ONLINE APPENDIX
Every Day is Earth Day: Evidence on the Long-term Impact of Environmental Activism

Daniel Hungerman
University of Notre Dame and NBER

Vivek Moorthy
University of Notre Dame

Appendix

Section 1. Weather on Earth Day and Voluntarism

1a. Additional Information on the 1973 Youth Socialization Survey

This survey is from the Youth-Parent Socialization Panel Study, 1965-1973. These data are taken from the Inter-university Consortium for Political and Social Research(ICPSR). Students were chosen in 1965 from a national probability sample of ninety-seven secondary schools (including 11 non-public schools). Within each school, 15-21 randomly-designated seniors were interviewed. The sample is thus nationally representative for high-school seniors in 1965. A total of 1348 (80.8 percent of the original sample) were re-interviewed in 1973 (one part of the data documentation says that the followup instead occurred in 1975, we believe this to be erroneous, cf. Jennings and Niemi, 1978). The sample is unweighted. Respondents were asked, "Have you ever taken part in a demonstration, protest, march, or sit-in" and if they answered yes were asked to give examples. The dataset includes the time period of each of the first two examples named. The survey also asks about type of activity but we found this hard to parse given many categories and the holistic nature of many Earth Day events; we viewed time as cleaner. If respondents named participation in other non-Earth-Day events from 1970 and the tendency to do this was unrelated to the weather, it would likely bias us towards zero.

We take as our dependent variable a dummy that equals unity if a respondent reports participating in a demonstration/protest in 1970 and zero otherwise. For location, we use the Primary Sampling Unit of respondents in the 1965 wave of the survey. PSUs are coded as SMAS or counties (the only exception is Toledo, Ohio, which we code as Lancaster county). For SMSAs, we make population-weighted averages of rainfall and our other county-level controls as we do for our GSS estimates (as discussed in more detail in Appendix Section 2). We also include a dummy for gender, a dummy for whether a respondent is white, the respondent's age, and a dummy for attending some college (it appears that the 1973 survey

does not ask about high school completion, perhaps assuming that all seniors interviewed in 1965 graduated).

1b. CPS Volunteer Supplement

Large-sample measures of voluntarism are available from the CPS Volunteer Supplement from 2002-2014 administered in September of each year by the US Census Bureau. We obtain these data from the Inter-university Consortium for Political and Social Research (ICPSR). The survey asks questions regarding participation in volunteer activities, defined as unpaid activities through or for an organization at any point in the previous year. They specifically word the question: "Since September 1st of the Last Year, have you done any volunteer activities through or for an organization?" If the participant answers yes, they are asked a series of questions about the type and amount of time spent on activities they engaged in.[1] Respondents were allowed to list up to seven organizations and could list the same type of organization more than once. The organization type of interest is classified as "Environmental or Animal Care Organization." This coding, and the large size of the CPS, allow us to focus on environmental voluntarism specifically.

We use two questions specifically to measure environmental voluntarism. First, we construct a binary yes/no variable for whether they volunteered for an environmental organization. About .9 percent of respondents across all survey years report having volunteered for such organizations. Second, for those who volunteered for an environmental organization, we use the question: "How many hours did you do volunteer activities for [an environmental or animal care organization] in the last year?" to construct our measure of total hours spent volunteering. In constructing the hours spent volunteering variable, there are a few considerations.

[1]There is also a second question regarding whether or not a respondent has volunteered, as some people may not think what they did counted as volunteer activity. The second question asks: "Sometimes people don't think of activities they do infrequently or activities they do for children's schools or youth organizations as volunteer activities. Since September 1st of last year, have you done any of these types of volunteer activities?" This second question may contain responses when the main voluntarism question of interest is answered as no or missing, and is used when constructing our measures of voluntarism.

People who reported yes to volunteering for an environmental organization but were missing for how many hours (e.g. not knowing or refusing to answer) are counted as missing, as they presumably spent a non-zero amount of time on environmental volunteering. These amount to about 2% of the observations used in estimation. Moreover, those who reported volunteering but did not list an environmental organization and those who did not volunteer at all were recorded as zeros. Observations are missing if they are "not in universe" or missing for all of the volunteer questions.

There is another question regarding hours volunteering in the volunteer supplement as well. Respondents provided how many weeks they volunteered for the organization they listed, and then were asked how many hours per week they volunteered. The results using this measure of hours are consistent with the previous measure.

Included in baseline regressions are controls for gender, marital status, race, whether the respondent is college educated, whether the respondent belongs to a family with income above the median income in their state for the year of the survey, county level controls, and year and region fixed effects. Standard errors are clustered at the county level. The main regressions are weighted by the "Final weight", which adjusts for geographic and demographic subgroups of the population. Results are robust to using the volunteer supplement non-response weight instead.

Figures A1 and A2 show day-by-day results of regressing hours of environmental volunteering on Earth Day rainfall (Figure A1) and a dummy for any environmental volunteering at all (Figure A2). The figure includes controls and census region fixed effects, and have a sample size of 422,172 and 425,692, respectively. Unlike the figures in the main text, here the relevant Earth Day rainfall is from Earth Day of the year a respondent was surveyed (in September). The coefficients are multiplied by 100.

Both pictures show that rain on Earth Day is associated with lower levels of voluntarism, while other days in April generally are not. The coefficient in Figure A1 suggests that an increase in 100 tenths of millimeters of rain is associated with a decline of .0134 hours in

average volunteering, which would be a decline of about 1,300 hours in total in a community of 100,000 people. Figure A2 indicates that this increase in rain would lower the probability that someone reports being a volunteer by close to .1%, or about 78 people in a town of 100,000. Together both pictures indicate that rainfall on recent Earth Days is associated with lower reports of environmental voluntarism, at both the extensive and intensive margins, when people are surveyed six months later.

Table A1 reports estimates from regressing whether an individual volunteered for an environmental organization on rainfall on the Earth day of the same year of the survey. Coefficients are multiplied by 100 for readability. The first column uses the indicator for whether an individual volunteered at all for an environmental (or animal care) organization and the second column uses the total number of hours spent volunteering for those organizations in the past year. The first row uses deviation-from-mean rainfall and includes the same contemporaneous individual controls and year fixed effects used for Figure A1 and A2. The second row uses simple precipitation, the third row redoes the first row with additional contemporaneous county level controls, and the fourth row further includes census region fixed effects. The fifth row uses winsorized precipitation, and includes the extra controls from row 3. The final row redoes row 3 using a logit regression for the first column and a tobit regression for the second column. For the tobit regression, we report marginal effects at the means for the truncated expectation, and estimate standard errors via the delta method.

The county level controls in row 3 include the proportion of the county that is black, white, female, high school graduated, married, and the fraction employed in manufacturing from the CPS survey of the concurrent year. These controls are created differently than those of other specifications, as these regressions relate rain on the Earth Day of each survey year to reported voluntarism during that same year. Specifically, we collapse data from the CPS surveys themselves to the county level using the final weight mentioned above. As with the main results, these controls have a negligible effect on the point estimates.

The coefficients in the first column are mostly marginally significant, and suggest that

more rain on Earth Day in a given year lowers the probability of having volunteered for an environmental or animal care organization in that same year. Row 4 suggests that an 100 tenths of a millimeter increase in rainfall leads to a decrease in the probability of volunteering by about .04 percentage points, which is about a 4.3 percent decrease over the mean.

The point estimates in the second column are all negative and mostly significant. The estimates with individual and county level controls and region fixed effects (row 4) suggest that an increase in 100 tenths of millimeters of rain decrease the average hours volunteered by .0086 hours, or a decline in a about 860 hours in a town of 100,000 people. There are many zeroes in the dependent variable, which may bias OLS downwards. Using the coefficients from the tobit specification, to adjust for this bias, shows that an increase in 100 tenths of millimeters of rain from average rainfall decreases the average annual hours volunteered by about .85 hours.[2] This is about 2 percent of the mean among those who report nonzero environmental voluntarism. Overall, then, both results from the Youth Survey and from the CPS data confirm the intuitive result that bad weather lowers participation on Earth Day. The results are larger for the Youth Survey data, but suggest the potential for economically significant responses in both cases.

Section 2. Additional Information on the GSS

For the General Social Survey, restricted-use Primary Sampling Unit information is available for the samples from 1977 through 1993. We obtained information on the list of primary sampling units from the NORC organization which oversees the GSS. The documentation provided lists Standard Metropolitan Statistical Areas for the 1970 sample frame (which also includes several counties and county groups). The documentation for the 1980 frame is worse, with several SMSAs misspelled and at least one PSU number apparently mislabeled.

We used both the 1970 and 1980 frames, discarding the Black Sample frame. We matched 1970 information on SMSAs to county level information using SMSA to Census 1970 and

[2]This is estimated by taking differences in the expected value of y—x conditional on y—x being greater than 0, i.e. the truncated expectation x'β + $\sigma\lambda$, where λ is the inverse Mills ratio.

1980 information provided by the US Census. For 1980, we matched data using SMSA name, and if there was no SMSA with a name we matched using the provided county name and state. For both the 1970 and 1980 sampling frames, there are several multi-county groups that are not SMSAs. We constructed SMSA-like groups of counties for these PSUs.

Since our weather data is available at the county level, but SMSAs span counties, we estimated daily precipitation in two ways. First, we used the recorded precipitation from the county with the largest 1970 population in each SMSA. Second, we took a 1970-population-weighted average of precipitation from counties in each SMSAs; the results reported in the paper use this latter measure. However, the correlation in April 22, 1970 precipitation with these two measures was close to 0.99, and results were generally quite similar regardless of which measure we used.

Section 3. Evidence from the Federal Election Commission

We also look at data on individual contributions to the League of Conservation Voters (LCV) from the Federal Election Commission (FEC) from 1978 to 1988.[3] We choose 1978 as the start date as this is the first year of available data in the relevant time period. The FEC reports all data on contributions over a threshold (for much of this period, $500) and contains zip code level identifiers. We match zip codes to counties and use the total individual contributions within a county as our outcome. We drop observations from zip codes that cross county borders (i.e., not fully contained within a county) and have non-zero contributions, as it is not clear which county generated that data. We have 27,654 observations in this sample.

Table A7 reports regressions of total contributions on rainfall on Earth Day. Specifications are clustered in different ways. Results are not statistically significant across all specifications and are sensitive to weighting; however, the results indicate that more rain on Earth Day decreases individual contributions to the LCV. The mean and standard deviation

[3]Data available at: `https://www.fec.gov/`. We use committee ID C00094870, which is the LCV PAC with data available over this time range.

of total contributions are 39 and 626.3 dollars, respectively. The estimated coefficient on the population weighted regression with residual rain and controls and region fixed effects (row 4) then implies that a one standard-deviation increase in residual rainfall on Earth Day leads to a 119 dollar, or .19 standard deviation, decrease in contributions. Figure A5 presents day-by-day estimates as in the main text. Again, the point estimates suggest that higher rain lowers donor support for the LCV, but the result is not statistically significant. Overall, we take Table A7 and Figure A5 as suggestive, but not conclusive, evidence that Earth Day affected support for the LCV. However, the results here are necessarily limited to only the largest donations, as only large donations are reported to the FEC.