Retrospective Voting and Natural Disasters that Cause No Damage: Accounting for the Selective Reporting of Weather Damage

Data Appendix

Justin Gallagher*

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*Contact information: Montana State University, P.O. Box 172920, Bozeman, MT 59717 (email: justin.gallagher1@montana.edu).

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1 Non-Reporting (Missing) Data in SHELDUS

1.1 SHELDUS Data Reporting Process

The main source of the weather damage information in SHELDUS is the National Centers for Environmental Information (formerly National Climatic Data Center), which is a part of the National Oceanic and Atmospheric Administration (NOAA): https://www.ncdc.noaa.gov/IPS/sd/sd.html. The National Centers for Environmental Information maintains a Storms Events Database which is used to publish a monthly periodical called Storm Data. SHELDUS is a compilation of the same monthly weather damage information that underly the Storm Data publications. The SHELDUS metadata description (SHE [2020]) is available here: https://cemhs.asu.edu/sheldus/metadata.

The current data collection practices for Storm Data, and by extension SHELDUS, are outlined in a 2016 National Weather Service (NWS) Directive (NWS [2016]). The weather damage information are currently entered by NWS personnel from each of the 122 weather forecast offices into an on-line Storm Data software program. Each weather forecast office is responsible for a fixed forecast area.

Historically, no software program was available and there was no mechanism to mandate reporting from the local offices to a centralized location. The following disclaimer was included as part of the Storm Data publications: "Due to difficulties inherent in the collection of this type of data, it is not all-inclusive" (Sto [1995], p2).

SHELDUS is updated over time. There are two types of updates. First, additional years are covered with a new version of the database. For example, SHELDUS version 7.0 (released in August 2009) updated the database to include damage information from 2008. Second, historical monthly SHELDUS values are sometimes revised. For example, SHELDUS version 16.0 (released November 1, 2017) made "data corrections to events pre-2016" (SHE [2020]).

2 Simulation Experiment Details

We simulate one hundred 10,000 observation datasets, and estimate three models: full sample, complete case, imputation using the Heckman Selection Model (as described in Manuscript Section 3.1). We consider a simple setting where the model of interest is $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2^* + \eta$.

The experiment includes four variables (Y, X_1, X_2, and Z). X_1 and Z are both normally distributed variables with mean 0 and variance 1. X_2 and X_1 are correlated (X_2 is a function of X_1). X_2 and Y are generated using Equations 1 and 2, respectively.

$$X_2 = 1 + 1 * X_1 + \epsilon \tag{1}$$

$$Y = 1 + 1 * X_1 + 1.5 * X_2 + \eta \tag{2}$$

A selection equation determines whether X_2 is observed (X_2^*), and we set the parameters so that approximately 50% of the observations of X_2 are missing in our complete case and imputation analyses. We model two different selection equations. Equation 3 is a selection equation that depends on Y. Equation 4 is a selection equation that does not depend on Y.

$$S_1 = 0.4 - 1 * Y + 1 * X_1 + 3 * Z + \upsilon_1 \tag{3}$$

$$S_2 = 0.4 + 1 * X_1 + 3 * Z + \upsilon_2 \tag{4}$$

We separately model cases where X_2^* is Missing at Random (MAR), and when X_2^* is Missing Not at Random (MNAR). We model MAR by jointly drawing υ_i (where i is either 1 or 2) and ϵ from a normal distribution with mean zero and the below variance-covariance matrix with $p = 0$.

$$\begin{bmatrix} 1 & p \\ p & 1 \end{bmatrix}$$

We model MNAR by jointly drawing υ_i and ϵ from a normal distribution with mean zero and $p = 0.8$.

We consider four cases determined by whether the selection model depends on Y, and whether X_2^* is MAR or MNAR. We impute 20 datasets (for each of the one hundred simulated datasets). The coefficient on the variable Z is strongly correlated with missingness when we estimate the first stage probit for the imputation model.

Appendix Table 1 shows the average coefficient estimate, standard error, and relative bias for β_2 for each case across the 100 simulated datasets. Relative bias is defined as the absolute value of: (estimated coefficient - actual coefficient)/actual coefficient.

3 Correcting Errors in the Posted Gasper and Reeves [2011] Data

We discovered several data errors related to duplicate observations and the incorrect reporting of Presidential Disaster Declarations in the posted Gasper and Reeves [2011] replication files.[1] This section describes the corrections we made to the data files. All of the reported results in the paper use the files that correct for the data errors (described below).

Paper Table 4 column 1 shows our replication of the presidential model. The specification is comparable to Table 2 model 3 in Gasper and Reeves [2011]. The coefficient estimates using the corrected files are similar to those reported in Gasper and Reeves [2011]. We are able to exactly replicate Gasper and Reeves [2011] when we use the uncorrected files.

3.1 Fix 1: Drop Duplicate Observations

In the presidential panel we drop 1,852 duplicate observations. These observations have duplicate values for all variables (i.e. each observation is identical). Opening the posted .csv file, *"presdata.csv"*, and running the Stata commands:

```
. insheet using presdata.csv, clear
```

[1] https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/WP0AIB

```
. bysort countyfips year:  gen dup = cond(_N==1,0,_n)
```

will identify these duplicates. Those observations where dup == 2 are dropped. There are no duplicates in the gubernatorial panel *govdata.csv*.

3.2 Fix 2: Counties with Missing Disasters

We collect the primary disaster declaration data from the Federal Emergency Management Agency (FEMA).[2] FEMA describes the dataset as:

> *This dataset lists all official FEMA Disaster Declarations, beginning with the first disaster declaration in 1953 and features all three disaster declaration types: major disaster, emergency, and fire management assistance.*

We follow Gasper and Reeves [2011] and only consider major disasters that are not related to "Terrorism" or "Human Cause".[3] Gasper and Reeves [2011] aggregate the monthly weather damage, disaster declaration, and turndown information to the six months (May-October) before an election.

The FEMA disaster declaration information includes the month of the declaration and the list of disaster counties. We merge this information by county fips code and year into *presdata.csv* and *govdata.csv*, after first implementing Fix 1. We identify a number of county-years that are listed by FEMA as having a Presidential Disaster Declaration within six months of an election, but which are not listed as having a declaration in the Gasper and Reeves [2011] files (i.e. *disdecsall6mo* = 0). There are 71 such observations in the presidential panel and 72 in the gubernatorial panel. The list of the county observations (county fips code in parenthesis) that we update the *disdecsall6mo* variable from zero to one is as follows:

1. **Presidential**

[2] https://www.fema.gov/openfema-dataset-disaster-declarations-summaries-v1
[3] See: Gasper and Reeves [2011], page 1144, footnote 7.

(a) FEMA Disaster 339, June 1972

   i. Richmond (51159), Fairfax (51059), Franklin (51067), Lynchburg city (51680), Roanoke (51161), Bedford (51019)

      Example Stata code to see observation in the .csv file:

```
. keep if (countyfips == 51159 & year == 1972)
```

(b) FEMA Disaster 341, June 1972

   i. Baltimore (24005), Prince George(24033)

(c) FEMA Disaster 505, June 1976

   i. Jefferson (16051), Fremont (16043), Bingham (16011), Madison (16065), Booneville (16019)

(d) FEMA Disaster 944, May 1992

   i. Franklin (51067), Bedford (51019), Roanoke (51161)

(e) FEMA Disaster 962, September 1992

   i. LaPorte (18091)

(f) FEMA Disaster 1118, June 1996

   i. LaMoure (38045)

(g) FEMA Disaster 1129, July 1996

   i. DuPage (17043)

(h) FEMA Disaster 1328, May 2000

   i. St. Louis (29189)

(i) FEMA Disaster 1334, June 2000

   i. LaMoure (38045)

(j) FEMA Disaster 1518, June 2004

    i. Fremont (19071)

(k) FEMA Disaster 1523, June 2004

    i. Bath (21011), Fleming (21069), Lewis (21135), Mason (21161), Nicholas (21181), Robertson (21201), Rowan (21205)

(l) FEMA Disaster 1526, June 2004

    i. Adams (55001), Brown (55009), Calumet (55015), Chippewa (55017), Dane (55025), Eau Claire (55035), Green (55045), Iowa (55049), Jackson (55053), Juneau (55057), La Crosse (55063), Lafayette (55065), Marathon (55073), Marquette (55077), Milwaukee (55079), Monroe (55081), Outagamie (55087), Portage (55097), Racine (55101), Richland (55103), Rock (55105), Sauk (5111), Shawano (55115), Sheboygan (55117), Taylor (55119), Trempealeau (55121), Walworth (55127), Washington (55131), Waukesha (55133), Waupaca (55135), Waushara (55137), Wood (55141)

(m) FEMA Disaster 1534, August 2004

    i. Albany (36001)

(n) FEMA Disaster 1544, September 2004

    i. Charles City (51036), King William (51101), New Kent (51127)

(o) FEMA Disaster 1570, October 2004

    i. Roanoke (51161)

(p) FEMA Disaster 3016, July 1976

    i. LaMoure (38045)

(q) FEMA Disaster 3017, September 1976

    i. St. Louis (29189)

(r) FEMA Disaster 3018, October 1976

i. Bedford (51019), Franklin (51067)

2. **<u>Gubernatorial</u>**

(a) FEMA Disaster 962, September 1992

i. LaPorte (18091)

(b) FEMA Disaster 1033, July 1994

i. Oglethorpe (13221)

(c) FEMA Disaster 1118, June 1996

i. LaMoure (38045)

(d) FEMA Disaster 1640, May 2006 & FEMA Disaster 1664, October 2006

i. Honolulu (15003) Kauai (15007)

(e) FEMA Disaster 1644, May 2006

i. York (23031)

(f) FEMA Disaster 1646, June 2006

i. Calaveras (6009), Madera (6039), Merced (6047), Stanislaus (6099), Tuolumne (6109)

(g) FEMA Disaster 1647, June 2006

i. Bennett (46007), Butte (46019), Harding (46063), Meade (46093), Perkins (46105)

(h) FEMA Disaster 1648, June 2006

i. Becker (27005), Kittson (27069), Marshall (27089), Red Lake (27125), Roseau (27135)

(i) FEMA Disaster 1649, June 2006

i. Adams (42001), Armstrong (42005), Berks (42011), Bradford (42015), Bucks (42017), Carbon (42025), Chester (42029), Columbia (42037), Dauphin (42043), Franklin (42055), Indiana (42063), Lackawana (42069), Lancaster (42071), Lebanon (42075), Luzerne (42079), Monroe (42089), Montgomery (42091), Montour (42093), Northampton (42095), Northumberland (42097), Perry (42099), Pike (42103), Schuylkill (42107), Sullivan (42113), Susquehanna (42115), Tioga (42117), Wayne (42127), Wyoming (42131)

(j) FEMA Disaster 1659, August 2006

i. Dona Ana (35013), Grant (35017), Guadalupe (35019), Harding (35021), Hidalgo (35023), Lincoln (35027), Luna (35029), McKinley (35031), Mora (35031), Otero (35035), Rio Arriba (35039), Sandoval (35043), San Miguel (35047), Sierra (35051), Socorro (35053), Taos (35055), Torrance (35057), Valencia (35061)

(k) FEMA Disaster 1660, September 2006

i. Gila (4007), Graham (4009), Greenlee (4011), Navajo (4017), Pima (4019), Pinal (4021)

(l) FEMA Disaster 1664, October 2006

i. Hawaii (15001), Maui (15009)

(m) FEMA Disaster 3016, July 1976

i. LaMoure (38045)

(n) FEMA Disaster 3017, September 1976

i. St. Louis (29189)

3.3 Fix 3: Counties that Should Have No Disasters

We also identify a number of county-years that are listed by FEMA as having no Presidential Disaster Declaration within six months of an election, but which are listed as having a declaration in the Gasper and Reeves [2011] files (i.e. *disdecsall6mo* = 1). There are 39 such observations in the presidential panel and 34 in the gubernatorial panel. The list of county observations (county fips code in parenthesis) that we update the *disdecsall6mo* variable from one to zero is as follows:

1. **Presidential**

    (a) FEMA Disaster 1553 & Disaster 1546, September 2004

        i. Forty-five of the 100 counties in North Carolina were eligible for Individual Assistance or Public Assistance in either of these disasters. However, *presdata.csv* lists 79 counties as having a disaster. The following 34 counties did not receive Individual Assistance or Public Assistance and are updated to *disdecsall6mo* = 0: 37013, 37015, 37019, 37029, 37031, 37041, 37049, 37053, 37055, 37061, 37065, 37073, 37079, 37083, 37091, 37095, 37101, 37103, 37107, 37117, 37127, 37129, 37131, 37133, 37137, 37139, 37141, 37143, 37147, 37163, 37177, 37187, 37191, 37195

    (b) FEMA Disaster 3079, May 1980

        i. This disaster refers to the "Mariel boatlift" which is not a natural disaster, falls under the category of "Human Cause", and is not a category used by Gasper and Reeves [2011][4]. We recode the counties 12011, 12087, and 12099 as not having a disaster.

    (c) Elkhart County (18039), Year = 2004. Indiana during this year received two disaster declarations. Disaster 1520, May, and Disaster 1542, July. Elkhart County is not listed as receiving Individual Assistance or Public Assistance for either of these disasters. We recode this observation as *disdecsall6mo* = 0.

    (d) Mineral County (54057), Year = 2004. West Virginia received three disaster declarations during this year. Disaster 1558, September, Disaster 1536, July, and

[4] See: Gasper and Reeves [2011], page 1144, footnote 7.

Disaster 1522, May. Mineral County is not listed as receiving Individual Assistance or Public Assistance for any of these disasters. We recode this observation as $disdecsall6mo = 0$.

2. **Gubernatorial**

   (a) The same 34 observations in North Carolina, Year == 2004, indicated in the above bullet point (a) for the presidential records, are updated for the gubernatorial panel.

4 Denied Disaster Declaration Request Counties

This section summarizes the supplemental data and analysis on denied Presidential Disaster Declaration request (turndown) counties referenced in the manuscript. We acquired information on 102 denied Presidential Disaster Declaration requests that occurred from 1979-2006 for 30 states. We received the information as part of a series of Freedom of Information Act (FOIA) and Open Records requests from the national FEMA office, the regional FEMA offices, state-level departments, and presidential libraries from 2011-2014.

We know the exact list of counties included as part of each of the 102 denied disaster requests. We use the list of counties to calculate sample statistics for the number of counties included in each turndown. We also calculate sample statistics for the proportion of a state's counties included in a turndown. The mean number of counties included is 6.4. The median is two. The mean and median percent of counties within a state included in a denied request is 8.9% and 4.2%, respectively.

5 References

Storm data. Technical Report 12, National Oceanic and Atmospheric Administration, December 1995. URL https://www.ncdc.noaa.gov/IPS/static/images/sdsample.pdf.

Storm data preparation. Technical report, National Weather Service, March 2016. URL https://www.ncdc.noaa.gov/stormevents/pd01016005curr.pdf.

Spatial hazards events and losses database for the united states metadata. Technical report, Arizona State University, June 2020. URL https://cemhs.asu.edu/sheldus/metadata.

John T. Gasper and Andrew Reeves. Make it rain? retrospection and the attentive electorate in the context of natural disasters. *American Journal of Political Science*, 55(2), 2011.

6 Figures and Tables

Table 1: **Simulation Results**

Model Coefficient:	Model Estimates for B2 = 1.0		
Sample:	Full	Complete Case	MNAR Imputation
	(1)	(2)	(3)
Panel A: Selection Does Not Depend on Y			
Missing at Random (MAR)			
Estimate	1.001	1.002	1.001
Standard Error	(0.010)	(0.014)	(0.011)
Relative Bias (%)	0.1	0.2	0.1
Missing Not at Random (MNAR)			
Estimate	0.999	0.998	1.020
Standard Error	(0.010)	(0.014)	(0.013)
Relative Bias (%)	-0.1	-0.2	0.2
Panel B: Selection Depends on Y			
Missing at Random (MAR)			
Estimate	1.001	0.944	0.997
Standard Error	(0.010)	(0.016)	(0.012)
Relative Bias (%)	0.1	-5.6	-0.3
Missing Not at Random (MNAR)			
Estimate	0.999	0.895	1.011
Standard Error	(0.010)	(0.017)	(0.014)
Relative Bias (%)	-0.1	-10.5	1.1

We simulate one hundred 10,000 observation datasets, and estimate three models: full sample (column 1), complete case (column 2), and after using an imputation procedure that is robust to nonrandom selection (column 3). See Appendix Section 2 for details regarding the simulation, and Manuscript Section 3.1 for imputation details. Relative bias is defined as the absolute value of: (estimated coefficient - actual coefficient)/actual coefficient.

Table 2: **Gasper and Reeves (2011) Impact on the Peer-Reviewed Literature Since 2014**

(1) Journal	(2) Authors and Year Published
American Journal of Political Science	Reeves and Rogowsi (2018)
American Political Science Review	Kriner and Reeves (2015)
American Political Science Review	Dynes and Holbein (2020)
Journal of Politics	Malhotra and Margalit (2014)
Journal of Politics	Reeves and Rogowski (2016)
Political Analysis	Heersink, Peterson, and Jenkins (2017)
Political Research Quarterly	Carlin, Love, and Zechmeister (2014)
Political Research Quarterly	Nyhan (2017)
Quarterly Journal of Political Science	Fair, Kuhn, Malhotra, and Shapiro (2017)

The table shows a list of publications in a sample of top, general interest political science journals that cite Gasper and Reeves [2011] since 2014. The journals sampled include: The American Journal of Political Science, The American Political Science Review, The Journal of Politics, Political Analysis, Political Research Quarterly, Presidential Studies Quarterly, and The Quarterly Journal of Political Science.