

ONLINE APPENDIX

Do Natural Disasters Help the Environment?
How Voters Respond and What That Means*

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*Replication archive: <https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/ITVLIK&version=DRAFT&faces-redirect=true>.

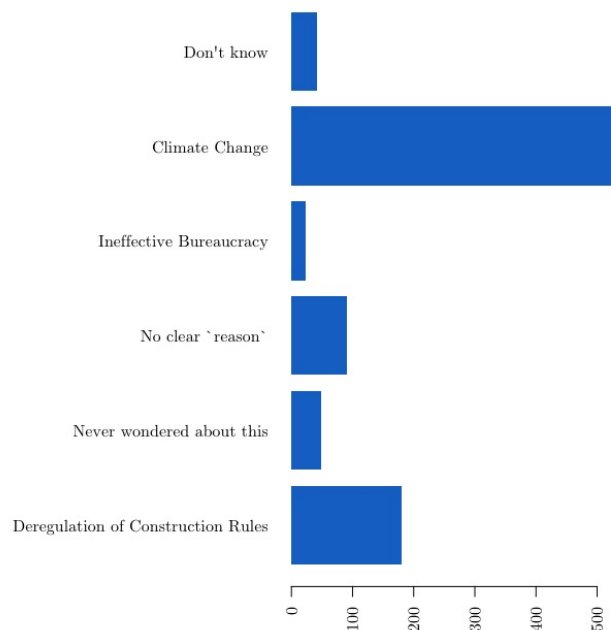
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A1 Survey Evidence

During the review period of this article we were able to attach a question to a survey in Switzerland. The survey is a four-wave panel administered by the Digital Democracy Lab at the University of Zürich (Gilardi et al., 2020). The Federal Statistical Office drew a random sample of 10,000 citizens from the national registry and respondents were contacted via letter and invited to participate in the online survey. In total, 929 voting-eligible citizens responded to the fourth wave which corresponds to the AAPOR response rate 1 of about 7.7%. We asked respondents: “Floods, mudslides or debris flows occur once in while. When you see how a community is hit by such an event, do you sometimes wonder what the cause is? If so, what do you think?”

Figure A1: Distribution of Survey Responses



Note: Survey responses to the following question: “Floods, mudslides or debris flows occur once in while. When you see how a community is hit by such an event, do you sometimes wonder what the cause is? If so, what do you think?”

The distribution of responses shows that the largest response group thinks of climate change when observing a flood. Note, that these data were elicited in January 2020 and the rest of empirical analysis in this paper is earlier (1998-2008).

A2 Full Estimation Results

Table A1: Voting and Weather (OLS)

| | MODEL I | MODEL II | MODEL III |
|------------------------|--------------------|-------------------|-------------------|
| Flooded | 0.86** (0.42) | 1.28*** (0.42) | 1.19*** (0.42) |
| Green Party % | 0.12*** (0.04) | | 0.01 (0.04) |
| Social Democrats % | 0.21*** (0.03) | | 0.23*** (0.03) |
| Christian Democrats % | -0.12*** (0.03) | | -0.07** (0.03) |
| Liberal Democrats % | -0.02 (0.03) | | 0.06** (0.03) |
| Swiss People's Party % | 0.06*** (0.02) | | 0.13*** (0.02) |
| Rainfall | | 0.33 (0.42) | 0.68 (0.43) |
| No vegetation | | -14.71 (64.97) | -23.48 (36.34) |
| Share of Water | | -0.27 (15.10) | -0.33 (3.48) |
| Share of Grass | | -0.18 (0.99) | -0.75 (1.20) |
| Artificial | | 0.85 (7.60) | 1.51 (4.29) |
| FE Votes | ✓ | ✓ | ✓ |
| FE Municipality | ✓ | ✓ | ✓ |
| R ² | 0.82 | 0.84 | 0.85 |
| Num. obs. | 21024 | 18320 | 17934 |

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

A3 Turnout Effects

Table A2: Turnout and Floods

| | MODEL I | MODEL II | MODEL III |
|------------------------|--------------------|-------------------|--------------------|
| Flooded | 0.03*** (0.00) | 0.03*** (0.00) | 0.03*** (0.00) |
| Green Party % | 0.00*** (0.00) | | 0.00** (0.00) |
| Social Democrats % | 0.00** (0.00) | | 0.00 (0.00) |
| Christian Democrats % | 0.00*** (0.00) | | 0.00** (0.00) |
| Liberal Democrats % | -0.00*** (0.00) | | -0.00*** (0.00) |
| Swiss People's Party % | 0.00** (0.00) | | 0.00** (0.00) |
| Rainfall | | -0.01** (0.00) | -0.01*** (0.00) |
| No vegetation | | -0.30 (0.49) | 1.64*** (0.29) |
| Share of Water | | -0.04 (0.11) | 0.18*** (0.03) |
| Share of Grass | | 0.00 (0.01) | -0.05*** (0.01) |
| Artificial | | 0.01 (0.06) | -0.22*** (0.03) |
| FE Votes | ✓ | ✓ | ✓ |
| FE Municipality | ✓ | ✓ | ✓ |
| R ² | 0.73 | 0.72 | 0.72 |
| Num. obs. | 18382 | 16046 | 15692 |

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

A4 Robustness Checks

A4.1 Future Exposure

In this section an additional exposure variable (`exposed` after vote) is coded as ‘1’ if a municipality was affected *after* the vote. We should not find any positive estimates. Indeed, we find no effects of exposure on voting outcome.

Table A3: Future Exposure– Voting and Weather (OLS)

| | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 |
|------------------------|--------------------|--------------------|------------------|-------------------|--------------------|-------------------|
| Flooded | | 0.86** (0.42) | | 1.31*** (0.42) | | 1.19*** (0.42) |
| Flooded After Vote | -0.03 (0.21) | -0.03 (0.21) | 0.07 (0.21) | 0.07 (0.21) | 0.05 (0.21) | 0.05 (0.21) |
| Green Party % | 0.12*** (0.04) | 0.12*** (0.04) | | | 0.01 (0.04) | 0.01 (0.04) |
| Social Democrats % | 0.21*** (0.03) | 0.21*** (0.03) | | | 0.23*** (0.03) | 0.23*** (0.03) |
| Christian Democrats % | -0.12*** (0.03) | -0.12*** (0.03) | | | -0.07*** (0.03) | -0.07** (0.03) |
| Liberal Democrats % | -0.02 (0.03) | -0.02 (0.03) | | | 0.06** (0.03) | 0.06** (0.03) |
| Swiss People’s Party % | 0.07*** (0.02) | 0.06*** (0.02) | | | 0.13*** (0.02) | 0.13*** (0.02) |
| Rainfall | | | 0.28 (0.43) | 0.37 (0.43) | 0.58 (0.43) | 0.67 (0.43) |
| No vegetation | | | -1.88 (36.37) | -1.92 (36.36) | -23.56 (36.35) | -23.47 (36.34) |
| Share of Water | | | 2.61 (3.48) | 2.60 (3.48) | -0.35 (3.48) | -0.33 (3.48) |
| Share of Grass | | | -0.72 (1.20) | -0.72 (1.20) | -0.75 (1.20) | -0.75 (1.20) |
| Artificial | | | -0.24 (4.29) | -0.24 (4.29) | 1.52 (4.29) | 1.51 (4.29) |
| R ² | 0.82 | 0.82 | 0.84 | 0.84 | 0.85 | 0.85 |
| Num. obs. | 21024 | 21024 | 17934 | 17934 | 17934 | 17934 |

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table A4: Future Exposure – ATT based on Entropy Balancing

| | Matched Sample | | | p -val | | Balance |
|--------------------------|-----------------|--------------|-----------|----------------|---------|-----------|
| | ATT s.e. | 0.18 0.49 | | 0.71 | | |
| | Before Matching | | | After Matching | | t -test |
| | $D = 1$ | $D = 0$ | t -test | $D = 1$ | $D = 0$ | |
| Flooding Risk | 0.52 | 0.26 | 0.00 | 0.52 | 0.52 | ✓ |
| Surface: % No vegetation | 4.71 | 3.32 | 0.00 | 4.71 | 4.71 | ✓ |
| Surface: % Water | 2.40 | 1.57 | 0.00 | 2.40 | 2.40 | ✓ |
| Surface: % Grass | 37.74 | 45.35 | 0.00 | 37.74 | 37.74 | ✓ |
| Surface: % Artificial | 17.05 | 12.70 | 0.00 | 17.05 | 17.05 | ✓ |
| Altitude (in m) | 559.38 | 588.36 | 0.00 | 559.38 | 559.38 | ✓ |
| Rainfall (per sqkm) | 1.82 | 2.49 | 0.00 | 1.82 | 1.82 | ✓ |
| Steepness in % | 11.31 | 9.49 | 0.00 | 11.31 | 11.31 | ✓ |
| Social Democrats (%) | 19.76 | 18.40 | 0.00 | 19.76 | 19.76 | ✓ |
| Christian Democrats (%) | 18.05 | 16.66 | 0.00 | 18.05 | 18.05 | ✓ |
| Greens (%) | 5.08 | 5.72 | 0.00 | 5.08 | 5.08 | ✓ |
| Liberals (%) | 19.07 | 18.16 | 0.00 | 19.07 | 19.07 | ✓ |
| Swiss People's Party (%) | 25.26 | 27.88 | 0.00 | 25.26 | 25.26 | ✓ |

A4.2 Replication with Other Environmental Votes (Placebo)

Table A5: Placebo Test– Other Votes

| | MODEL I | MODEL II | MODEL III |
|------------------------|--------------------|---------------------|---------------------|
| Flooded | 0.82 (0.54) | 0.43 (0.53) | -0.00 (0.54) |
| Green Party % | 0.26*** (0.04) | | 0.25*** (0.04) |
| Social Democrats % | 0.13*** (0.03) | | 0.03 (0.03) |
| Christian Democrats % | -0.13*** (0.03) | | -0.19*** (0.03) |
| Liberal Democrats % | -0.01 (0.03) | | 0.01 (0.03) |
| Swiss People's Party % | -0.03 (0.02) | | -0.01 (0.03) |
| Rainfall | | -10.33*** (0.60) | -11.05*** (0.61) |
| No vegetation | | 70.94 (45.37) | 71.18 (45.15) |
| Share of Water | | 6.45 (4.34) | 5.01 (4.32) |
| Share of Grass | | 1.33 (1.50) | 0.66 (1.50) |
| Artificial | | -4.23 (5.35) | -5.21 (5.32) |
| FE Votes | ✓ | ✓ | ✓ |
| FE Municipality | ✓ | ✓ | ✓ |
| R ² | 0.77 | 0.79 | 0.79 |
| Num. obs. | 7918 | 6886 | 6726 |

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table A6: Placebo Test – ATT based on Entropy Balancing

| | Matched Sample | | | p -val | | |
|--------------------------|-----------------|-------------|-------------|----------------|---------|------------|
| | ATT | 0.27 | 0.68 | | | |
| | s.e. | 0.66 | | | | |
| | Before Matching | | | After Matching | | Balance |
| | $D = 1$ | $D = 0$ | t -test | $D = 1$ | $D = 0$ | $t - test$ |
| Flooding Risk | 0.55 | 0.28 | 0.00 | 0.55 | 0.55 | ✓ |
| Surface: % No vegetation | 3.34 | 3.51 | 0.73 | 3.34 | 3.34 | ✓ |
| Surface: % Water | 2.12 | 1.66 | 0.02 | 2.12 | 2.12 | ✓ |
| Surface: % Grass | 37.00 | 44.70 | 0.00 | 37.00 | 37.00 | ✓ |
| Surface: % Artificial | 20.15 | 12.96 | 0.00 | 20.15 | 20.15 | ✓ |
| Altitude (in m) | 545.56 | 586.33 | 0.00 | 545.56 | 545.56 | ✓ |
| Rainfall (per sqkm) | 1.29 | 2.04 | 0.00 | 1.29 | 1.29 | ✓ |
| Steepness in % | 10.90 | 9.68 | 0.04 | 10.90 | 10.90 | ✓ |
| Social Democrats (%) | 19.75 | 18.52 | 0.04 | 19.75 | 19.75 | ✓ |
| Christian Democrats (%) | 15.09 | 15.98 | 0.36 | 15.09 | 15.09 | ✓ |
| Greens (%) | 7.41 | 6.92 | 0.26 | 7.41 | 7.41 | ✓ |
| Liberals (%) | 18.75 | 16.68 | 0.00 | 18.75 | 18.75 | ✓ |
| Swiss People's Party (%) | 30.02 | 30.32 | 0.72 | 30.02 | 30.02 | ✓ |

A4.3 Replication with Non-Environmental Votes (Placebo)

To show the robustness of the empirical results we also run the same models as in the main text but we now analyze seven votes not concerned with climate change but rather with the European Union and Switzerland’s relationship with it. For our period we find seven votes that concern Switzerland’s relationship with the European Union - these votes are shown in [Table A7](#).

Table A7: Placebo Test – Votes related to Switzerland’s Relationship with the EU

| Date | Vote |
|-----------|--|
| 8.6.1997 | Initiative ‘A People’s Vote on EU Accession Negotiations!’ |
| 21.5.2000 | Federal decree on sectorial treaties with the European Community |
| 4.3.2001 | Initiative ‘Yes to Europe’ |
| 5.6.2005 | Federal decree from 17.12.2004 regarding bilateral treaty on Schengen and Dublin agreement |
| 25.9.2005 | Federal decree on the extension of the right to free movement and the accompanying measures |
| 8.2.2009 | Federal decree on the right of free movement extension to Bulgaria and Rumania |
| 17.5.2009 | Federal decree on adopting the EU directive on biometric passports (extension of Schengen agreement) |

Table A8: Placebo Test– Non-Environmental Votes

| | MODEL I | MODEL II | MODEL III |
|------------------------|-------------------|--------------------|--------------------|
| Exposed | -0.35 (0.57) | -0.39 (0.57) | -0.38 (0.57) |
| Green Party % | 0.06 (0.04) | | 0.06 (0.04) |
| Social Democrats % | 0.01 (0.03) | | -0.03 (0.03) |
| Christian Democrats % | 0.13*** (0.02) | | 0.12*** (0.02) |
| Liberal Democrats % | 0.19*** (0.03) | | 0.16*** (0.03) |
| Swiss People’s Party % | 0.02 (0.02) | | 0.00 (0.02) |
| Rainfall | | -2.27*** (0.43) | -2.42*** (0.45) |
| No vegetation | | -9.80 (21.58) | 7.22 (9.55) |
| Share of Water | | 0.75 (5.03) | 2.37* (1.27) |
| Share of Grass | | -0.01 (0.33) | -0.48 (1.20) |
| Artificial | | 0.09 (2.52) | -0.06 (2.47) |
| FE Votes | ✓ | ✓ | ✓ |
| FE Municipality | ✓ | ✓ | ✓ |
| R ² | 0.89 | 0.89 | 0.90 |
| Num. obs. | 14413 | 14627 | 13937 |

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table A9: Placebo Test – ATT based on Entropy Balancing, Non-Environmental Votes

| | Matched Sample | | | <i>p</i> -val | | |
|--------------------------|-----------------|--------------|----------------|----------------|--------------|------------------------|
| | ATT | -0.09 | | 0.96 | | |
| | s.e. | 1.73 | | | | |
| | Before Matching | | | After Matching | | Balance |
| | <i>D</i> = 1 | <i>D</i> = 0 | <i>t</i> -test | <i>D</i> = 1 | <i>D</i> = 0 | <i>t</i> - <i>test</i> |
| Flooding Risk | 0.95 | 0.31 | 0.00 | 0.95 | 0.95 | ✓ |
| Surface: % No vegetation | 11.66 | 3.35 | 0.00 | 11.66 | 11.66 | ✓ |
| Surface: % Water | 4.97 | 1.71 | 0.00 | 4.97 | 4.97 | ✓ |
| Surface: % Grass | 29.98 | 44.54 | 0.00 | 29.98 | 29.98 | ✓ |
| Surface: % Artificial | 16.13 | 13.99 | 0.11 | 16.13 | 16.13 | ✓ |
| Altitude (in m) | 627.65 | 574.20 | 0.02 | 627.65 | 627.65 | ✓ |
| Rainfall (per sqkm) | 1.02 | 2.24 | 0.00 | 1.02 | 1.02 | ✓ |
| Steepness in % | 17.78 | 9.19 | 0.00 | 17.78 | 17.78 | ✓ |
| Social Democrats (%) | 17.94 | 17.68 | 0.71 | 17.94 | 17.94 | ✓ |
| Christian Democrats (%) | 22.92 | 16.05 | 0.00 | 22.92 | 22.92 | ✓ |
| Greens (%) | 6.01 | 6.48 | 0.18 | 6.01 | 6.01 | ✓ |
| Liberals (%) | 18.40 | 17.78 | 0.54 | 18.40 | 18.40 | ✓ |
| Swiss People's Party (%) | 26.45 | 29.01 | 0.02 | 26.45 | 26.45 | ✓ |

A4.4 Spatial Robustness

Table A10: Spatial Robustness

| | Model 1 | Model 2 | Model 3 | Model 4 |
|--------------------------|-------------------|-------------------|-------------------|-------------------|
| Directly Exposed | 1.10*** (0.43) | 1.14*** (0.42) | 1.19*** (0.42) | 1.10*** (0.43) |
| Close to Exposure (2 km) | 0.56 (0.35) | | | 0.41 (0.45) |
| Close to Exposure (4 km) | | 0.34 (0.24) | | 0.44 (0.36) |
| Close to Exposure (8 km) | | | -0.08 (0.18) | -0.35 (0.22) |
| ----- | | | | |
| Green Party % | 0.01 (0.04) | 0.01 (0.04) | 0.01 (0.04) | 0.01 (0.04) |
| Social Democrats % | 0.23*** (0.03) | 0.23*** (0.03) | 0.23*** (0.03) | 0.23*** (0.03) |
| Christian Democrats % | -0.07** (0.03) | -0.07** (0.03) | -0.07** (0.03) | -0.07** (0.03) |
| Liberal Democrats % | 0.06** (0.03) | 0.06** (0.03) | 0.06** (0.03) | 0.06** (0.03) |
| Swiss People's Party % | 0.13*** (0.02) | 0.13*** (0.02) | 0.13*** (0.02) | 0.13*** (0.02) |
| ----- | | | | |
| Rainfall | 0.67 (0.43) | 0.68 (0.43) | 0.68 (0.43) | 0.67 (0.43) |
| No vegetation | -23.71 (36.34) | -23.65 (36.34) | -23.52 (36.34) | -24.07 (36.34) |
| Share of Water | -0.34 (3.48) | -0.35 (3.48) | -0.33 (3.48) | -0.38 (3.48) |
| Share of Gras | -0.72 (1.20) | -0.73 (1.20) | -0.75 (1.20) | -0.70 (1.20) |
| Artificial | 1.56 (4.29) | 1.54 (4.29) | 1.51 (4.29) | 1.62 (4.29) |
| ----- | | | | |
| FE Votes | ✓ | ✓ | ✓ | ✓ |
| FE Municipality | ✓ | ✓ | ✓ | ✓ |
| R ² | 0.85 | 0.85 | 0.85 | 0.85 |
| Num. obs. | 17934 | 17934 | 17934 | 17934 |

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

A5 All Votes in Main Analysis

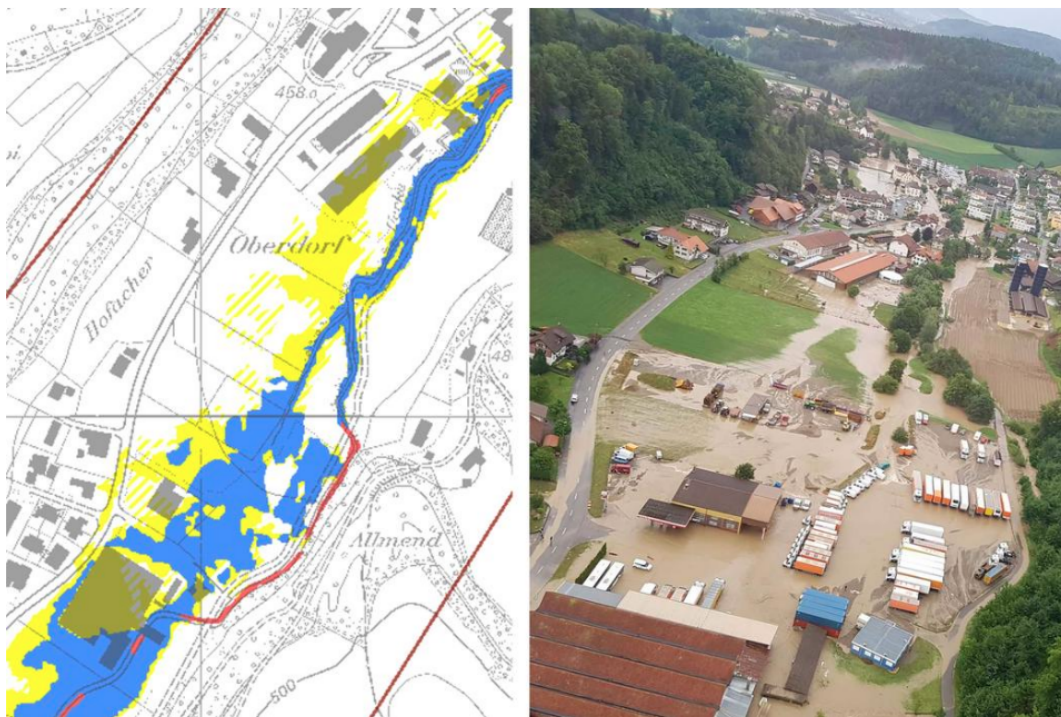
Table A11: Full List of All Ballot Measures

| BALLOT MEASURE | TURNOUT | SUPPORT | DATE | TYPE |
|--|---------|---------|------------|-----------------------------------|
| Mileage-Based Heavy-Vehicle Levy (Leistungsabhängige Schwerverkehrsabgabe / redevance sur le trafic des poids lourds liée aux prestations) | 51.8% | 57.2% | 27.9.1998 | Referendum |
| Reduce Traffic by Half (Verkehrshalbierung / visant à réduire de moitié le trafic routier motorisé) | 42.4% | 21.3% | 12.3.2000 | Initiative |
| Solar Power Tax (für einen Solar-Rappen / pour l'introduction d'un centime solaire) | 44.7% | 31.3% | 24.9.2000 | Initiative |
| Subsidy for renewable energies (Förderabgabe für erneuerbare Energien / redevance pour l'encouragement des nergies renouvelables) | 44.7% | 45.3% | 24.9.2000 | Counter Proposal by Government |
| Speed Limit 30 kmh Within Townlimits (Für mehr Verkehrssicherheit durch Tempo 30 innerorts / pour plus de sécurité à l'intérieur des localités grâce à une vitesse maximale de 30 km/h) | 55.8% | 20.3% | 4.3.2001 | Initiative |
| Four Car-Free Sundays Annually (Für einen autofreien Sonntag pro Jahreszeit / Pour un dimanche sans voitures par saison) | 49.8% | 37.6% | 18.5.2003 | Initiative |
| Avanti – Efficient Highways (Avanti - für sichere und leistungsfähige Autobahnen / Avanti - pour des autoroutes sûres et performantes) | 45.6% | 62.8%* | 8.2.2004 | Counter Proposal by Government |
| Limiting Legal Capabilities of Environmental Groups (Droit de recours des organisations: Assez d'obstructionisme) | 47.2% | 66.0%* | 30.11.2008 | Initiative |

*For the two votes where a NO vote was pro-climate, we record the NO votes as support (“Limiting Legal Capabilities of Environmental Groups” and “Avanti – Efficient Highways”).

A6 Value of Risk Measure

Figure A2: Flood Measure and Actual Flood (June 2017)



Note: This is an example of the risk measure map and an actual flood in the municipality of Uerkheim (Canton of Argovia). The accuracy of the risk measure is striking.

References

Gilardi, Fabrizio, Lucien Baumgartner, Clau Dermot, Theresa Gessler, Maël Kubli, Lucas Leemann, and Stefan Müller. 2020. “Digital Democracy Lab: Research Infrastructure and Datasets to Study Online Political Behavior and Communication in Switzerland.” *Working Paper University of Zürich* pp. 1–9.