# Coattails, Raincoats, and Congressional Election Outcomes
## Online Appendix

**District-Level Analyses**

Table A.1 provides statistical analyses similar to those in Table 1 but focus on congressional districts instead of counties. These analyses differ in other respects. First, I study elections from 1952 – 2008. Second, I rely on a congressional district rainfall measure developed by Brooks and Henderson (2016). Brooks and Henderson "use census to county-to-district matching to link each county to all congressional districts containing parts of that county. We then average rain across all county stations within each district, weighting by county population" and then "normalize and deviate each district-level precipitation measure… [to remove] systematic trends in rain variation that could correlate with district factors" (2016, 658). Third, I replace the "Moving Average of Republican Vote Share in the Three Previous Elections" measure of Normal vote with a "Normal vote" measure developed by Levendusky, Pope, and Jackman (2008) that is based on demographic variables, election outcomes, and candidate characteristics. I make this substitution because a similar previous election moving average is not available for congressional districts, largely due to redistricting. Fourth, I replace county random effects with state random effects. Fifth, I control for whether an incumbent was present in an election and if that incumbent was a freshman representative. Main findings are similar. The strength of the relationship between presidential vote and congressional vote decreases when it rains at above average levels.

**Table A.1: District Level Relationship between Congressional and Presidential Vote Conditional on Deviation from Normal Rainfall**

|  | Coattail Model | Raincoat Model |
|---|---|---|
| GOP Pres Vote | 0.074 | 0.075 |
|  | (0.038) | (0.039) |
| Normal Vote | 7.294* | 7.288* |
| (Levenduski et. al 2008) | (0.462) | (0.470) |
| Rainfall Deviation Measure |  | 0.013 |
| (Henderson and Brooks 2016) |  | (0.253) |
| GOP Pres Vote x Rainfall Measure |  | -0.075* |
|  |  | (0.037) |
| Normal Vote x Rainfall Measure |  | 0.647 |
|  |  | (0.493) |
| Property Requirement | -10.841* | -10.761* |
|  | (0.903) | (0.856) |
| Literacy Test | -1.159* | -1.189* |
|  | (0.547) | (0.546) |
| Poll Tax | -3.888* | -3.814* |
|  | (0.815) | (0.834) |
| Motor Voter | 2.437* | 2.456* |
|  | (0.420) | (0.422) |
| Freshman Incumbent | 3.070* | 3.078* |
|  | (0.257) | (0.253) |
| Incumbent Seeking Reelection | 11.115* | 11.103* |
|  | (0.323) | (0.321) |
| Constant | 46.187* | 46.184* |
|  | (0.259) | (0.261) |
| Within R-Squared | 0.798 | 0.798 |
| Between R-Squared | 0.879 | 0.877 |
| $\sigma_\mu$ | 1.966 | 1.981 |
| $\rho$ | 0.070 | 0.072 |
| N | 12930 | 12930 |

1952 – 2008 Congressional Elections in Presidential Election Years. Estimations include fixed effects for years and random effects for states. Robust standard errors in parentheses. * $p < 0.05$

## Non-Mean Centered Predictors

To facilitate interpretation of interactive effects in the analysis presented in Table 1, I mean center non-dichotomous predictor variables. Estimates in Table A.2 provide comparable analyses with unadjusted predictor variables.

**Table A.2: Relationship between Congressional and Presidential Vote Conditional on Deviation from Normal Rainfall using non-mean centered predictors**

| | Coattail Model | Raincoat Model |
|---|---|---|
| GOP Pres Vote | 0.499* | 0.498* |
| | (0.012) | (0.011) |
| Normal Vote: | 0.422* | 0.423* |
| Moving Average of Republican Vote Share in Three Previous Elections | (0.017) | (0.017) |
| (Election Day Rain - Normal Rain) | | -0.412 |
| | | (1.706) |
| GOP Pres Vote x (Election Day Rain - Normal Rain) | | -0.173* |
| | | (0.027) |
| Normal Vote x (Election Day Rain - Normal Rain) | | 0.139* |
| | | (0.031) |
| Property | 6.264* | 6.280* |
| | (1.220) | (1.232) |
| Motor Voter | 2.404* | 2.457* |
| | (0.418) | (0.414) |
| Literacy Test | 1.677* | 1.719* |
| | (0.466) | (0.464) |
| Poll Tax | -9.601* | -9.814* |
| | (0.696) | (0.694) |
| % High School Graduates | -1.816* | -1.787* |
| | (0.333) | (0.331) |
| % African American | -0.259* | -0.268* |
| | (0.046) | (0.046) |
| Income | 1.234* | 1.173* |
| | (0.521) | (0.521) |
| Constant | 6.328* | 7.052* |
| | (1.643) | (1.644) |
| Within R-Squared | 0.307 | 0.310 |
| Between R-Squared | 0.662 | 0.661 |
| $\sigma_\mu$ | 7.977 | 7.975 |
| $\rho$ | 0.351 | 0.352 |
| N | 29857 | 29857 |

Estimations include fixed effects for years and random effects for counties.
Robust Standard errors in parentheses. $^* p < 0.05$

**Instrumental Variable Analyses**

Analyses in Table 1 examine the direct relationship between rainfall and election outcomes similar to prior work (e.g. Gomez et. al 2007: Table 2; Henderson and Brooks 2016: Table 2). Accompanying discussion of these findings presume changes in rainfall affect levels of turnout, which in turn affect the strength of the relationship between presidential and congressional election outcomes. These analyses, however, do not empirically relate the exogenous treatment "(Election Day Rain – Normal Rain)" to turnout and then relate changes in turnout attributable to rain to election outcomes.

To further study how changes in turnout relate the strength of the relationship between presidential and congressional election outcomes, I conduct instrumental variable analyses similar to Hansford and Gomez (2010, Table 1). In a first stage estimation, I use the "(Election Day Rain – Normal Rain)" measure as an instrument for "Turnout"; the product of "(Election Day Rain – Normal Rain)" and "Presidential Vote" as an instrument for "Turnout x Presidential Vote;" and the product of "(Election Day Rain – Normal Rain)" and "Normal Vote" as an instrument for "Turnout x Normal Vote." My instrumented "Turnout," "Turnout x Presidential Vote," and "Turnout x. Normal Vote" measures respectively replace my "(Election Day Rain – Normal Rain)," "(Election Day Rain – Normal Rain) x Presidential Vote," and "(Election Day Rain – Normal Rain) x. Normal Vote" in Equation 1 in a second stage estimation.

Analyses in Table A.3 present the results of the second stage estimation and indicate there is a positive relationship between "Turnout x Presidential Vote" and congressional vote share. Similar to the substantive conclusions drawn in Table 1, these findings suggest that the more electoral success a presidential candidate has in a particular county, his congressional copartisans also experience more electoral success, particularly when there is higher turnout. Similar to Hansford

and Gomez (2010, 274), I also find that as turnout increases, election outcomes mirror the "Normal Vote" less.

**Table A.3: Relationship between Congressional and Presidential Vote Conditional on Instrumented Turnout**

|  | Second Stage Estimates |
|---|---|
| Turnout | -0.840* |
|  | (0.338) |
| GOP Pres Vote | 0.652* |
|  | (0.042) |
| Normal Vote: | 0.562* |
|  | (0.069) |
| Moving Average of Republican Vote Share in Three Previous Elections |  |
| Turnout x. Pres Vote | 0.071* |
|  | (0.016) |
| Turnout x. Normal Vote | -0.115* |
|  | (0.025) |
| Motor Voter | 4.460* |
|  | (0.518) |
| Literacy Test | 1.035 |
|  | (1.212) |
| Poll Tax | 3.694 |
|  | (5.249) |
| % High School Graduates | 5.605* |
|  | (1.625) |
| % African American | -0.264* |
|  | (0.096) |
| Income | -8.187* |
|  | (2.846) |
| Property | 81.250* |
|  | (23.493) |
| Constant | 50.300* |
|  | (0.932) |
| Within R-Squared | 0.099 |
| Between R-Squared | 0.351 |
| $\sigma_\mu$ | 3.572 |
| $\rho$ | 0.017 |
| N | 29857 |
| F test, excluded instruments for Turnout | 45.4 |
| F test, excluded instruments for Turnout x Presidential Vote | 37.7 |
| F test, excluded instruments for Turnout x Normal Vote | 32.7 |

Standard errors in parentheses
$^*$ $p < 0.05$

# References

Gomez, Brad T., Thomas G. Hansford, and George A. Krause. 2007. "The Republicans Should Pray for Rain: Weather, Turnout, and Voting in U.S. Presidential Elections." *Journal of Politics* 69 (3): 649–663. https://doi.org/10.1111/j.1468-2508.2007.00565.x.

Hansford, Thomas G., and Brad T. Gomez. 2010. "Estimating the Electoral Effects of Voter Turnout." *American Political Science Review* 104 (02): 268–88. https://doi.org/10.1017/S0003055410000109.

Henderson, John, and John Brooks. 2016. "Mediating the Electoral Connection: The Information Effects of Voter Signals on Legislative Behavior." 78(3): 653-659. https://doi.org/10.1086/685380.

Levendusky, Matthew S., Jeremy C. Pope, and Simon D. Jackman. 2008. "Measuring District-Level Partisanship with Implications for the Analysis of U.S. Elections." *The Journal of Politics* 70 (3): 736–53. https://doi.org/10.1017/S0022381608080729.