

Online Appendix for
“After a Storm Come Votes: Identifying the Effects of
Disaster Relief on Electoral Outcomes”

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A Data

A.1 Time Frame

In the “Municipal Disaster Relief” subsection under the “DISASTER” section in the main text, we consider disasters between 1991 and 2017 due to data availability. The data of rainfall are available only after April 1988. Since we need the rainfall data one calendar year before an election, the first election we study is the upper chamber election not in 1989 but in 1992, in which case we refer to rainfall and disasters in 1991. We choose the last year of the analysis as 2017 because, as of our collection of data (June 1, 2020), data of disaster relief is available only up to 2017.

We do not analyze the elections before 1996 because their electoral system is different from, and hence not comparable with, elections after 1996. As of our collection of the data, the 2017 election is the latest election. We do not analyze upper chamber elections in 1989 or earlier because rainfall data are available only after April 1988. We do not analyze the 2019 upper chamber election because the data about the disaster relief (in 2018) is not available (as of June 1, 2020).

A.2 Municipalities

In order to address municipal merger, we refer to Kondo (2019) and its associated website (<https://sites.google.com/site/keisukekondokk/data-jp>, accessed on December 1, 2019). In the case of a fraction variable $Z = X/Y$, if municipalities 1 and 2 merged into municipality 3, we calculate $Z_3 = X_3/Y_3 = (X_1 + X_2)/(Y_1 + Y_2)$, not $Z_3 = \{(X_1/Y_1) + (X_2/Y_2)\}/2$.

We merge Kofu City and Fujikawaguchiko Town into one unit. On March 1, 2006, the northern and southern parts of Kamikuishiki Village were merged into Kofu City and Fujikawaguchiko Town, respectively. Because the data for each of those parts are not available before 2006, we cannot aggregate the old three municipalities to the new two municipalities.

We omit 13 municipalities that suffered from major non-rainfall disasters and resulted in the evacuation of the residents: Miyake Village due to an volcano eruption in 2000, and the 12 municipalities in Fukushima Prefecture¹ which had (and, for some municipalities, still have) evacuation areas due to distribution of radioactive materials from the nuclear power station accident in 2011. Citizens lived and voted (geographically) outside those municipalities in which we measure the amounts of rainfall. Moreover, even the census data are not available in some of the municipalities.

We remove 5 municipalities in which the rainfall data are missing in any year during 1991–2016 (all of them are small remote islands): Aogashima, Kitadaitou, Ogasawara, Tarama Villages and Yonaguni Town.

In sum, the number of observations in a given year is 1,722 out of 1,741 municipalities ($= 1,741 - 1 - 13 - 5$).

A.3 Governing Parties

Table A.1 shows the dates of elections (the leftmost column) and the corresponding governing parties defined in the third section (the remaining columns) for the lower chamber (top panel) and the upper chamber (bottom panel). The New Conservative Party did not field its list of candidates to any PR district in the election to the lower chamber in 2003.

¹Specifically, they are two cities (Minami-sōma and Tamura), seven towns (Futaba, Hirono, Kawamata, Namie, Naraha, Ōkuma, and Tomioka), and three villages (Kawauchi, Katsurao, and Iitate).

Table A.1: Governing Parties before an Election

Election day	LDP	CGP	CP	SDP	DPJ	PNP	NPH
Lower Chamber							
1996/10/20	X			X			X
2000/6/25	X	X	X				
2003/11/9	X	X	X				
2005/9/11	X	X					
2009/8/30	X	X					
2012/12/16					X	X	
2014/12/14	X	X					
2017/10/22	X	X					
Upper Chamber							
1992/7/26	X						
1995/7/23	X			X			X
1998/7/12	X						
2001/7/29	X	X	X				
2004/7/11	X	X					
2007/7/29	X	X					
2010/7/11					X	X	
2013/7/21	X	X					
2016/7/10	X	X					

Note

LDP: Liberal Democratic Party

CGP: Clean Government Party (their official English name is Komeito, which is the same as the Japanese name)

CP: Conservative Party (after December 25, 2002, New Conservative Party)

SDP: Social Democratic Party

DPJ: Democratic Party of Japan

PNP: People's New Party

NPH: New Party Harbinger

A.4 Variables**A.4.1 Election**

The data sources of vote share are Asahi Shimbun [Asahi Newspaper] (1996–2017) for the lower chamber and Natori et al. (2014), its associated website (<http://db.cps.kutc.kansai-u.ac.jp/>, accessed on March 17, 2020), and Asahi Shimbun [Asahi Newspaper] (2016) for the upper chamber. The municipality is the smallest unit where votes are counted.

We corrected an error where, in the election to the upper chamber in 2013, the numbers of votes to (governing) parties are switched between Nishihara and Minamiaso Villages, by referring to Asahi Shimbun [Asahi Newspaper] (2013).

The number of the eligible citizens in 2003 and the number of voting citizens in 1996 and 2003 refer to those for SMD, not PR, due to data availability. In the case of Morioka city in 2014, we corrected the numbers of eligible citizens and voting citizens in Asahi Shimbun [Asahi Newspaper] (1996–2017) by referring to the city’s website (<http://www.city.morioka.iwate.jp/shisei/senkyo/kiroku/1012197.html>, accessed on November 15, 2020).

A.4.2 Disaster Relief

We calculate the logarithm of per capita disaster relief (in thousand yen) in fiscal year $t - 1$, $D_{i,t-1}$. We add one to per capita disaster relief before taking its logarithm in order to deal with the value of zero.

A.4.3 Rainfall

The data source of rainfall is Kishō Gyōmu Shien Sentā [Center for Meteorological Support Service] (1991–2017). The Analyzed Rainfall Data are based on the observations at more than 1,300 weather stations and 20 precipitation radars in Japan (<https://www.jma.go.jp/jma/kishou/known/kurashi/kaiseki.html>, <https://www.jma.go.jp/jma/kishou/known/radar/kaisetsu.html>, and <https://www.jma.go.jp/jma/kishou/known/amedas/kaisetsu.html>, accessed on September 7, 2019). We use hourly precipitation recorded every hour on the hour available at a spatial resolution of a one to five-kilometer grid cell (<http://www.jmbasc.or.jp/jp/offline/cd0100.html>, accessed on April 23, 2020). We calculate the maximum values by omitting missing values (about 3% of cell-hours). A grid cell at the border of municipalities is assigned to the municipality that includes the center of the grid cell. In Japan, a fiscal year begins on April 1 and ends on March 31, though the government’s disaster expenses are based on calendar year. That is, for disasters which occur

between January 1 and December 31 in a year, the government covers 85% of the cost damaged by the disasters towards the end of the corresponding fiscal year, namely, March 31 of the following calendar year (Infrastructure Disaster Act, Article 4, Agriculture Disaster Act, Article 3, Zenkoku Bōsai Kyōkai [Association of Nationwide Disaster Prevention] 2018, 119). Accordingly, we use the maximum rainfall in the previous *calendar* year $t - 1$ of an election as an IV for the disaster relief in the corresponding *fiscal* year $t - 1$.

A.4.4 Control and Placebo Variables

Table A.2 shows the definitions of the control and placebo variables. Agricultural products and cultivated areas are placebo variables, and the other variables are controls. The data source is Sōmushō Tōkeikyoku [Statistics Bureau, Ministry of Internal Affairs and Communications] (1990–2016). The unit of observation is the current municipality as of the end of a given fiscal year. We take a logarithm of a variable if the maximum of the variable is larger than one.

Table A.2: Definition of Control and Placebo Variables

Variable Name	logged or not (	Numerator	÷	Denominator	)
Agricultural Products	log(	C3101 + 1	÷	F2201 + 1	)
Cultivated Area		C3107	÷	B1101	
Daytime Population	log(	A6107	÷	A1101	)
DID Population		A1801	÷	A1101	
Income	log(	C120110	÷	C120120	)
Labor Force		F1101	÷	A1101	
Local Tax Revenue	log(	D320101	÷	A1101	)
Old Population		A1303	÷	A1101	
Population	log(	A1101			)
Population Density	log(	A1101	÷	B1101	)
Primary Industry Employment		F2201	÷	F1102	
Secondary Industry Employment		F2211	÷	F1102	
Unemployment		F1107	÷	F1101	

Note: Numerators and denominators refer to variable codes from Sōmushō Tōkeikyoku [Statistics Bureau, Ministry of Internal Affairs and Communications] (1990–2016).

The numbers and names of the variables in Sōmushō Tōkeikyoku [Statistics Bureau,

Ministry of Internal Affairs and Communications] (1990–2016) we use are as follows (unit is shown in square brackets). Variables with an asterisk (*) are based on the census and are available in years ending with zero or five. If the data of a variable come from the census, we refer to the latest census as of fiscal year $t - 1$. For instance, we refer to the 1995 and 2000 census for fiscal years 1995 (for the 1996 election) and 2004 (for the 2005 election), respectively. The other variables are available every year.

A1101* Total population [person]

A1303* Total population (65 or older) [person]

A1801* Densely inhabited districts (DIDs) population [person]

A6107* Daytime population [person]

B1101 Total land area (excluding the northern territories and Takeshima Island) [hectare]

C120110 Taxable income [thousand yen]

C120120 Number of tax debtors (per income) [person]

C3101 Gross agricultural products (available only up to 2006) [million yen]

C3107 Cultivated area [hectare]

D320101 Local tax revenue [thousand yen]

F1101* Labour force [person]

F1102* Number of employed persons [person]

F1107* Number of unemployed persons [person]

F2201* Number of persons employed in the primary industry [person]

F2211* Number of persons employed in the secondary industry [person]

We fill missing values of variable A1801 by zero, supposing such municipalities have no DID.

Variables C120110 and C120120 are not available for Waga Town, Ezuriko and Kami Villages in 1990, and Tonan Village in 1991. Thus, we substitute the corresponding values in the previous years. The corresponding values in the following years are not available because these municipalities were merged into other municipalities.

Variable C3101 and thus the variable agricultural products are available only up to 2006.

A.5 Summary Statistics

For analysis, we use R version 3.5.0 (R Development Core Team 2018). Table A.3 presents the summary statistics of the variables used in the IV analysis. For the variables that are transformed to logarithms in the main analysis (shown with asterisk *), we report the summary statistics before the transformation.

Table A.3: Summary Statistics: IV

	Mean	Median	S.D.	Min.	Max.	<i>N</i>
<u>Lower Chamber</u>						
Governing Parties' Vote Share	44.465	46.969	12.674	5.724	86.012	13,776
Disaster Relief*	7.552	0.566	30.945	0.000	1154.68	13,776
Maximum Rainfall*	57.533	55.000	20.392	7.000	255.000	13,776
Agricultural Products	2.668	2.405	1.764	0.009	41.000	6,791
Cultivated Areas	0.167	0.126	0.141	0.000	0.752	13,491
Daytime Population*	0.971	0.958	0.555	0.601	27.312	13,776
DID Population	0.280	0.105	0.338	0.000	1.000	13,776
Income*	3020.320	2934.447	559.708	1921.309	11332.853	13,776
Labor Force	0.517	0.518	0.038	0.36	0.817	13,776
Local Tax Revenue*	122.091	109.631	73.770	25.445	1720.244	13,776
Old Population	0.239	0.232	0.083	0.043	0.605	13,776
Population*	73482	26848	180783	275	3724844	13,776
Population Density*	10.316	2.203	23.579	0.016	223.802	13,776
Primary Industry Employment	0.128	0.098	0.111	0.000	0.840	13,776
Secondary Industry Employment	0.291	0.287	0.092	0.010	0.655	13,776
Unemployment	0.046	0.043	0.022	0.000	0.227	13,776
<u>Upper Chamber</u>						
Governing Parties' Vote Share	46.703	46.830	12.657	6.557	87.221	15,498
Disaster Relief*	7.839	0.531	43.510	0.000	3287.364	15,498
Maximum Rainfall*	55.555	53.000	19.921	6.000	255.000	15,498
Agricultural Products	2.678	2.432	1.690	0.001	51.000	10,188
Cultivated Area	0.169	0.129	0.142	0.000	0.759	14,015
Daytime Population*	0.970	0.956	0.594	0.601	27.312	15,498
DID Population	0.280	0.124	0.336	0.000	1.000	15,498
Income*	3034.345	2941.807	641.679	1863.761	39740.800	15,498
Labor Force	0.520	0.521	0.038	0.360	0.817	15,498
Local Tax Revenue*	118.974	106.397	71.932	24.365	1612.17	15,498
Old Population	0.218	0.210	0.078	0.043	0.572	15,498
Population*	73227	27031	178620	275	3688773	15,498
Population Density*	10.218	2.235	23.245	0.016	218.815	15,498
Primary Industry Employment	0.136	0.107	0.115	0.000	0.840	15,498
Secondary Industry Employment	0.300	0.297	0.094	0.010	0.655	15,498
Unemployment	0.045	0.041	0.023	0.000	0.227	15,498

B Analysis

B.1 Validity Checks

One concern about the exclusion restriction is that the maximum rainfall might affect agricultural outputs, which, in turn, might decrease the governing parties' vote shares. We address this concern by analyzing the effect of the maximum rainfall on agricultural production and cultivated area. We replace $D_{i,t-1}$ in Eq. (2) by the logarithm of gross agricultural products per farmer and the proportion of cultivated area to the total area in fiscal year $t - 1$. Table B.1 reports the OLS estimates ($\tilde{\beta}^R$ in Eq. (2)).² No estimate is significantly different from zero even at the 10% or lower level. This is consistent with our argument; the maximum *hourly* rainfall is not a strong predictor of agricultural outputs. This implies that the exclusion restriction is unlikely to be violated by the path through the agricultural outcomes.

Table B.1: The Effects of the Maximum Rainfall on the Placebo Variables

	Lower Chamber		Upper Chamber	
	Agricultural Products	Cultivated Areas	Agricultural Products	Cultivated Areas
Maximum Rainfall ($R_{i,t-1}$)	0.0105 (0.0080)	-0.0002 (0.0004)	-0.0091 (0.0078)	0.0000 (0.0004)
N	6,791	13,491	10,188	14,015

Note: The standard errors (clustered by municipality) are in parentheses. No coefficient is significantly different from zero at the 10% or lower level.

Another potential concern may be the exogeneity of rainfall. Past maximum rainfall, might affect both the current maximum rainfall and electoral results. We therefore repeat

²We omit dozens of observations that have missing values in each placebo variable. We focus on fiscal year $t - 1$ instead of t because the maximum rainfall in *calendar* year $t - 1$, $R_{i,t-1}$, should affect the placebo variables in *fiscal* year $t - 1$ instead of that in fiscal year t . Moreover, a placebo variable in fiscal year t would not be clearly prior to the outcome variable in an election year t , V_{it} .

our analysis, controlling for the past two year lags of the maximum rainfall, $R_{i,t-2}$ and $R_{i,t-3}$. As seen in Table B.2, the results still remain the same in effect with the alternative specifications.

Table B.2: The Effects of Disaster Relief on the Governing Parties' Vote Share with Past Rainfall Controlled

	Lower Chamber	Upper Chamber
2nd Stage		
Disaster Relief ($D_{i,t-1}$)	1.089** (0.383)	2.618** (0.673)
1st Stage		
Maximum Rainfall ($R_{i,t-1}$)	0.466** (0.032)	0.291** (0.027)
F	244.5	124.8
N	13,776	15,476

Note: ** $p < 0.01$. The standard errors (clustered by municipality) are in parentheses.

B.2 Robustness Checks

For IV estimation, we use R package `lfe` (Gaure 2019).

First, we transform the disaster relief in a few different ways: the dummy variable of whether a municipality obtain any disaster relief in a year (Table B.3), the logarithm of the amount of the disaster relief (not divided by population, Table B.4), and the proportion of the amount of the disaster relief to the total expenditure (Table B.5). For all checks, our findings are robust to alternative specifications; the maximum rainfall increases disaster relief, which in turn increases governing parties' vote share.

Table B.3: The Effects of Disaster Relief Dummy on the Governing Parties' Vote Share

	Lower Chamber	Upper Chamber
2nd Stage		
Disaster Relief Dummy	5.040** (1.537)	6.731** (1.796)
1st Stage		
Maximum Rainfall ($R_{i,t-1}$)	0.121** (0.012)	0.113** (0.012)
F	114.1	108.6
N	13,776	15,498

Note: ** $p < 0.01$. The standard errors (clustered by municipality) are in parentheses.

Table B.4: The Effects of the Logged Amount of Disaster Relief on the Governing Parties' Vote Share

	Lower Chamber	Upper Chamber
2nd Stage		
Logged Amount of Disaster Relief	8.544** (2.589)	20.130** (5.755)
1st Stage		
Maximum Rainfall ($R_{i,t-1}$)	0.071** (0.007)	0.038** (0.006)
F	118.7	50.3
N	13,776	15,498

Note: ** $p < 0.01$. The standard errors (clustered by municipality) are in parentheses.

Table B.5: The Effects of the Proportion of the Disaster Relief on the Governing Parties' Vote Share

	Lower Chamber	Upper Chamber
2nd Stage		
Proportion of Disaster Relief	10.386** (3.220)	18.233** (5.151)
1st Stage		
Maximum Rainfall ($R_{i,t-1}$)	0.059** (0.006)	0.042** (0.006)
F	92.4	58.4
N	13,776	15,498

Note: ** $p < 0.01$. The standard errors (clustered by municipality) are in parentheses.

Second, Betz et al. (2020) warn that when outcome and instrumental variables are spatially clustered, even the IV estimates are biased, possibly worse than the OLS estimates. The examples they mention include rainfall and natural disasters, which are exactly what we study. Thus, we apply the method they recommend, spatial-two stage least squares, where we treat geographically contiguous municipalities in the same year as connected units in the connectivity matrix.³ The spatial regression does not change our findings (Table B.6)).⁴

Table B.6: The Effects of Disaster Relief on the Governing Parties' Vote Share with Spatial TSLS

	Lower Chamber	Upper Chamber
2nd Stage		
Disaster Relief ($D_{i,t-1}$)	5.396** (0.627)	3.282** (0.376)
N	13,776	15,498

Note: ** $p < 0.01$. The robust standard errors are in parentheses.

Third, we used the governing party candidates' vote share in SMDs of the lower chamber and SMDs and MMDs of the upper chamber.⁵ We then conduct the same TSLS as that in the main analysis (Eqs. (1) and (2)). As seen in Table B.7, disaster relief significantly increases governing party candidates' vote share in the lower tier. The coefficients are even

³We use R package `sphet` (Piras 2018) and a function thereof, `spreg()`. Even though the cluster-robust standard errors are not available in `sphet`, Betz et al. (2020) are concerned with bias, not efficiency, and hence we pay attention to point estimates.

⁴Because it is not straightforward to calculate the first-stage results of the spatial TSLS, we do not report them.

⁵When a municipality contains multiple SMDs of the lower chamber, we used the total vote share of governing party candidates. We drop municipalities where there is no governing party candidate in any district. (Therefore, the analyses of the lower tier can suffer from selection bias. This is another reason why we prefer the upper tier, namely, PR districts, to the lower tier). We also excluded Kasugai and Seto Cities in the 2017 lower chamber election because their vote counts were not available. For the party affiliation of the lower chamber candidates before 2009, we refer to Mizusaki and Mori (1996–2014).

larger than those in Table 2 of the main text. These results imply the robustness of our findings.

Table B.7: The Effects of Disaster Relief on the Governing Party Candidates' Vote Share in the Lower Tier

	Lower Chamber	Upper Chamber
2nd Stage		
Disaster Relief ($D_{i,t-1}$)	2.782** (0.825)	3.940** (1.061)
1st Stage		
Maximum Rainfall ($R_{i,t-1}$)	0.464** (0.032)	0.313** (0.027)
F	238.2	138.4
N	13,329	15,005

Note: ** $p < 0.01$. The standard errors (clustered by municipality) are in parentheses.

C Sources of the “Decision Process” Subsection

The sources of the “Decision Process” subsection under the “DISASTER” section are as follows.

- Assessment Guideline for Disaster Recovery Project for Public Civil Engineering Facilities (Notice No. 351 issued by Chief of River Bureau, Ministry of Construction, September 15, 1957, hereafter we call “Infrastructure Disaster Act Assessment Guideline”), No. 3, Section 1, (2).
- Outline of Procedures of Project to Recover Agricultural Land and Facilities for Agriculture Damaged by Disaster (Notice Nōchi D 1130 issued by Vice Minister, Ministry of Agriculture and Forestry, September 10, 1965, hereafter we call “Agriculture Disaster Act Procedure Outline”), No. 3, (2).
- Nōrin-shō Nōson Shinkō-kyoku Seibi-bu Bōsai-ka [Disaster Prevention and Restoration

Division, Rural Infrastructure Department, Rural Development Bureau, Ministry of Agriculture, Forestry and Fisheries] (2015, 161).

C.1 Discretion

- Outline of Procedures of Infrastructure Disaster Act (Notice No. 114 issued by Vice Minister, Ministry of Construction, December 10, 1956), No. 3, Section 2, g.
- Infrastructure Disaster Act Assessment Guideline, No. 3, Section 4.
- Agriculture Disaster Act Procedure Outline, No. 15, Section 2, c, (b), (v).
- Agreements on Assessment for Project to Recover Agricultural Land and Facilities for Agriculture Damaged by Disaster (issued by Director of Construction Division, Bureau of Structural Improvement, Ministry of Agriculture and Forestry, September 10, 1965), No. 1, Section 2 and No. 3, Section 1.

C.2 Lobbying

- Shushō Kantei [Prime Minister’s Office], “Reiwa gannen taifū dai 19 gō niyuru higaijōkyō shisatsu notameno Fukushima ken oyobi Miyagi ken hōmon [Visit to Fukushima and Miyagi prefectures for observing damages by Typhoon Hagibis in 2019],” October 17, 2019, https://www.kantei.go.jp/jp/98_abe/actions/201910/17sisatsu.html (accessed on June 13, 2021).
- NHK (the Japan Broadcasting Corporation), “Ken kanri no kawa mo kuni ga kawarini fukkyū, Akabane Kokkōshō [The national government will recover rivers managed by prefectures, said Minister of Land, Infrastructure, Transport and Tourism],” October 20, 2019, <https://www.nhk.or.jp/politics/articles/statement/24570.html> (accessed on June 13, 2021).

- Fukushima Ken [Fukushima Prefecture], “Reiwa gannen taifū dai 19 gō nikakawaru yōbōsho [Requests concerned with Typhoon Hagibis in 2019],” October 25, 2019, <https://www.pref.fukushima.lg.jp/uploaded/attachment/357402.pdf> (accessed on May 20, 2021).
- NHK, “Taifū higai sōki fukkyū no shien wo yōsei: Ibaraki ken chiji [The governor of Ibaraki Prefecture requested speedy recovery from the damages by Typhoon],” October 21, 2019, <https://www.nhk.or.jp/politics/articles/statement/24663.html> (accessed on June 13, 2021).
- Ibaraki Ken [Ibaraki Prefecture], “Taifū dai 19 gō niyoru ōame tō saigai nikakawaru kinkyū yōbōsho [Requests concerned with the damage by Typhoon Hagibis’s heavy rain],” October 21, 2019, https://www.pref.iwate.jp/_res/projects/default_project/_page_/001/025/566/taihu19youbou.pdf (accessed on June 9, 2021).
- Iwate Ken Chiji [Governor of Iwate Prefecture], “Taifū dai 19 gō no ōametō niyoru higai nikansuru yōbōsho [Requests concerned with the damage caused by Typhoon Hagibis’s heavy rain],” October 23, 2019, https://www.pref.iwate.jp/_res/projects/default_project/_page_/001/025/566/taihu19youbou.pdf (accessed on June 9, 2021).
- NHK, “Saitama ken chiji kanbochokan ni taifū higai de shien wo yōbō [The governor of Saitama Prefecture requested Chief Cabinet Secretary support concerned with the damages by Typhoon],” October 21, 2019, <https://www.nhk.or.jp/politics/articles/statement/24657.html> (accessed on June 13, 2021).

References

- Asahi Shimbun [Asahi Newspaper] (1996–2017). *Asahi shimbun de miru sōsenkyo no subete* [The Database of the General Election]. Tokyo: Asahi Shimbun.
- Asahi Shimbun [Asahi Newspaper] (2013). *Asahi shimbun de miru 2013 san-insen no subete* [The Database of the 2013 Election of the House of Councilors]. Tokyo: Asahi Shimbun.
- Asahi Shimbun [Asahi Newspaper] (2016). *Asahi shimbun de miru 2016 san’insen no subete* [The Database of the 2016 Election of the House of Councilors]. Tokyo: Asahi Shimbun.
- Betz, Timm , Scott J. Cook, and Florian M. Hollenbach (2020). Spatial Interdependence and Instrumental Variable Models. *Political Science Research and Methods* 8(4), 646–661.
- Gaure, Simen (2019). Package ‘lfe’. <https://cran.r-project.org/web/packages/lfe/lfe.pdf>, accessed on April 26, 2020.
- Kishō Gyōmu Shien Sentā [Center for Meteorological Support Service] (1991–2017). *Kaiseki uryō* [Analyzed Rainfall Data]. Tokyo: Kishō Gyōmu Shien Sentā.
- Kondo, Keisuke (2019). Shikuchōson gappei wo kōryo shita shikuchōson paneru dēta no saku-sei [Making Municipal Panel Data with Municipal Merger]. Unpublished Manuscript. RI-ETI Technical Paper Series 19-T-001. Last Modified in March, 2019. <https://www.rieti.go.jp/jp/publications/summary/19030013.html>, accessed on December 1, 2019.
- Mizusaki, Setsufumi and Hiroki Mori (1996–2014). Shūgiin giin sōsenkyo dēeta [Data of the Elections to the House of Representatives]. Tokyo: Leviathan Data Bank.
- Natori, Ryota , Kentaro Fukumoto, Kazuo Kishimoto, Akira Tsuji, Hidenori Tsutsumi, and Yusaku Horiuchi (2014). Sangiin giin tsūjō senkyo dēta bēsu no kaihatsu to riyō [The Database of Japanese House of Councilors Elections: Development and User Guide]. *Senkyo Kenkyū* 30(2), 105–115.

Nōrin-shō Nōson Shinkō-kyoku Seibi-bu Bōsai-ka [Disaster Prevention and Restoration Division, Rural Infrastructure Department, Rural Development Bureau, Ministry of Agriculture, Forestry and Fisheries] (2015). *Saigai fukkyū jigyo no kaisetsu: 2015 nenban* [Commentary on Disaster Recovery Projects: 2015]. Tokyo: Zenkoku Nōson Shinkō Gijutsu Renmei.

Piras, Gianfranco (2018). Package ‘sphet’. <https://cran.r-project.org/web/packages/sphet/sphet.pdf>, accessed on November 9, 2020.

R Development Core Team (2018). R: A Language and Environment for Statistical Computing (Version 3.5.0).

Sōmushō Tōkeikyoku [Statistics Bureau, Ministry of Internal Affairs and Communications] (1990–2016). Tōkei de miru shikuchōson no sugata [Statistical Observations of Cities, Wards, Towns and Villages]. <https://www.e-stat.go.jp/regional-statistics/ssdsview/municipality>, accessed on April 20, 2020.

Zenkoku Bōsai Kyōkai [Association of Nationwide Disaster Prevention] (2018). *Saigai fukkyū jitsumu kōgishū* [Lectures on Disaster Recovery Operation]. Tokyo: Zenkoku Bōsai Kyōkai.