Online Appendix:
Electoral Fraud or Violence
The Effect of Observers on Party Manipulation Strategies

Joseph Asunka, Sarah Brierley, Miriam Golden, Eric Kramon, and George Ofosu[1]

August 29, 2016

[1]The William and Flora Hewlett Foundation (asunka@ucla.edu); Department of Political Science, University of California, Los Angeles (sabrierley@ucla.edu); Department of Political Science, University of California, Los Angeles (golden@ucla.edu); Department of Political Science, George Washington University (ekramon@gwu.edu); Department of Political Science, University of California, Los Angeles (ofosu@ucla.edu).

Table of Contents

A Treatment Assignment

Table A.1: Constituency and Polling Station Treatment Assignment

Panel A: Constituency Level Assignment

	Low	Medium	High	Total
Competitive	5	9	9	23
Non-Competitive	8	15	14	37
Total	13	24	23	60

Panel B: Polling Station Level Assignment

	Low	Medium	High	Total
Treated	182	422	688	1,292
Control	311	511	196	1,018
Total	493	933	884	2,310

Note: Panel A shows the number of constituencies in each block assigned to each of the three constituency level treatments. We block randomize the constituency level treatment with a 20 percent probability of a constituency being assigned to Low, and 40 percent probability in being assigned to Medium and High, respectively. Panel B presents the number of polling stations assigned to treatment and control in each of the three constituency level treatment conditions.

B Balance Tests

In Tables B.1 and B.2 below we demonstrate balance in covariates between a) treatment and control polling stations and b) constituencies assigned to low, medium and high observer saturation levels.

Table B.1: Polling Station Level Covariate Balance

	Mean Control	Mean Observed	Difference	P-Value
NPP Presidential Vote 2008	.357	.355	.002	.864
NDC Presidential Vote 2008	.436	.433	.002	.881
NPP Parliamentary Vote 2008	.383	.358	.025	.087
NDC Parliamentary Vote 2008	.408	.414	-.006	.694
Poverty index	.984	.963	.02	.23
Electricity	1.154	1.129	.025	.286
Medicine	.891	.905	-.014	.514
Sufficient Food	.881	.842	.038	.1
Cash Income	1.008	.976	.032	.126
No Formal Schooling	.147	.15	-.003	.793
Completed Primary Schooling	.685	.708	-.022	.11
Post Primary Schooling	.511	.537	-.026	.088
Formal House	.172	.178	-.006	.626
Concrete Permanent House	.41	.422	-.012	.427
Concrete and Mud House	.224	.215	.008	.504
Mud House	.187	.179	.008	.494

Notes: Data are from a household survey we conducted in the communities surrounding treatment and control polling station in the two days following the election. The sample is approximately 6,000 voters. P-values are calculated from two-tailed difference-of-means tests. Presidential and Parliamentary Vote indicates the share of respondents who voted for the party in 2008. Respondents were also asked how often they went without the following in the past year: Cash income; sufficient food; medicine; and electricity. Responses were, Never (0), Occasionally (1) or Most of the time (2). Poverty index is the summation of these the responses divided by the total number of items recorded. Enumerators also asked respondents their level of education and recorded the material that their homes were made from.

Table B.2: Constituency Level Covariate Balance

	Low	Medium	High
NPP Presidential Vote share 2008	0.27	0.29	0.30
	(0.05)	(0.03)	(0.04)
NDC Presidential Vote share 2008	0.34	0.37	0.37
	(0.06)	(0.04)	(0.04)
NPP Parliamentary Vote share 2008	0.31	0.29	0.31
	(0.05)	(0.03)	(0.04)
NDC Parliamentary Vote share 2008	0.30	0.35	0.35
	(0.05)	(0.03)	(0.04)
Poverty Index	1.02	0.97	0.98
	(0.06)	(0.05)	(0.05)
Share with No Formal Education	0.13	0.14	0.12
	(0.03)	(0.01)	(0.02)

Note: Data are from a household survey we conducted in the communities near treatment and control polling station in the two days following the election. The sample is approximately 6,000 voters. Standard errors are reported in parentheses.

C Direct and Spillover Effects in Single-Party Dominant and Electorally Competitive Constituencies

Table C.1: Quantities of interest in in competitive and non-competitive constituencies

	Competitive			***Non-Competitive***		
	Saturation			***Saturation***		
Indicators	Low	Middle	High	Low	Middle	High
Intimidation						
Treatment	0.09	0.04	0.04	0.02	0.08	0.04
	(0.03)	(0.02)	(0.01)	(0.01)	(0.02)	(0.01)
Control	0.04	0.30	0.10	0.14	0.04	0.06
	(0.03)	(0.04)	(0.04)	(0.04)	(0.02)	(0.03)
ITT	0.05	0.00	0.01	-0.11	-0.05	-0.09
	(0.04)	(0.03)	(0.03)	(0.04)	(0.04)	(0.04)
TCE	0.04	0.10	0.03	-0.08	-0.07	-0.09
	(0.04)	(0.04)	(0.03)	(0.04)	(0.04)	(0.04)
ASNT	0.00	0.27	0.07	0.00	-0.09	-0.08
	(0.04)	(0.05)	(0.05)	(0.05)	(0.04)	(0.05)
Turnout						
Treatment	0.85	0.80	0.81	0.84	0.83	0.84
	(0.03)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
Control	0.92	0.86	0.85	0.87	0.85	0.86
	(0.05)	(0.03)	(0.04)	(0.02)	(0.02)	(0.03)
ITT	-0.07	-0.12	-0.11	-0.03	-0.04	-0.03
	(0.06)	(0.05)	(0.05)	(0.03)	(0.02)	(0.02)
TCE	-0.05	-0.10	-0.09	-0.02	-0.03	-0.02
	(0.06)	(0.05)	(0.05)	(0.02)	(0.02)	(0.02)
ASNT	0.00	-0.06	-0.07	0.00	-0.02	-0.01
	(0.07)	(0.06)	(0.06)	(0.03)	(0.03)	(0.04)
Outlier ($> \bar{x} + 1.96 * SD$)						
Treatment	0.01	0.03	0.02	0.02	0.01	0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Control	0.03	0.06	0.06	0.06	0.04	0.07
	(0.02)	(0.02)	(0.03)	(0.02)	(0.01)	(0.03)
ITT	-0.02	-0.00	-0.01	-0.04	-0.05	-0.05
	(0.03)	(0.03)	(0.03)	(0.03)	(0.02)	(0.02)
TCE	-0.02	0.01	0.00	-0.02	-0.03	-0.03
	(0.03)	(0.03)	(0.03)	(0.03)	(0.02)	(0.02)
ASNT	0.00	0.03	0.02	0.00	-0.02	0.01
	(0.03)	(0.03)	(0.04)	(0.03)	(0.03)	(0.04)
*Outlier (> Upper Q. + 1.5*IQR)*						
Treatment	0.04	0.04	0.05	0.03	0.03	0.02
	(0.02)	(0.02)	(0.01)	(0.02)	(0.01)	(0.01)
Control	0.08	0.10	0.06	0.07	0.07	0.10
	(0.04)	(0.03)	(0.03)	(0.03)	(0.02)	(0.04)
ITT	-0.04	-0.04	-0.04	-0.04	-0.04	-0.06
	(0.04)	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)
TCE	-0.03	-0.02	-0.03	-0.03	-0.03	-0.03
	(0.04)	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)
ASNT	0.00	0.01	-0.03	0.00	-0.01	0.03
	(0.05)	(0.04)	(0.05)	(0.04)	(0.03)	(0.05)

Note: Table reports mean estimates for our dependent variables in each of our six treatment conditions disaggregated by the level of electoral competition. In estimating these means, each unit is weight by the inverse of its treatment probability. Standard errors are reported in parentheses. Table also shows the spillover-corrected ITT and ASNT for stations in each level of observer saturation with standard errors reported in parentheses.

D Characteristics of Single-Party Dominant and Electorally Competitive Constituencies

Table D.1: Infrastructure and Development Differences Between Competitive and Non-Competitive Constituencies

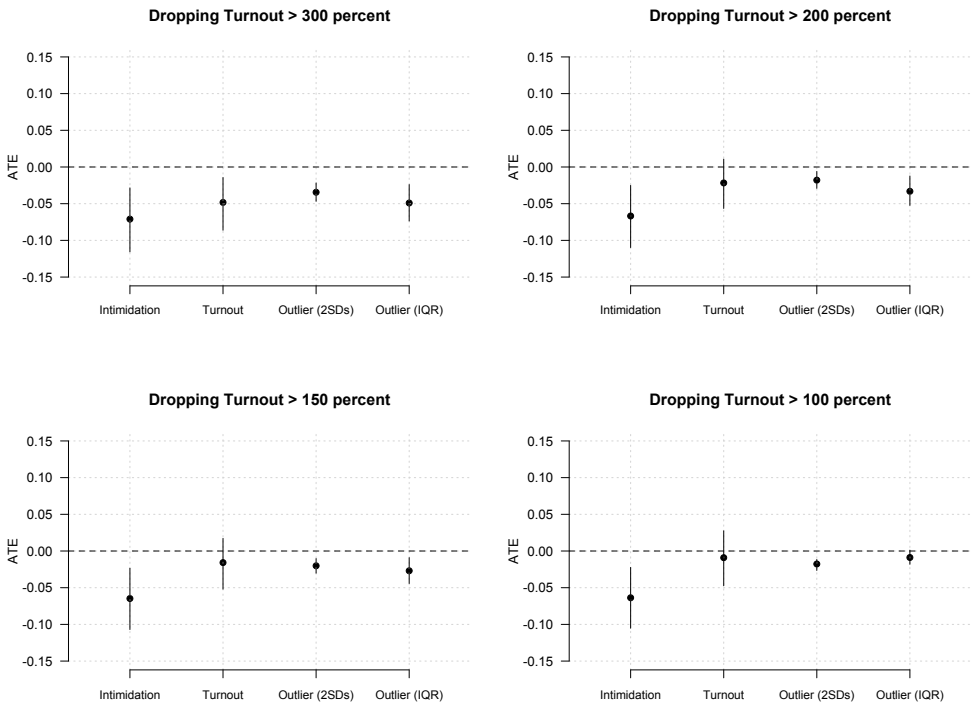
	Non-competitive	Competitive	Difference	P Value
Electricity	.356	.360	-.004	0.523
Roads	.119	.109	.010	0.399
Poverty Index	.999	.961	.037	0.277
Ethnic Diversity	.634	.511	.123	0.003
Polling Station density	.486	.522	-.035	0.603

Notes: Electricity is measured using 2010 census data from communities that surround our sampled polling stations. Each household was asked if they had access to electricity in their homes. We also use 2010 census data to measure ethnic diversity. Each census respondent is asked their ethnic group. We measure diversity using a standardized Herfindahl index, which indicates the probability that two people picked at random belong to the same ethnic group. The data on roads displays the length of trunk road per square kilometer in each constituency. Poverty Index is from our household survey.

E Robustness Tests

In this appendix, we test the robustness of our results to the removal of extremely high levels of turnout from our sample. The panels in Figure E.1 present treatment effects removing polling stations with turnout rates greater than 300 percent, 200 percent, 250 percent, and 100 percent, respectively. Our inferences about the direct effect of observers are robust to the removal of these extreme values.

Figure E.1: Robustness Tests: Direct Effect of Observers in Full Sample



Notes: Figure shows intention-to-treat (ITT) effects of observers. Our unit of analysis is the polling station. In estimating all quantities of interest, we use inverse probability weighting. We use randomization inference to calculate the 95 percent confidence bounds around these estimates. Specifically, we assume that the estimated effect is same for all units and use that to generate hypothetical potential outcomes for each unit. When simulating possible random allocation of treatment we cluster on constituency.

F Constituency Level Analysis

In this section, we estimate the total causal effect (TCE) of observers, conditional on observer saturation. The total causal effect, $TCE(s)$, refers to the effect of increasing the saturation of observers on the overall level of fraud at the constituency level. To estimate this quantity, we compare fraud/violence outcomes for all stations (treated and control) at medium (and high) saturation to fraud outcomes in control in low saturation. Again, the latter serve as our estimate of the baseline level of fraud in the absence of observers. $TCE(s)$ are calculated as follows:

$$TCE(s) = E(Y_{ij}|S_j = s) - E(Y_{ij}|T_{ij} = 0, S_j = low). \quad (1)$$

This estimation takes into account spillover effects (positive or negative) to estimate the overall effect of observers in a constituency. A negative value indicates that observers reduce overall levels of fraud in the constituency. A positive value indicates the opposite. Additionally, $TCE(s)$ provides information about the marginal impact of adding more observers to a constituency. If $TCE(s)$ increases as saturation increases, this is evidence of increasing returns. If $TCE(s)$ decreases as saturation increases, this is evidence of decreasing returns. If $TCE(s)$ remains constant, this is evidence of constant returns.

The results are presented in Table F.1. In the full sample, increasing share of polling stations with observers leads to statistically significant decreases in overall levels of fraud and violence. In electorally competitive constituencies, increasing the saturation of observers decreases overall levels of fraud but has no impact on levels of violence and intimidation. In non-competitive areas, increasing the saturation of observers has relatively little impact on overall levels of fraud, but a substantial negative effect on levels of violence and intimidation. These results are consistent with the patterns of spillover documented in the main body of the paper.

Table F.1: Total Causal effects

	Low	Middle	High
Turnout			
TCE (s)	-	-0.056	-0.025
Standard error	-	(0.024)	(0.025)
P-value	-	0.020	0.298
Intimidation during voting			
TCE (s)	-	-0.020	-0.057
Standard error	-	(0.026)	(0.025)
P-value	-	0.442	0.023

Note: Table F.1 report TCE estimates for our dependent variables, turnout and intimidation during voting, in middle and high saturations. In calculating these estimates, each unit is weighted by the inverse of its treatment probability. Standard errors are reported in parentheses. We also report the p-values from a two-sided t-test of these estimates.

Table F.2: TCEs across treatment conditions in competitive and non-competitive constituencies

	Competitive			***Non-Competitive***		
	Saturation			***Saturation***		
Indicators	Low	Middle	High	Low	Middle	High
Turnout						
TCE (s)	-	-0.095	-0.092	-	-0.032	0.020
Standard error	-	(0.053)	(0.052)	-	(0.024)	0.027
P-value	-	0.073	0.077	-	0.182	0.459
Intimidation during voting						
TCE (s)	-	0.109	0.052	-	-0.097	-0.124
Standard error	-	(0.029)	(0.025)	-	(0.037)	(0.036)
P-value	-	0.000	0.038	-	0.008	0.001

Note: Table F.2 report TCE estimates for our dependent variables, turnout and intimidation during voting, in middle and high saturations disaggregated by the level of electoral competition. In calculating these estimates, each unit is weighted by the inverse of its treatment probability. Standard errors are reported in parentheses. We also report the p-values from a two-sided t-test of these estimates.