in millions) | U.S. Census Bureau |
| Log Income _{<i>i,t</i>} | Log personal average income in state <i>i</i> in year <i>t</i> | U.S. Census Bureau |
| Share Government Employees _{<i>i,t</i>} | Percent of employees who work for the federal or state government in state <i>i</i> in year <i>t</i> | Bureau of Labor Statistics |
| Corruption/Government Employees _{<i>i,t</i>} | Number of corruption-related crime convictions per 100,000 federal and state employees in state <i>i</i> in year <i>t</i> | Report to Congress on the Activities and Operations of the Public Integrity Section; Bureau of Labor Statistics |
| FEMA/Government Employees _{<i>i,t-j</i>} | Hundreds of dollars of FEMA relief per federal or state employee in state <i>i</i> in year <i>t-j</i> | Garrett and Sobel (2003); Bureau of Labor Statistics |

Note. FEMA = Federal Emergency Management Agency.

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