

## ONLINE APPENDIX

## SUMMARY STATISTICS OF SAMPLED CONSTITUENCIES AND COVARIATE BALANCE

TABLE A.1. Summary statistics of sampled constituencies

Variable	Constituencies		Min	Max	P-value (KS-test)
	Study region N= 122	Sample N= 60			
<b>Part A: Constituency electoral characteristics</b>					
# Polling stations	96.074 (30.707)	99.333 (30.049)	36	174	0.989
Log # Voters	10.788 (0.402)	10.830 (0.376)	9.399	11.630	0.598
# Candidates (2012)	4.496 (0.887)	4.517 (0.868)	3	8	0.996
Area (km. sq.)	651.986 (605.497)	711.375 (653.081)	3.064	3,710.232	0.996
Distance to constituency (Km)	185.681 (60.560)	183.182 (65.234)	27.951	321.141	0.989
Voter density (# voters/Area (km. sq.))	817.401 (2,837.714)	501.435 (1,117.443)	3.256	25,611.890	1.000
<b>Part B: Constituency characteristics-district census</b>					
Rural population	0.587 (0.291)	0.557 (0.290)	0.00003	1	0.887
Proportion of pop. with electricity	0.586 (0.188)	0.584 (0.177)	0.258	0.893	0.985
Fuel (electric and gas)	0.112 (0.112)	0.111 (0.110)	0.006	0.358	1.000
Cement walls	0.532 (0.227)	0.539 (0.210)	0.076	0.886	0.911
Muslim population	0.105 (0.063)	0.107 (0.074)	0.009	0.445	1.000
Population in Agriculture	0.463 (0.247)	0.465 (0.240)	0.033	0.846	0.998
%Ashanti	0.256 (0.295)	0.257 (0.303)	0.001	0.855	1.000
%Fante	0.165 (0.250)	0.147 (0.231)	0.001	0.945	0.907
%Ewe	0.188 (0.300)	0.197 (0.318)	0.004	0.957	0.970
%Dagomba	0.007 (0.011)	0.008 (0.013)	0	0.088	1.000
Education (primary or less)	0.905 (0.062)	0.902 (0.068)	0.674	0.983	1.000
Employed	0.498 (0.047)	0.495 (0.046)	0.396	0.634	1.000

*Notes:* Table A.1 shows the summary statistics of constituencies in the four regions of the study and the sample. I obtained data on the electoral characteristics of constituencies from Ghana's Electoral Commission. To calculate distances from the capital to constituencies, I use the `geocode` function in the `ggmap` package in R to take the geocoordinates of constituency capitals. Using the geo-coordinates of Ghana's parliament, I calculated the euclidean distances between constituency capitals and the Parliament. Data on the socio-economic characteristics of constituencies are from Ghana's 2010 national census.

TABLE A.2. Covariate balance: AIO treatment (two treatment arms)

Variable	Intensity of observation (Treatment)		Min	Max	Diff-in-means	T-test <i>P</i> – value	KS-test <i>P</i> – value
	Low N	High N					
<b>Part A: Constituency electoral characteristics</b>							
# Polling stations	95.462 (29.028)	100.404 (30.544)	36	166	4.943	0.597	0.597
Log # voters	10.814 (0.367)	10.815 (0.423)	9.399	11.605	0.001	0.991	0.253
Log # valid votes (2012)	10.581 (0.300)	10.535 (0.400)	9.106	11.257	-0.045	0.660	0.660
# Candidates (2012)	4.500 (0.979)	4.521 (0.847)	3	6.500	0.021	0.944	0.991
Vote margin (2012)	0.311 (0.290)	0.320 (0.262)	0.012	0.873	0.009	0.922	0.536
Turnout (2012)	0.787 (0.044)	0.763 (0.048)	0.639	0.868	-0.024	0.103	0.365
Term of MP	1.462 (0.776)	1.979 (1.170)	1	5	0.517	0.070	0.685
Area (km. sq.)	526.984 (396.877)	762.376 (702.635)	13.387	3,710.232	235.392	0.127	0.616
Distance to constituency (Km)	182.374 (67.115)	183.930 (65.719)	27.951	320.692	1.556	0.942	0.972
Voter density (# voters/Area (km. sq.))	786.787 (1,345.280)	422.508 (1,048.844)	3.256	5,918.110	-364.279	0.380	0.546
Spatial segregation of partisans (Entropy ( <i>H</i> ))	0.090 (0.067)	0.092 (0.056)	0.019	0.249	0.002	0.922	0.721
Incumbent party	0.385 (0.506)	0.596 (0.496)	0	1	0.211	0.197	0.754
Vote margin (2008)	0.330 (0.301)	0.295 (0.260)	0.001	0.876	-0.035	0.708	0.991
Turnout (2008)	0.721 (0.040)	0.702 (0.058)	0.539	0.805	-0.019	0.181	0.812
Distance to constituency (Km) (no impute)	177.636 (72.421)	182.966 (67.718)	27.951	320.692	5.331	0.829	0.863
<b>Part B: Constituency characteristics-district census</b>							
Rural population	0.523 (0.311)	0.566 (0.286)	0.00003	0.956	0.044	0.654	0.754
Proportion of pop. with electricity	0.591 (0.178)	0.582 (0.178)	0.275	0.893	-0.008	0.884	0.963
Fuel (electric and gas)	0.117 (0.117)	0.109 (0.109)	0.006	0.358	-0.008	0.827	0.908
Cement walls	0.564 (0.227)	0.532 (0.208)	0.086	0.883	-0.032	0.655	0.980
Muslim population	0.099 (0.059)	0.110 (0.078)	0.009	0.445	0.011	0.581	0.972
Population in Agriculture	0.453 (0.266)	0.468 (0.235)	0.033	0.833	0.015	0.860	0.956
%Ashanti	0.303 (0.326)	0.244 (0.299)	0.001	0.855	-0.060	0.559	0.982
%Fante	0.125 (0.212)	0.153 (0.238)	0.001	0.944	0.028	0.684	0.804
%Ewe	0.190 (0.331)	0.199 (0.317)	0.004	0.957	0.009	0.932	0.997
%Dagomba	0.006 (0.009)	0.008 (0.014)	0	0.088	0.002	0.604	0.944
Ethnic Fractionalization	0.516 (0.212)	0.560 (0.244)	0.082	0.898	0.044	0.532	0.641
Education (primary or less)	0.899 (0.086)	0.903 (0.064)	0.674	0.983	0.005	0.860	0.997
Employed	0.494 (0.047)	0.496 (0.046)	0.396	0.598	0.002	0.887	0.877

TABLE A.3. Covariate balance: AIO treatment (three treatment arms)

Variable N	Intensity of observation (Treatment)			P-value (KS-test)		
	Low (13)	Medium (24)	High (23)	Low vs. Medium	Low vs. High	Medium vs. High
<b>Part A: Constituency electoral characteristics</b>						
# Polling stations	95.462 (29.028)	100.083 (31.887)	100.739 (29.791)	0.484	0.483	0.958
Log # Voters	10.814 (0.367)	10.788 (0.500)	10.844 (0.333)	0.467	0.241	0.864
Log valid votes (2012)	10.581 (0.300)	10.486 (0.470)	10.587 (0.313)	0.577	0.706	0.833
# Candidates (2012)	4.500 (0.979)	4.542 (0.920)	4.500 (0.783)	1.000	0.957	1.000
Vote margin (2012)	0.311 (0.290)	0.264 (0.238)	0.378 (0.278)	0.729	0.566	0.273
Turnout (2012)	0.787 (0.044)	0.758 (0.044)	0.768 (0.052)	0.329	0.631	0.792
Term of MP	1.462 (0.776)	2.167 (1.373)	1.783 (0.902)	0.745	0.841	0.932
Area (km. sq.)	526.984 (396.877)	929.261 (858.774)	588.236 (446.287)	0.360	0.963	0.345
Distance to constituency (Km)	182.374 (67.115)	182.697 (61.085)	185.216 (71.597)	0.997	0.880	1.000
Voter density (# voters/Area (km. sq.))	786.787 (1,345.280)	498.218 (1,327.712)	343.505 (666.657)	0.139	0.864	0.098
Spatial segregation of partisans (Entropy( $H$ ))	0.090 (0.067)	0.084 (0.036)	0.101 (0.071)	0.617	0.906	0.339
Incumbent party	0.385 (0.506)	0.708 (0.464)	0.478 (0.511)	0.340	1.000	0.563
Vote margin (2008)	0.330 (0.301)	0.213 (0.208)	0.381 (0.285)	0.484	0.768	0.097
Turnout (2008)	0.721 (0.040)	0.702 (0.054)	0.703 (0.064)	0.513	0.784	0.553
Distance to constituency (Km) (no impute)	177.636 (72.421)	182.817 (63.867)	183.102 (72.544)	0.939	0.843	0.996
<b>Part B: Constituency characteristics-district census</b>						
Rural population	0.523 (0.311)	0.588 (0.309)	0.544 (0.265)	0.513	0.933	0.698
Proportion of pop. with electricity	0.591 (0.178)	0.556 (0.192)	0.610 (0.162)	0.636	0.841	0.189
Fuel (electric and gas)	0.117 (0.117)	0.103 (0.120)	0.116 (0.098)	0.543	0.933	0.174
Cement walls	0.564 (0.227)	0.497 (0.216)	0.570 (0.196)	0.364	1.000	0.089
Muslim population	0.099 (0.059)	0.099 (0.046)	0.121 (0.101)	0.991	0.880	0.573
Population in Agriculture	0.453 (0.266)	0.510 (0.249)	0.424 (0.216)	0.513	0.439	0.089
%Ashanti	0.303 (0.326)	0.209 (0.292)	0.279 (0.309)	0.956	0.995	0.938
% Fante	0.125 (0.212)	0.217 (0.287)	0.086 (0.153)	0.574	0.813	0.359
% Ewe	0.190 (0.331)	0.176 (0.291)	0.222 (0.348)	1.000	0.992	0.979
% Dagomba	0.006 (0.009)	0.006 (0.008)	0.010 (0.019)	0.995	0.608	0.464
Ethnic Fractionalization	0.516 (0.212)	0.571 (0.256)	0.548 (0.236)	0.513	0.827	0.760
Education (primary or less)	0.899 (0.086)	0.919 (0.055)	0.887 (0.069)	0.513	0.657	0.017
Employed	0.494 (0.047)	0.510 (0.043)	0.481 (0.046)	0.652	0.359	0.017

FIGURE A.1. Quantile-quantile plots of covariates by treatment (electoral characteristics)

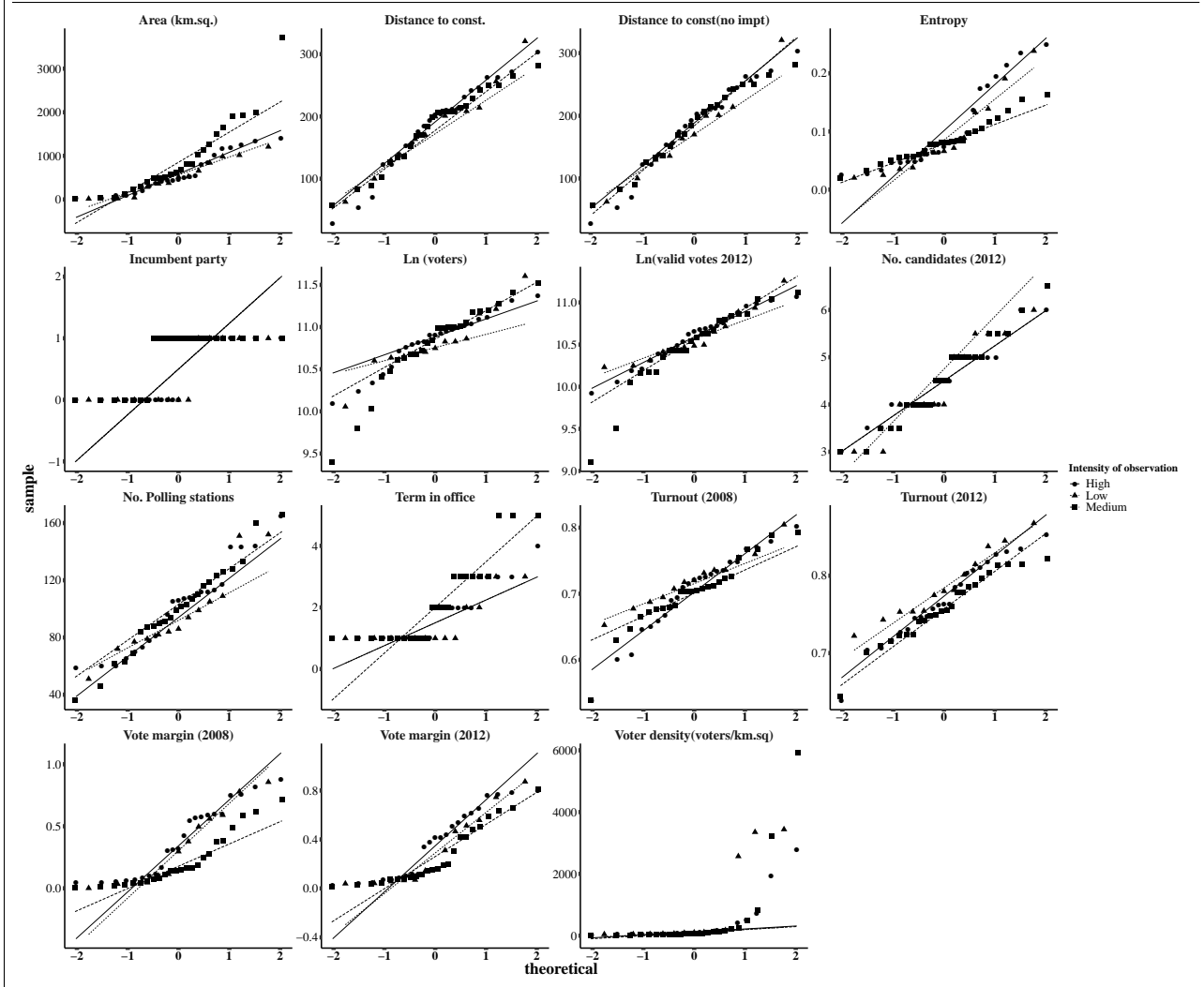


FIGURE A.2. Quantile-quantile plots of covariates by treatment (district census)

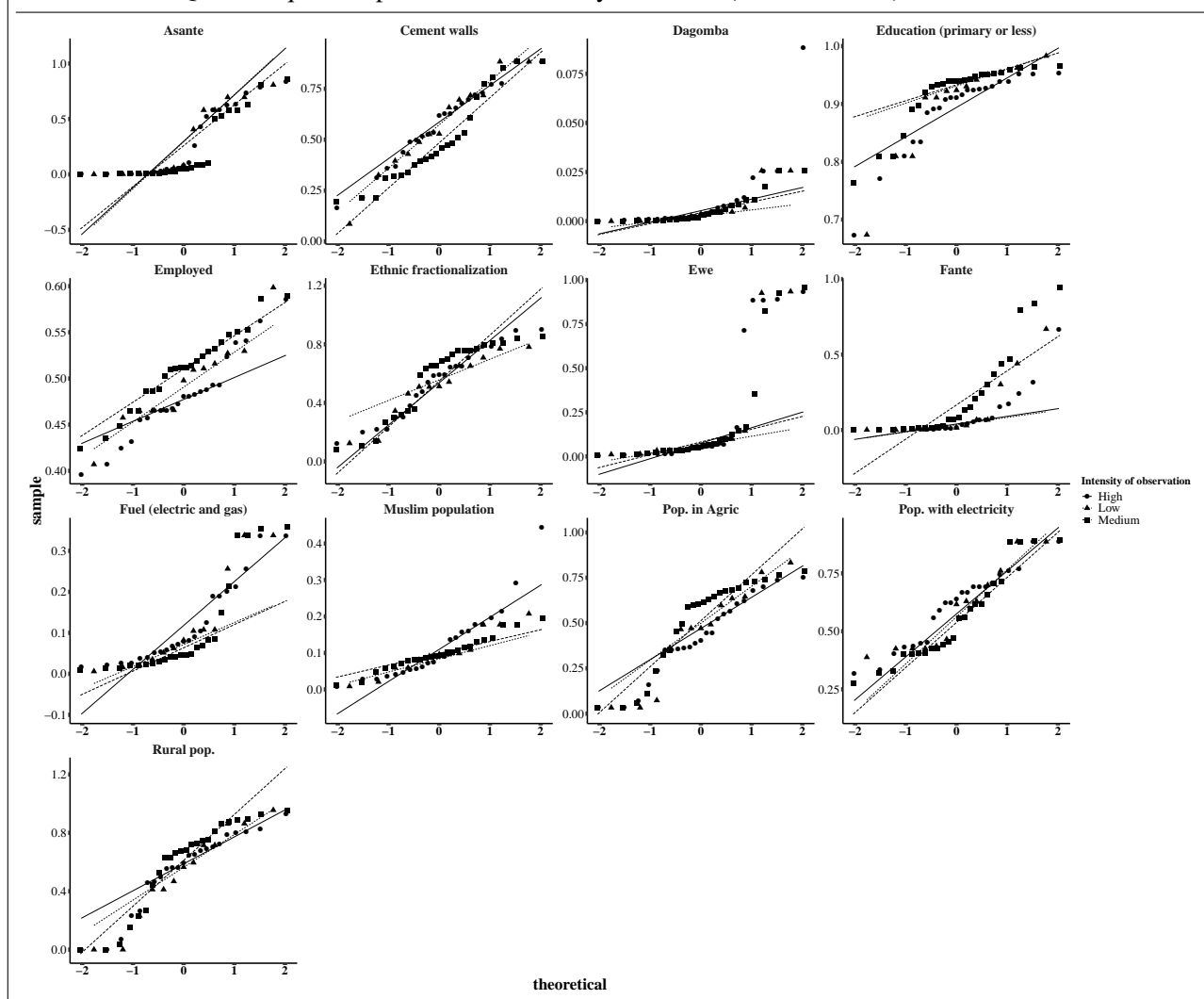


TABLE A.4. Covariate balance: post-election survey of citizens' assessments of the performance of 2012 incumbent MPs and reported vote choice in 2008

Variable	Intensity of observation (Treatment)			Min	Max	P-value (KS-test)		
	Low (12)	Medium (24)	High (23)			Low-Medium	Low-High	Medium-High
<b>Part A: 2012 Survey: respondent's rating of 2012 incumbent performance</b>								
Delivering public service to community	0.512 (0.171)	0.471 (0.192)	0.472 (0.164)	0.042	0.848	0.867	0.942	0.937
Helping the national economy	0.438 (0.153)	0.421 (0.176)	0.389 (0.153)	0.029	0.750	0.878	0.790	0.808
Improving your family's economic situation	0.380 (0.134)	0.374 (0.201)	0.320 (0.129)	0.029	0.750	0.867	0.424	0.212
Providing peace and security	0.509 (0.179)	0.523 (0.221)	0.501 (0.164)	0.058	1	0.878	0.951	0.844
Helping the poor	0.402 (0.147)	0.418 (0.193)	0.398 (0.171)	0.028	0.846	0.979	0.933	0.998
Managing country's new oil revenues	0.422 (0.154)	0.394 (0.206)	0.341 (0.163)	0.029	0.750	0.699	0.338	0.817
<b>Part B: 2012 Survey: respondent's party choices in 2008</b>								
Prop. voting for NPP parliamentary candidate.	0.423 (0.243)	0.428 (0.210)	0.414 (0.253)	0	0.818	1.000	0.534	0.314
Prop. voting for NDC parliamentary candidate	0.413 (0.229)	0.453 (0.158)	0.438 (0.238)	0.111	0.950	0.336	0.951	0.351

Notes: Part A of Table A.4 shows balance for citizens' ratings for their MP who served 2009-2013 terms in a post-election survey (N=6176) that I conducted with my collaborators immediately after the 2012 elections. These ratings were in response to the question was: "How would you rate your incumbent MP's performance in the following areas?" Respondents had five options: "excellent," "good," "fair," "poor," and "don't know." I created a dummy with the the first two options taking a value of 1. Accordingly, the average across treatment represents the proportion of respondents who believed the incumbent had performed "excellent" or "good." Part B of Table A.4 reports voters' reported vote choice in the prior (2008) parliamentary elections. The data is then summarized at the constituency level. Standard standard deviations of the group means are reported in parentheses. *P-values* corresponding to a two-sample T-tests and Kolmogorov-Smirnov test are reported.

FIGURE A.3. Quantile-quantile plots of covariates by treatment: post-election survey of citizens' assessments of the performance of 2012 incumbent MPs and reported vote choice in 2008

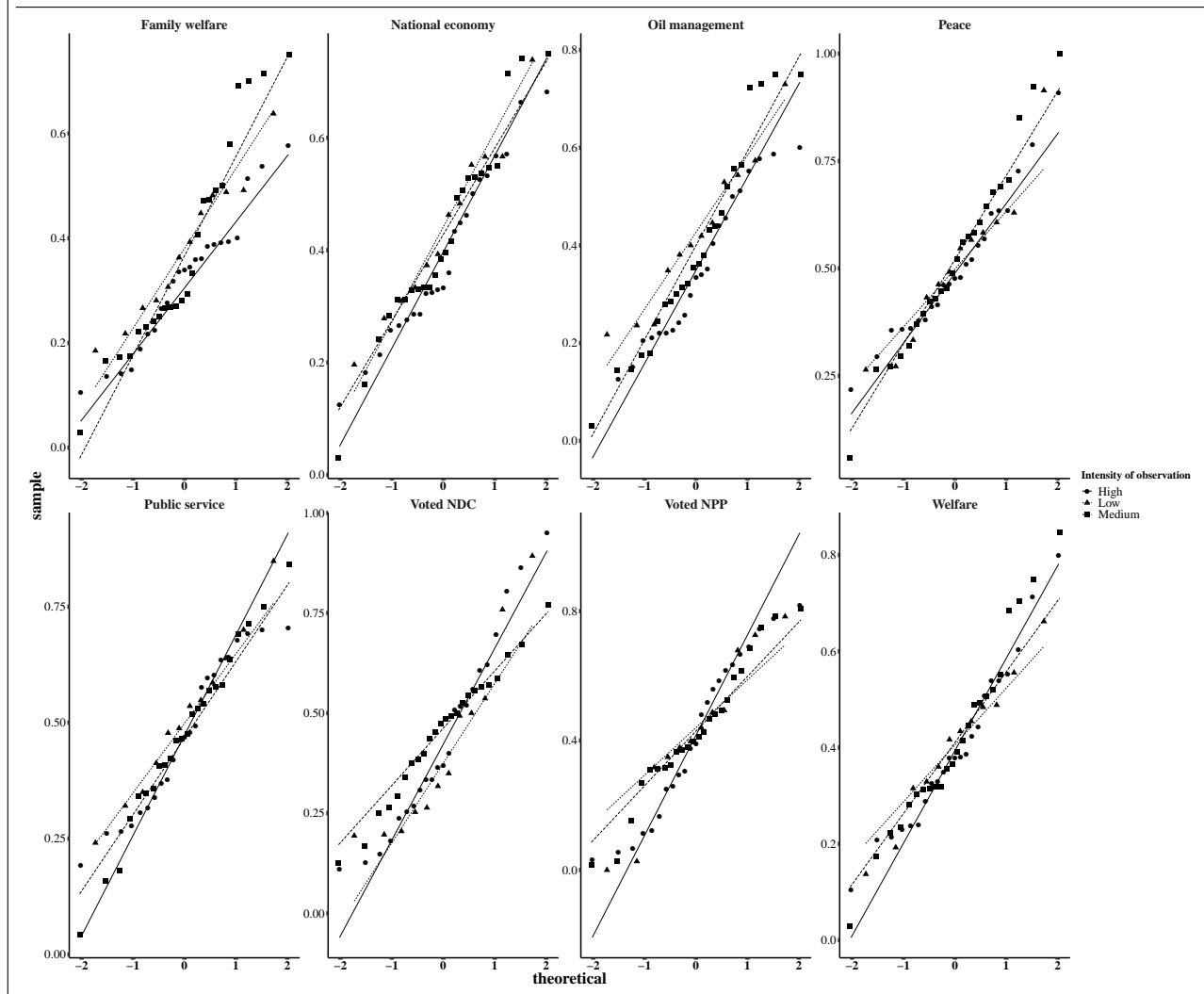


TABLE A.5. Covariate balance: letter treatment (EIO)

Variable	Incumbent received letter (Treatment)		Min	Max	Diff-in-means	T-test	KS-test
	No N= 30	Yes N= 30				<i>P</i> – value	<i>P</i> – value
<b>Part A: Constituency electoral characteristics</b>							
# Polling stations	103.767 (30.643)	94.900 (29.281)	36	166	-8.867	0.257	0.236
Log # Voters	10.855 (0.343)	10.775 (0.467)	9.399	11.605	-0.080	0.452	0.808
Proportion of monitored ps (2012)	0.224 (0.072)	0.216 (0.089)	0.085	0.457	-0.008	0.696	0.586
Log # Valid votes (2012)	10.576 (0.346)	10.514 (0.413)	9.106	11.257	-0.062	0.529	0.239
# Candidates (2012)	4.467 (0.850)	4.567 (0.898)	3	6.500	0.100	0.659	0.952
Vote margin (2012)	0.294 (0.259)	0.341 (0.275)	0.012	0.873	0.046	0.506	0.958
Turnout (2012)	0.775 (0.055)	0.761 (0.038)	0.639	0.868	-0.014	0.262	0.393
Term of MP	1.867 (1.224)	1.867 (1.008)	1	5	0	1	0.998
Area (km. sq.)	749.573 (572.144)	673.176 (733.055)	13.387	3,710.232	-76.398	0.654	0.808
Distance to constituency	191.094 (64.261)	176.092 (66.854)	27.951	320.692	-15.002	0.379	0.388
Voter density (# voters/Area (km. sq.))	455.650 (976.962)	547.219 (1,257.627)	3.256	5,918.110	91.568	0.754	0.808
Spatial segregation of partisans (Entropy)	0.100 (0.067)	0.084 (0.047)	0.019	0.249	-0.016	0.287	0.958
Incumbent party	0.567 (0.504)	0.533 (0.507)	0	1	-0.033	0.799	1
Vote margin (2008)	0.291 (0.251)	0.314 (0.286)	0.001	0.876	0.023	0.746	0.998
Turnout (2008)	0.709 (0.059)	0.704 (0.052)	0.539	0.805	-0.005	0.746	0.952
Distance to constituency (no impute)	192.785 (63.911)	169.624 (71.688)	27.951	320.692	-23.161	0.223	0.212
<b>Part B: Constituency characteristics-district census</b>							
Rural population	0.590 (0.286)	0.523 (0.294)	0.00003	0.956	-0.067	0.374	0.388
Proportion of pop. with electricity	0.575 (0.171)	0.593 (0.185)	0.275	0.893	0.019	0.684	0.952
Fuel (electric and gas)	0.100 (0.101)	0.122 (0.119)	0.006	0.358	0.023	0.430	0.799
Cement walls	0.520 (0.209)	0.559 (0.213)	0.086	0.883	0.039	0.474	0.388
Muslim population	0.119 (0.089)	0.096 (0.054)	0.009	0.445	-0.024	0.214	0.799
Population in Agriculture	0.483 (0.225)	0.446 (0.256)	0.033	0.833	-0.037	0.557	0.586
%Ashanti	0.264 (0.305)	0.249 (0.307)	0.001	0.855	-0.015	0.851	0.799
%Fante	0.163 (0.251)	0.130 (0.213)	0.001	0.944	-0.033	0.585	0.952
%Ewe	0.175 (0.297)	0.219 (0.340)	0.004	0.957	0.044	0.593	0.998
%Dagomba	0.008 (0.017)	0.007 (0.008)	0	0.088	-0.002	0.577	0.952
Ethnic Fractionalization	0.569 (0.244)	0.532 (0.231)	0.082	0.898	-0.037	0.547	0.799
Education (primary or less)	0.909 (0.063)	0.896 (0.074)	0.674	0.983	-0.013	0.450	0.799
Employed	0.500 (0.042)	0.490 (0.050)	0.396	0.598	-0.009	0.436	0.952

Notes: Table A.5 shows the covariate balance for electoral and geographic variables across treatments. I ran 58 iterations of randomization until I obtained a treatment and control group where the smallest p-value associated with the covariates' difference in means was  $p\text{-value} \geq 0.21$ . This approach is referred to as "big stick" method (Bruhn and McKenzie 2009). I used the `randomize` function from the `ri` package in R specifying the AIO as the block.



## TREATMENT LETTERS

FIGURE B.1. Treatment: letter to Members of Parliament

PHONE:  
EMAIL:  
November 15, 2015

Dear Hon. «MP»:

As you may recall, I asked during our interview whether you or your agents saw independent election observers at polling stations in your constituency during last year's elections. In 2012, I was part of a research team from [redacted] that worked with CODEO to study the impact of observers on election day irregularities at a sample of the polling stations in the country. As part of this study, some constituencies were randomly selected to have a higher proportion (about 80 percent) of their polling stations monitored by observers during the polls.

We found that constituencies that had a higher proportion of their polling stations monitored by observers had lower incidence of electoral fraud. This was a credit to domestic election observation and the important role they play in promoting electoral integrity and democracy in Ghana.

To validate our finding, I am seeking to collaborate with CODEO to repeat this study in a random set of constituencies. While I await confirmation to implement this study, I have already selected my sample of constituencies and randomly assigned some to have about 80 percent of stations observed. As a courtesy, I want to inform you that your constituency happened to be one of those that will receive observers at 80 percent of stations.

I will get back in touch with you once I have confirmation that the study will go ahead, but I am at this point very hopeful that it will happen.

Sincerely,

## FIGURE B.2. Treatment: follow-up letter to Members of Parliament

PHONE:  
EMAIL:  
April 15, 2016

«title» «MP\_name\_new»  
«CON\_NAME»  
«address»  
«location».

Dear Hon. «MP\_name\_new»:

Thank you for your participation in my MPs' survey last year (November and December, 2015).

As you may recall, I mentioned that I am seeking to collaborate with the Coalition of Domestic Election Observers (CODEO) to study the impact of domestic election observers on election day processes in Ghana's November 2016 general elections. While I await confirmation to implement this study, I have already selected my sample of constituencies and randomly assigned some to have about 80 percent of stations observed by CODEO monitors.

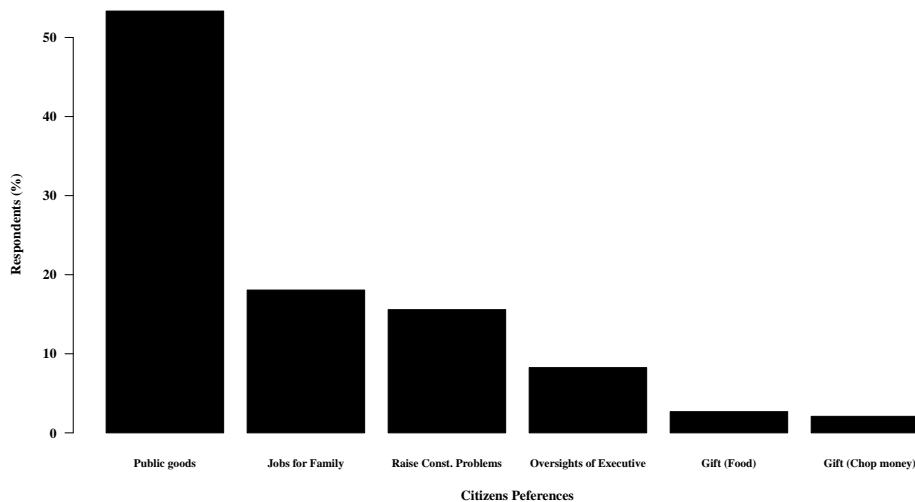
**As a courtesy, I want to remind you that your constituency is one of those that would receive observers at 80 percent of polling stations on election day.**

I will get back in touch with you once I have confirmation that the study will go ahead, but I am at this point very hopeful that it will happen.

Sincerely,

## WHAT CONSTITUENTS WANT FROM THEIR MEMBERS OF PARLIAMENT IN GHANA

FIGURE C.1. Constituents' preferences



*Notes:*

1. Response to the question: "You said you would probably vote for the parliamentary candidate of . . . if the election was held today. Consider if another candidate from another party did one of the following things, and tell me which ONE could possibly make you switch."
2. Source: Data shared by Cheeseman, Lynch, and Wallis (2015)

## DENSITY DISTRIBUTION OF DEPENDENT VARIABLES ACROSS TREATMENT CONDITIONS

FIGURE D.1. Density plots of the percentages of CDFs used by MPs across treatments conditions

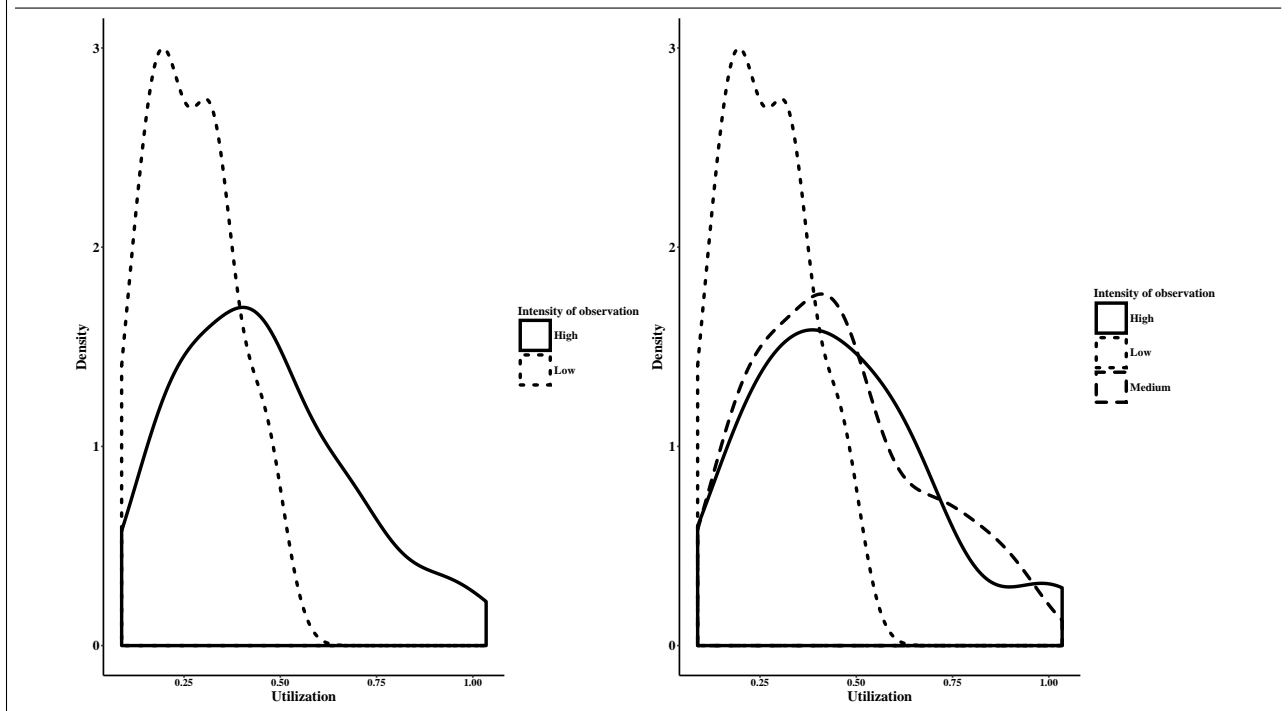
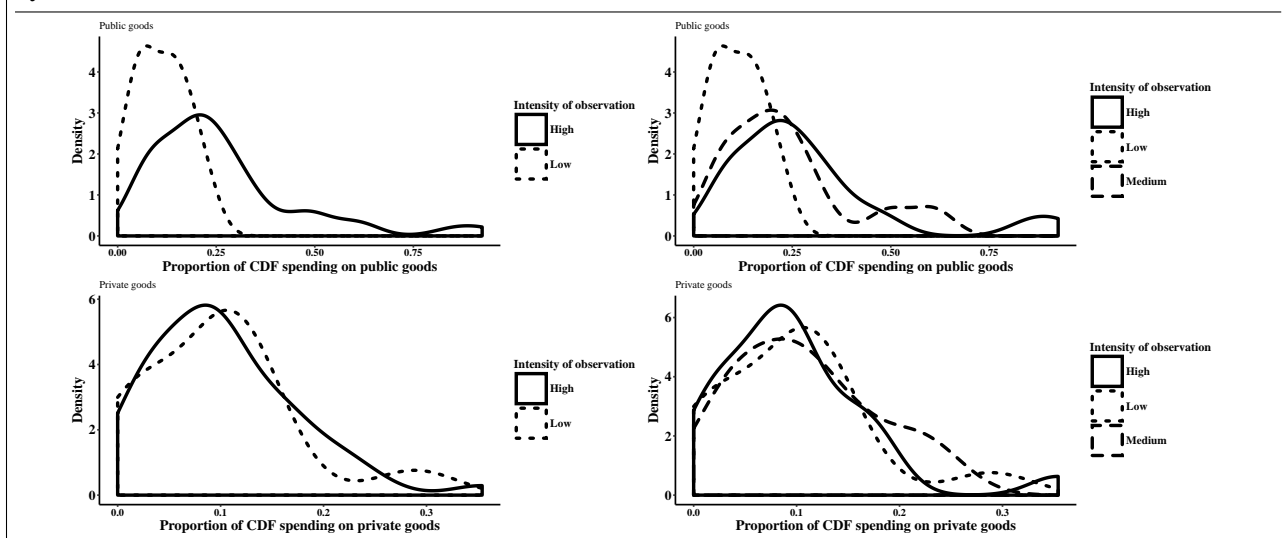


FIGURE D.2. Density plots of the percentages of CDFs used by MPs for public and private goods provision by treatment conditions



## MAIN EFFECT TABLES AND ROBUSTNESS CHECKS

In this section, I show the main results reported in the results section across the three treatment arms. I also show that a handful of constituencies or outliers do not drive the results. Specifically, to ensure that the main findings presented in the results section are not artifacts of the small sample size, I use randomization inference to estimate 10,000 average ITTs under the sharp null hypothesis of no effect for each unit. Figure E.1 and E.4 show the distribution for the two and three treatment arms, respectively. To examine whether the results presented in Section ?? is not driven by one influential

case, I reestimate the average ITT effects coefficients 59 times sequentially removing one observation at a time. The estimated ITT effects for *utilization*, and *public* and *private* expenditures are displayed in Figures E.3. Finally, I use bootstrapping to estimate the 95% confidence intervals that bounds these estimates, which ensures the inclusion and exclusion of few constituencies do not drive the result. Figures E.2 and E.4 show the distribution of the estimated average ITT effects in 10,000 re-randomization of the the sample of constituencies with replacement.

## Main results

TABLE E.1. Average CDF spending across six expenditure categories by the intensity of election observation

Expenditure Category	Total GHC			2014 GHC			2015 GHC			2016 GHC		
	Intensity of Observation			Intensity of Observation			Intensity of Observation			Intensity of Observation		
	Low (1)	Medium (2)	High (3)	Low (4)	Medium (5)	High (6)	Low (7)	Medium (8)	High (9)	Low (10)	Medium (11)	High (12)
Public goods	140,041 (85,995)	299,421 (209,280)	366,009 (277,270)	17,744 (19,296)	45,913 (47,724)	51,548 (48,625)	70,845 (54,498)	119,611 (87,539)	174,306 (146,857)	51,451 (30,471)	139,719 (113,964)	140,155 (132,608)
Private goods	122,003 (95,047)	136,081 (88,798)	123,311 (96,892)	15,735 (17,445)	22,896 (24,496)	19,379 (17,404)	45,434 (34,476)	48,530 (36,506)	49,144 (38,327)	60,834 (54,550)	67,466 (59,401)	54,788 (71,832)
Donations to local groups	15,113 (16,207)	33,041 (32,489)	38,373 (48,103)	1,500 (3,030)	2,678 (3,353)	3,516 (7,886)	6,333 (10,098)	12,579 (25,800)	18,839 (30,494)	7,279 (9,140)	18,557 (23,077)	16,018 (23,608)
Transfers to local government	9,675 (17,452)	57,709 (75,222)	31,856 (69,932)	1,316 (2,571)	12,897 (19,345)	4,593 (9,647)	1,735 (3,748)	30,102 (64,134)	4,328 (6,246)	6,625 (16,268)	15,349 (21,367)	22,935 (67,526)
Monitoring and office expense	3,282 (3,862)	12,569 (17,890)	6,865 (11,533)	1,119 (1,898)	2,925 (11,025)	2,353 (5,539)	829 (1,909)	4,248 (7,215)	1,425 (3,644)	1,334 (2,404)	5,631 (10,792)	3,087 (6,972)
Unclear purposed expenditure	46,516 (61,455)	22,506 (40,568)	19,885 (28,982)	4,806 (16,501)	3,551 (7,536)	1,192 (3,386)	15,330 (27,414)	8,126 (15,310)	9,367 (21,510)	26,380 (43,123)	11,300 (34,554)	9,326 (19,238)
Total	336,630 (144,758)	561,328 (284,893)	586,299 (304,484)	42,221 (28,445)	90,860 (69,452)	82,580 (59,078)	140,506 (67,151)	223,197 (141,639)	257,409 (146,699)	153,903 (89,591)	258,022 (159,395)	246,310 (164,706)

### Notes:

- Table E.1 shows the average amount of CDF funds spent by Members of Parliament (MPs) in the sample between 2014 and 2016 by treatment conditions. Standard deviations are reported in parentheses. Columns (1)-(2) shows total for the three year period while columns (3)-(8) breaks the spending for each year by treatment. These estimates suggest that MPs elected through intensely monitored election spent more of their available funds overall and in each year compared to their counterparts elected in constituencies with fewer monitors. Amounts are in Ghana Cedis (GHC) (\$1  $\approx$  4).
- Source:* Author's coding of original expenditure sheets collected from Ghana's District Assemblies' Common Fund Administration.

TABLE E.2. ITT effect of intensity of observation on the use of CDF

	Intensity of Observation		ITT	P-value (RI)
	Low	High		
Utilization	0.266 (0.032)	0.457 (0.033)	0.190*** (0.047)	0.006
Public Goods	0.111 (0.019)	0.264 (0.028)	0.153*** (0.034)	0.0079
Private Goods	0.096 (0.021)	0.103 (0.011)	0.007 (0.024)	0.7739

*Notes:* Members of Parliament elected in high intensely monitored constituencies spent more of their available CDFs between 2014 and 2016 compared to those elected from low-intensely monitored electoral districts. Two-tailed randomization inference (RI) based on 10,000 permutation of the initial randomization. \* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$

FIGURE E.1. Distribution of average ITTs generated using randomization inference under the null hypothesis tests for main results (two treatment arms)

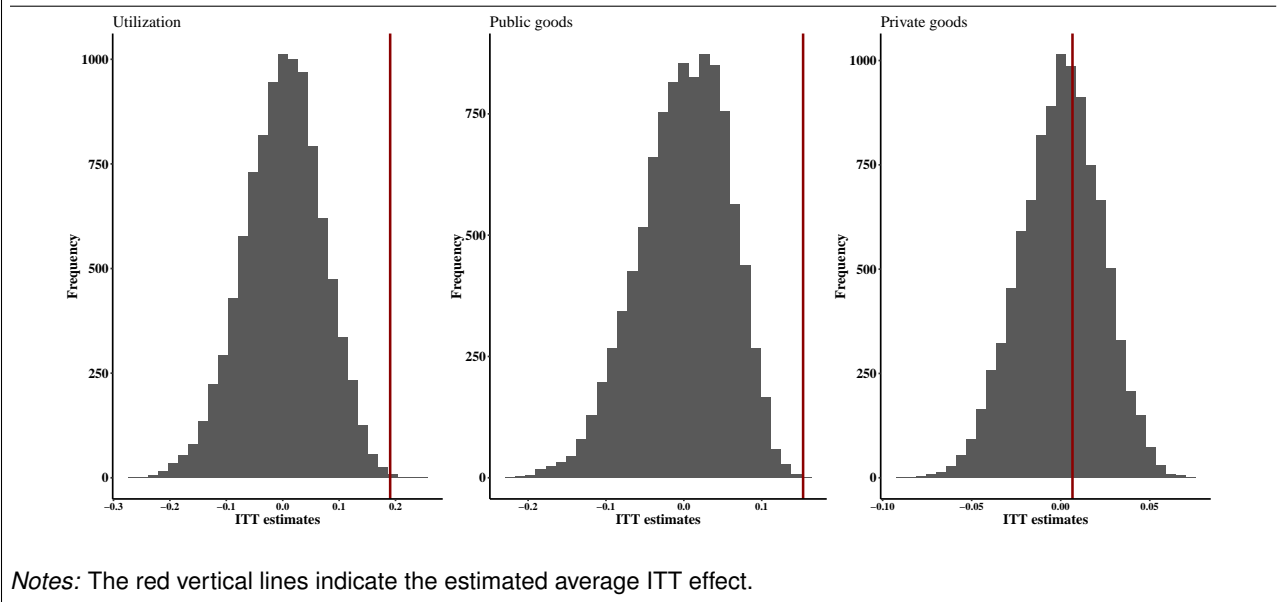


FIGURE E.2. Distribution of bootstrapped estimates of the average ITT effects (two treatment arms)

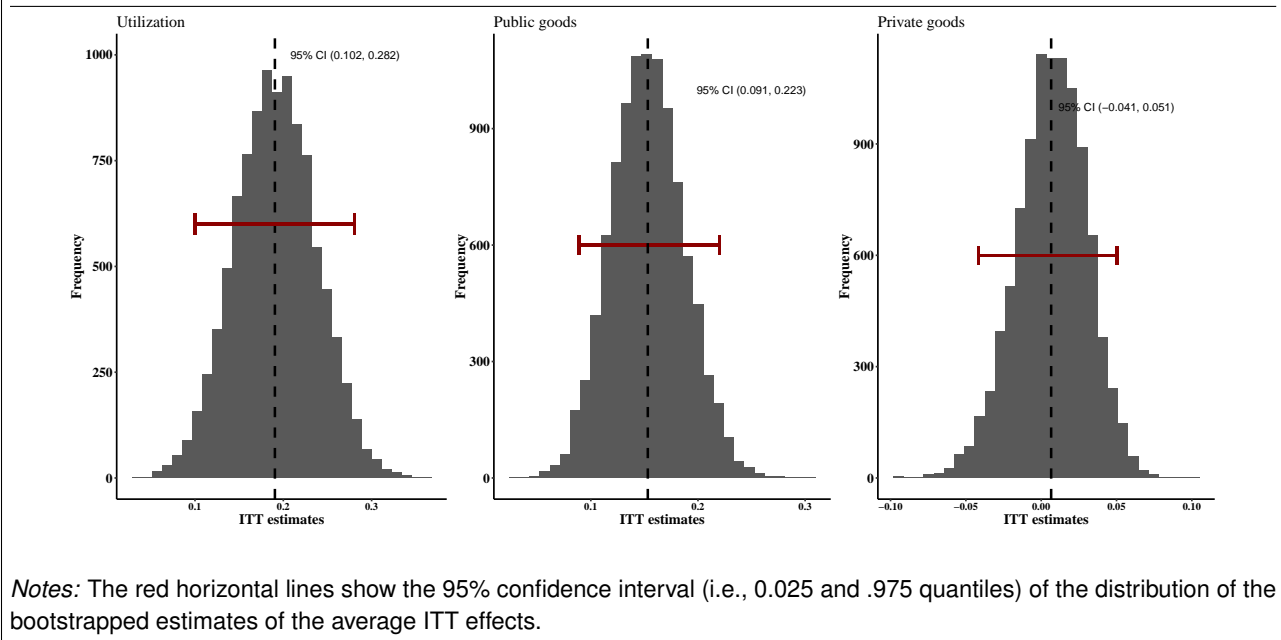


FIGURE E.3. Estimates of the ITT effect of intensity of observation on MPs' use of CDFs is not driven by a single case

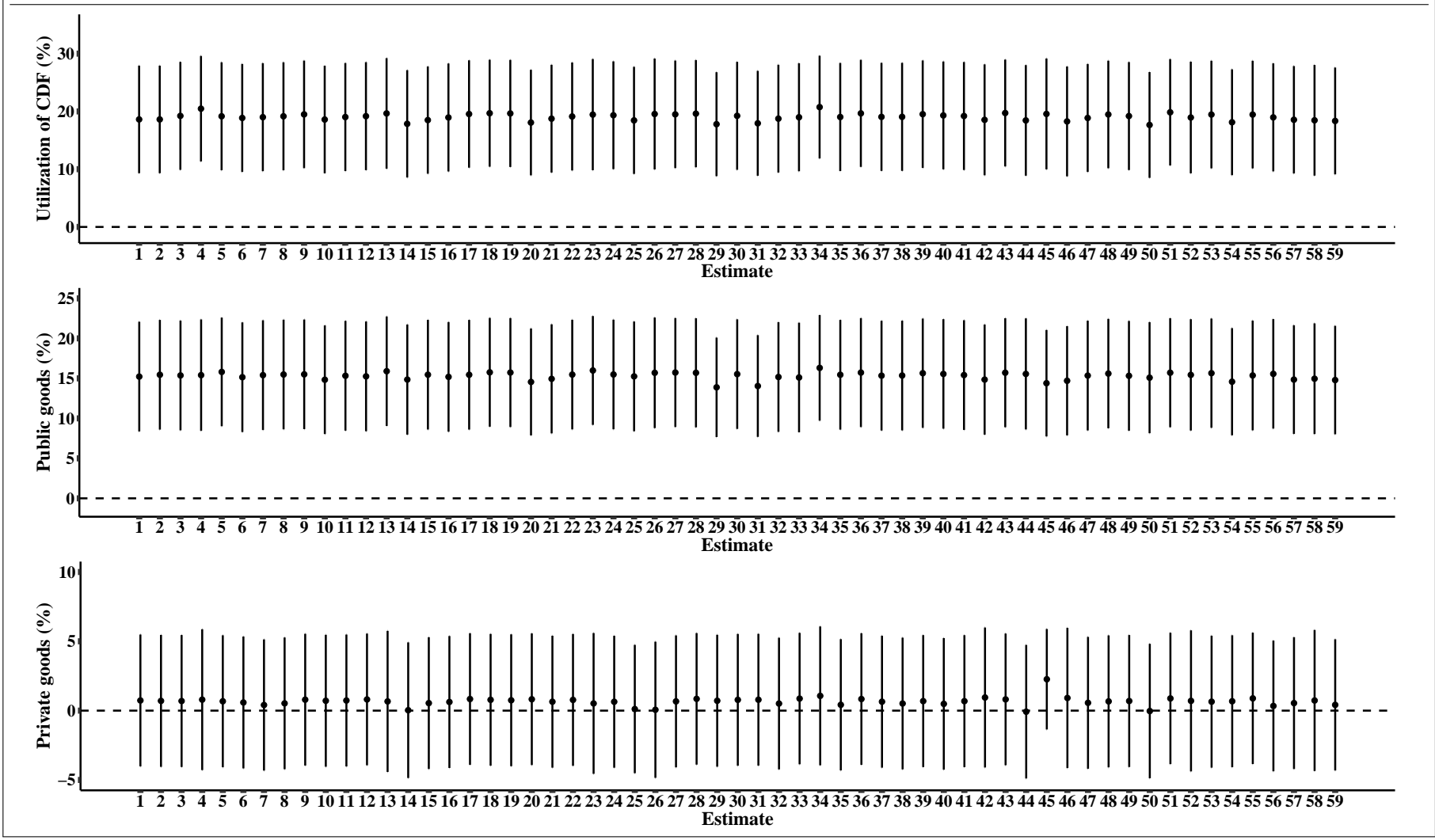
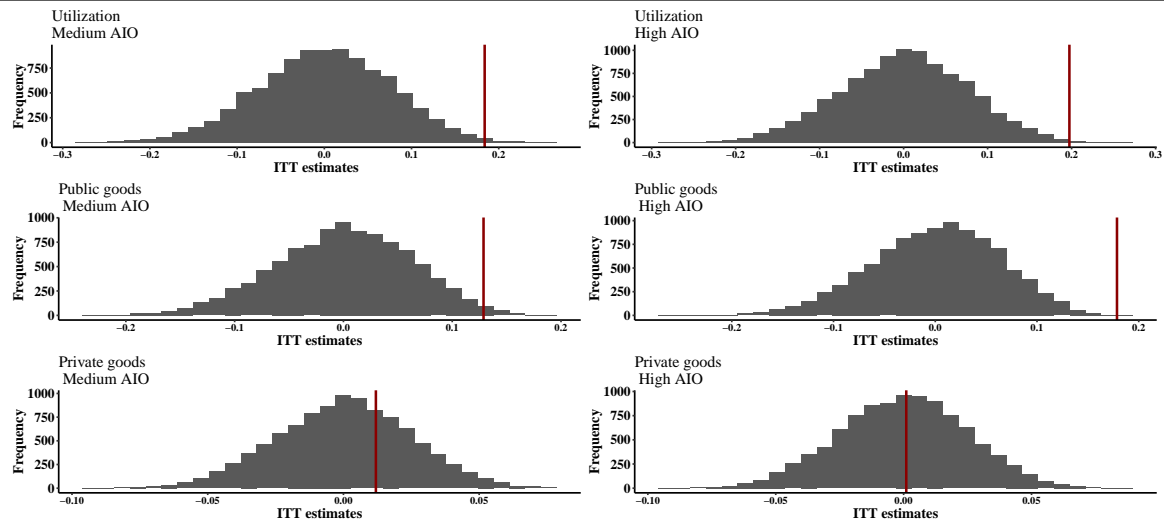


TABLE E.3. ITT effect of intensity of observation on CDF use across three treatment arms

	<i>Dependent variable:</i>		
	Utilization (1)	Public goods (2)	Private goods (3)
Medium AIO	0.184*** (0.057) [0.015]	0.129*** (0.039) [0.037]	0.012 (0.026) [0.629]
High AIO	0.197*** (0.061) [0.008]	0.179*** (0.051) [0.004]	0.001 (0.027) [0.969]
Constant	0.266*** (0.033)	0.111*** (0.020)	0.096*** (0.022)
Observations	60	60	60
R <sup>2</sup>	0.184	0.191	0.006
Adjusted R <sup>2</sup>	0.155	0.163	-0.029

Notes: *P* – values generated from a two-tailed RI tests based on 10,000 permutation of the initial randomization are reported in brackets for each ITT estimate. \**p*<0.1, \*\**p*<0.05; \*\*\**p*<0.01

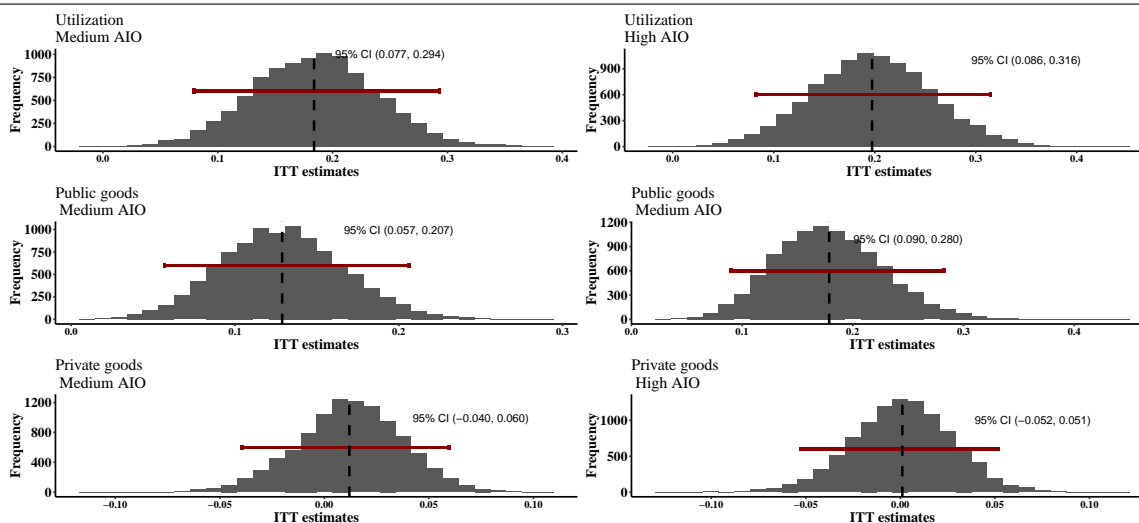
FIGURE E.4. Distribution of ITTs generated from randomization inference under the null hypothesis tests using the three treatment arms



Notes: The red vertical lines indicate the estimated ITT effect.



FIGURE E.5. Distribution of bootstrapped estimates of the average ITT effects (three treatment arms)



Notes: The red horizontal lines show the 95% confidence interval (i.e., 0.025 and .975 quantiles) of the distribution of the bootstrapped estimates of the average ITT effects.

TABLE E.4. Heterogeneous effect: Average ITT effect of intensity of observation on the use of CDF by electoral competition

	<i>Dependent variable:</i>		
	Utilization	Public goods	Private goods
	(1)	(2)	(3)
High AIO	0.211** (0.084)	0.141** (0.058)	0.043 (0.030)
Vote margin (2008)	0.074 (0.162)	-0.005 (0.104)	0.119* (0.062)
High AIO: vote margin (2008)	-0.062 (0.218)	0.041 (0.168)	-0.111 (0.073)
Constant	0.242*** (0.060)	0.112*** (0.029)	0.057** (0.025)
Observations	60	60	60
R <sup>2</sup>	0.129	0.122	0.052
Adjusted R <sup>2</sup>	0.082	0.075	0.001

Notes: Robust standard errors (HC 3) reported in parentheses. \*p<0.1; \*\*p<0.05; \*\*\*p<0.01

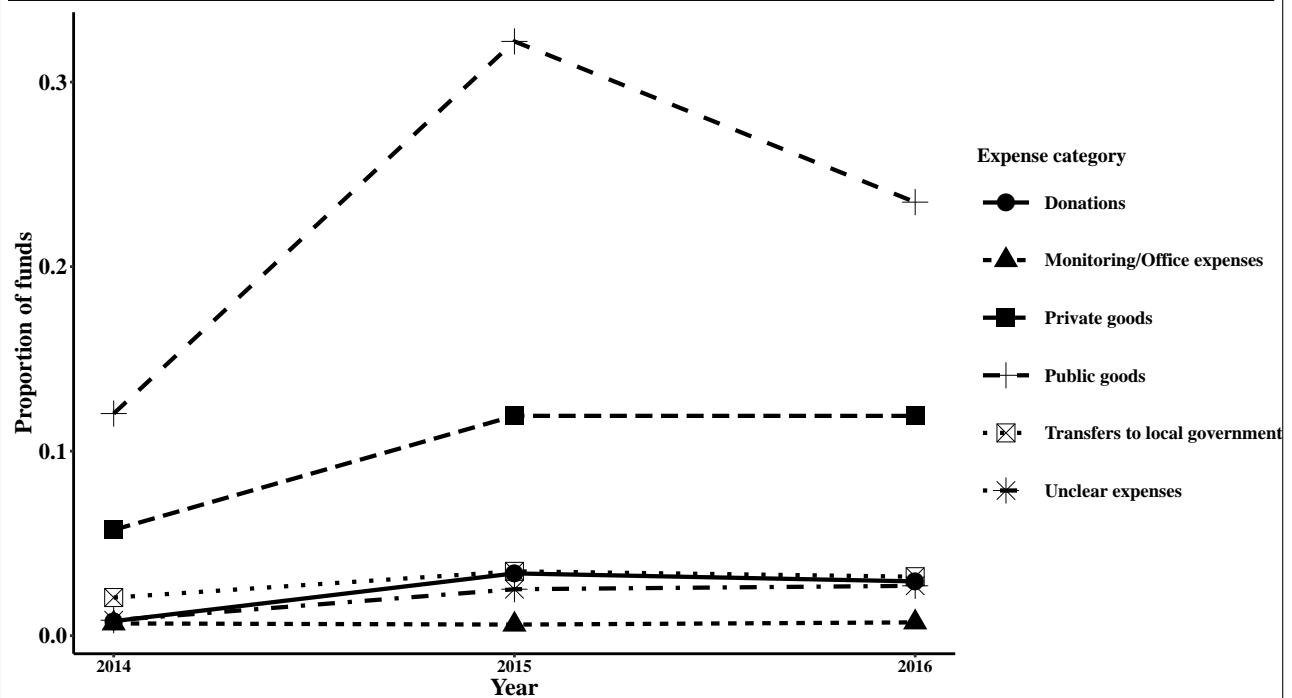
## Average ITT effects of AIO: over time, control for co-partisanship with local mayor, and clustering errors at district-level

TABLE E.5. ITT effect of intensity of observation on the use of CDF use adjusting for partisan affiliation

	<i>Dependent variable:</i>						
	Utilization (1)	Public goods (2)	Private goods (3)	Donations (4)	Transfers to LG (5)	Monitoring/Office expenses (6)	Unclear (7)
Medium AIO	0.117* (0.062)	0.094** (0.046)	0.005 (0.026)	0.010 (0.007)	0.026** (0.012)	0.005* (0.003)	-0.023 (0.017)
High AIO	0.178*** (0.053)	0.169*** (0.047)	-0.001 (0.027)	0.017* (0.009)	0.014 (0.011)	0.002 (0.002)	-0.022 (0.015)
Incumbent party (NDC=1)	0.206*** (0.053)	0.106** (0.047)	0.022 (0.020)	0.014* (0.008)	0.042*** (0.012)	0.008*** (0.002)	0.014 (0.009)
Constant	0.187*** (0.039)	0.070** (0.029)	0.088*** (0.025)	0.007 (0.006)	-0.008 (0.006)	-0.001 (0.001)	0.031*** (0.012)
Observations	60	60	60	60	60	60	60
R <sup>2</sup>	0.327	0.212	0.028	0.109	0.227	0.206	0.100
Adjusted R <sup>2</sup>	0.291	0.170	-0.024	0.061	0.185	0.164	0.051

Notes: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01

FIGURE E.6. Composition of CDF spending by year



Notes: Figure E.6 shows the average proportion of CDFs spent on the various types of expenses over time. On average, MPs spent 12% of the funds on public goods in 2014, which rose to 32% in 2015 and decreased to 24% in 2016. Regarding private goods, in 2014, MPs spent 6%, on average, which increase to 12% in 2015 and 2016, a 100 percent increase. Donation to groups and unclear expenses also increased over time from 0.8% in 2014 to about 3% in 2015 and 2016. The remaining categories remained the same over time.

TABLE E.6. Average ITT effects of intensity of observation on the use of CDF by year

	<i>Dependent variable:</i>						
	Utilization (1)	Public goods (2)	Private goods (3)	Donations (4)	Transfers to LG (5)	Monitoring/Office expenses (6)	Unclear (7)
<b>Panel A: 2014</b>							
Medium AIO	0.140*** (0.048)	0.081** (0.033)	0.021 (0.021)	0.003 (0.003)	0.033*** (0.012)	0.005 (0.007)	-0.004 (0.014)
High AIO	0.116*** (0.043)	0.097*** (0.034)	0.010 (0.018)	0.006 (0.005)	0.009 (0.006)	0.004 (0.004)	-0.010 (0.014)
Constant	0.121*** (0.024)	0.051*** (0.016)	0.045*** (0.014)	0.004* (0.003)	0.004* (0.002)	0.003** (0.002)	0.014 (0.014)
Observations	60	60	60	60	60	60	60
R <sup>2</sup>	0.096	0.085	0.018	0.019	0.114	0.008	0.025
Adjusted R <sup>2</sup>	0.065	0.053	-0.016	-0.015	0.083	-0.027	-0.009
<b>Panel B: 2015</b>							
Medium AIO	0.205** (0.088)	0.121** (0.060)	0.008 (0.031)	0.015 (0.015)	0.070** (0.033)	0.008** (0.004)	-0.018 (0.021)
High AIO	0.290*** (0.091)	0.256*** (0.087)	0.009 (0.032)	0.031* (0.018)	0.006 (0.004)	0.001 (0.002)	-0.015 (0.023)
Constant	0.348*** (0.048)	0.175*** (0.039)	0.113*** (0.025)	0.016** (0.007)	0.004 (0.003)	0.002 (0.001)	0.038* (0.020)
Observations	60	60	60	60	60	60	60
R <sup>2</sup>	0.104	0.120	0.002	0.035	0.097	0.081	0.018
Adjusted R <sup>2</sup>	0.072	0.089	-0.033	0.001	0.066	0.049	-0.016
<b>Panel C: 2016</b>							
Medium AIO	0.203** (0.083)	0.172*** (0.050)	0.013 (0.039)	0.022** (0.011)	0.017 (0.013)	0.008* (0.005)	-0.029 (0.028)
High AIO	0.180** (0.085)	0.173*** (0.058)	-0.012 (0.043)	0.017 (0.011)	0.032 (0.030)	0.003 (0.003)	-0.033 (0.026)
Constant	0.300*** (0.050)	0.100*** (0.017)	0.119*** (0.031)	0.014*** (0.005)	0.013 (0.009)	0.003* (0.001)	0.051** (0.024)
Observations	59	59	59	59	59	59	59
R <sup>2</sup>	0.074	0.104	0.008	0.042	0.019	0.043	0.045
Adjusted R <sup>2</sup>	0.040	0.072	-0.027	0.008	-0.016	0.009	0.011

Notes: Robust standard errors (HC3) reported in parentheses. \*p<0.1; \*\*p<0.05; \*\*\*p<0.01

TABLE E.7. Robustness: ITT effect of intensity of observation on the use of CDF

	<i>Dependent variable:</i>						
	Utilization (1)	Public goods (2)	Private goods (3)	Donations (4)	Transfers to LG (5)	Monitoring/Office expenses (6)	Unclear (7)
Medium AIO	0.184*** (0.054)	0.129*** (0.038)	0.012 (0.025)	0.015** (0.006)	0.040*** (0.013)	0.007** (0.003)	-0.019 (0.015)
High AIO	0.197*** (0.060)	0.179*** (0.050)	0.001 (0.029)	0.018** (0.008)	0.018 (0.012)	0.003 (0.002)	-0.021 (0.014)
Constant	0.266*** (0.031)	0.111*** (0.019)	0.096*** (0.021)	0.012*** (0.004)	0.008** (0.004)	0.003*** (0.001)	0.037*** (0.013)
Observations	60	60	60	60	60	60	60
R <sup>2</sup>	0.127	0.134	0.006	0.057	0.085	0.072	0.060
Adjusted R <sup>2</sup>	0.096	0.104	-0.029	0.023	0.053	0.039	0.027

Notes: Robust standard errors clustered at the district level are reported in parentheses. \*p<0.1; \*\*p<0.05; \*\*\*p<0.01

TABLE E.8. Average ITT effects of intensity of observation on CDF use with covariate adjustments

	<i>Dependent variable:</i>		
	Utilization (1)	Public goods (2)	Private goods (3)
Medium AIO	0.203*** (0.058)	0.144*** (0.038)	0.020 (0.024)
High AIO	0.169*** (0.059)	0.163*** (0.045)	0.0004 (0.024)
Voter density (# voters/Area (km. sq.))	-0.00001 (0.00003)	0.00001 (0.00003)	-0.00000 (0.00002)
Margin of victory (2008)	0.032 (0.125)	-0.005 (0.116)	0.033 (0.029)
Education (primary or less)	-0.121 (0.963)	0.464 (0.936)	-0.463 (0.334)
Employed	-1.463 (1.145)	-1.813* (1.075)	0.527* (0.308)
Cement wall	-0.226 (0.258)	-0.117 (0.206)	0.081 (0.079)
Pop. in agriculture	-0.124 (0.370)	-0.033 (0.300)	0.032 (0.097)
Constant	1.278** (0.618)	0.667 (0.518)	0.182 (0.250)
Observations	60	60	60
R <sup>2</sup>	0.209	0.236	0.155
Adjusted R <sup>2</sup>	0.084	0.116	0.023

Notes: Robust standard errors (HC 3) reported in parentheses. \*p<0.1; \*\*p<0.05; \*\*\*p<0.01

## Average ITT effects of AIO on other expenses

As I noted in the section on measuring political responsiveness, in addition to spending on public and private goods, legislators also dedicated part of their CDF to other expenses related to their work as MPs. The careful coding of MPs' expense sheets provides further insights into whom legislators are accountable to. In this section, I examine the effect of the intense election monitoring on these additional categories of spending and discuss the implications for political responsiveness.

Four additional spending categories arose from my coding: donations to support local groups to undertake projects or activities; transfers towards local government projects and activities; monitoring of constituency projects and office expenses; and unclear expenses. Between 2014 and 2016, the proportion of CDFs that MPs spent on each of these expenses were 2.5%, 3%, 0.7%, and 2.1%, respectively (see Table I.2).

The first expenditure category concerns payments to local religious groups and traditional authorities (i.e., chiefs). It also includes support to youth organizations to organize various skills-building workshops, health awareness campaigns, and soccer tournaments. In a unique study of the accountability pressures that Ghanaian legislators face, Lindberg (2010) finds that religious leaders and civil society groups hardly held legislators to account in any meaningful way. Nonetheless, religious leaders invited MPs to attend their functions and donate to their projects. The CDF records provide empirical evidence for this claim. Also, the data show that incumbents give funds to help repair the palaces or organize traditional festivals. Traditional leaders may also request donations from legislators. The incentives for MPs to donate to chiefs may be twofold. First, chiefs may "control" how constituents under their jurisdiction vote (Lindberg 2010). Second, chiefs control lands and other resources (community labor) that MPs often need to commission infrastructure projects (Baldwin 2013). Therefore, MPs may be responsive to the chief to curry favors to win votes and facilitate the provision of public goods.

The second form of the expense that appeared on MPs' records were funds that were transferred to the local government that oversees the legislator's account. These expenses came in three main forms. First, MPs donated part of their funds to support activities that are typically organized (and paid for) by the local government. These included payment for national events held locally such as the national Independence Day and Farmers' Day celebrations. Second, the local administrator transferred funds from the MPs' CDF account to pay for some operating expenses of the local government including the repair works on local government offices, and fuel to operate government vehicles, as well as maintenance of machinery. It is not clear whether the consent of the MP is sought before such payments are made. Third, some expenses were recorded as 'loans' deducted from an MP's CDF account to his or her, perhaps cash-strapped, local government (interview with DACF officials). Together, these expenses may represent an MP's support to public service provision in their constituencies, but because the local government is directly responsible for such activities, I consider them to be separate. Also, MPs may agree to such payments to help their local government to curry favors in the implementation of their own projects.

Third, MPs are allowed to use a part of their funds to conduct monitoring of ongoing projects in their constituencies. These projects may be MP-initiated or initiated by the central government, which would form part of their oversight functions. Legislators may use such inspections to ensure that commissioned infrastructure projects are completed on time or assess the status of such projects to report to constituents or the appropriate executive agency for action. Therefore, spending on monitoring would serve to indicate the amount of effort a legislator dedicates to supervising public goods in their constituency. I also find that part of the CDF was devoted to renting office spaces and covering operating expenses including paying staff salary. The records on office expenses provide

evidence on which MPs has established a personal office in their constituencies. Creating an office in one's constituency may indicate how attentive an MP is to the needs of her constituents. Individual constituents can visit these offices to register their concerns.

Finally, there were expenses that I could not easily classify because the beneficiaries or purposes were unclear. These expenses included an MP's direct purchase of items such as TV sets, cutlasses, etc. Similar purchases that indicated the reason for such acquisitions suggest that these items may be distributed to community centers (e.g., TV sets) or to farmers during national farmers' day celebration (cutlasses). However, MPs may also hand them out to their supporters. Accordingly, I coded such expenses as unclear. Other items included the purchase of building materials, which legislators can donate to communities or individuals. Also, there were records of the acquisition of food items (e.g., bags of rice, oil etc.) with no stated beneficiaries. In some case, where an adequate description was given, it appears that MPs donate such food items to Muslim communities during the Ramadan season, however this remains speculative.

Table E.9 displays the effect of the intensity of election monitoring on these other expense categories. Columns (1), (2), (3), and (4) show the results for donation to local groups, transfers to local governments, monitoring and office expenses, and unclear expenses, respectively. To be consistent with the main analysis in the paper, Panel A shows the results for the two treatment arms while Panel B disaggregates the results by the three treatment arms (for reference). The results shows that MPs elected in intensely-monitored elections (high-AIO) donated 1.7 percentage points (pp) more of their funds to local groups compared to those in low-AIO (Column (1)), which suggests that fairer election may induce politicians to respond to parochial interests in their constituencies. While some of these expenses may help address issues such as youth unemployment (i.e. skill-building workshops), community health, or curry favors with chiefs to provide public works, they may also serve clientelistic purposes. Future research can address such goals more systematically.

Second, the results in Column (2) indicate that MPs elected in intensely-monitored elections donated to the local government about 3 pp of their funds compared to their counterparts elected in low-AIO. Again, the results can be taken to indicate that fairer elections encourage MPs to help their local governments to provide services in their constituencies. Activities such as Independence Day and Farmers' Day celebrations allow MPs to claim credit for their support of the local government and communities.

Third, while the proportion of CDF dedicated to MPs monitoring activities and maintaining an office in their constituency was less than one percent, the results in Column (3) suggest that fairer elections increased incumbents' spending on these issues by about a half a percentage point. This effect is not substantively large but corroborates the general findings in this paper that fairer elections encourage politicians to put in more effort to address constituents' demands.

Finally, I do not find any statistically significant difference between treatments regarding the proportion of CDF spending that I could not easily classify. Such a null finding on this category may serve to indicate, reassuringly, that the local governments in the different treatment conditions were no different regarding the clarity of their record keeping.

TABLE E.9. ITT effect of intensity of observation on the use of CDF for other types of expenses

	<i>Dependent variable:</i>			
	Donations to local groups (1)	Transfers to LGs (2)	Monitoring and office expenses (3)	Unclear expenses (4)
<b>Panel A: Two treatment arms</b>				
High AIO (Medium & High)	0.017*** (0.006)	0.029*** (0.010)	0.005** (0.002)	−0.020 (0.015)
Constant	0.012*** (0.004)	0.008* (0.004)	0.003*** (0.001)	0.037** (0.014)
Observations	60	60	60	60
R <sup>2</sup>	0.054	0.050	0.038	0.059
Adjusted R <sup>2</sup>	0.037	0.034	0.022	0.043
<b>Panel B: Three treatment arms</b>				
Medium AIO	0.015** (0.007)	0.040*** (0.013)	0.007** (0.003)	−0.019 (0.016)
High AIO	0.018** (0.009)	0.018 (0.012)	0.003 (0.002)	−0.021 (0.015)
Constant	0.012*** (0.004)	0.008* (0.004)	0.003*** (0.001)	0.037** (0.014)
Observations	60	60	60	60
R <sup>2</sup>	0.085	0.112	0.093	0.068
Adjusted R <sup>2</sup>	0.053	0.081	0.061	0.035

*Notes:* \*p<0.1; \*\*p<0.05; \*\*\*p<0.01

## TESTING THE MECHANISMS THROUGH WHICH ELECTORAL INTEGRITY AFFECT MPS' BEHAVIOR

TABLE F.1. The intensity of observation has no effect on the characteristics of elected candidates

Incumbents Characteristics	N	Intensity of observation			P-value
		Low	Medium	High	
# Parliamentary Terms-incumbent MP	60	1.4615	2.1667	1.7826	0.6131
Female	60	0.0769	0.1667	0.00	0.2652
Minister	60	0.1538	0.2083	0.00	0.0953
Incumbent Party MP	60	0.3846	0.7083	0.4783	0.8666
Age	60	47.6923	50.2917	45.4348	0.2309
Highest education	60	5.0769	5.1667	5.1304	0.9073

*Note:* Data on MPs' gender, age, and education was coded from the handbook "Know Your MPs (2013-2017)." (Vieta 2013). I coded incumbents' term in office and party affiliation using election results obtained from Ghana's Electoral Commission. I coded ministerial status from parliamentary records. While there are substantive differences across treatment regarding MPs' gender, ministerial position, and co-partisanship with the president (and thus the local mayor), Table F.2 shows that only the latter is significantly associated with the dependent variable (CDF spending). Voters may have chosen candidates who belonged to the incumbent party, who they believe can spend more of their CDF. However, the main results in this paper do not substantively change when I account for co-partisanship with the local mayor (see Table E.5). The group means and p-values corresponding to the F-test statistic of all three treatment conditions are shown in the last column of the table.

TABLE F.2. Association between MPs characteristics and CDF spending

	<i>Dependent variable:</i>						
	CDF spending						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
# Parliamentary Terms-incumbent MP	-0.001 (0.027)						0.019 (0.029)
Female		0.037 (0.105)					0.022 (0.112)
Minister			0.131 (0.111)				0.025 (0.139)
Incumbent Party MP (NDC)				0.216*** (0.050)			0.202*** (0.058)
Age					0.007* (0.004)		0.002 (0.004)
Highest Education						0.033 (0.029)	0.019 (0.026)
Constant	0.416*** (0.058)	0.412*** (0.031)	0.400*** (0.030)	0.296*** (0.030)	0.091 (0.173)	0.245 (0.150)	0.061 (0.226)
Observations	60	60	60	60	60	60	60
R <sup>2</sup>	0.00001	0.002	0.036	0.238	0.053	0.021	0.259
Adjusted R <sup>2</sup>	-0.017	-0.015	0.020	0.224	0.037	0.004	0.175

*Note:*

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01



TABLE F.3. Suggestive evidence that MPs elected in higher-intensity of observation are more likely to report they saw an observer at a polling station they visited

	<i>Actual Intensity of Observation</i>	
	Low	High
MP saw Observers	41.67 (5)	58.82 (20)
MP did not see observers	58.33 (7)	41.18 (14)

Notes: Specific question: "Did you personally see observers at some of the polling stations you visited?" N= 46 MPs, Chi-squared= 1.05, P-value= 0.31

TABLE F.4. Suggestive evidence that MPs were aware of the intensity of observation within their constituencies

	<i>Intensity of Observation</i>		
	Low	High	<i>ITT</i>
MPs estimate of intensity of observation	0.133 (0.153)	0.283 (0.312)	0.150 (0.136)
N	3	15	
Empirical intensity of observation	0.145 (0.054)	0.249 (0.077)	0.104*** (0.021)
N	13	47	

Note: Table F.4 (upper panel) report the average of MPs' estimates of the proportion of polling stations in their constituencies that were monitored by election observers with standard deviations reported in parentheses. Their estimates were in response to the question: *For every twenty (20) polling stations in your constituency, how many would you say were monitored by domestic election observers.* Table F.4 (lower panel) also provide the average of the empirical saturation of observation across the three treatment intensities below these estimates with standard deviations reported in parentheses. Empirical intensity of observation refers to the actual proportion of polling stations within the entire constituency, and not the experimental sample, that were monitored by observers. \* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$

TABLE F.5. The intensity of election observation in a constituency neither affected citizens' pressures on MPs or government officials to provide public goods and services

	<i>Dependent variable:</i>					
	Contacted MP (1)	Attended Community Meeting (2)	Joined Group to Raise Issue (3)	Requested Government Action (4)	Contacted Government Official (5)	Voters' Duty that MPs' Work (6)
High Intensity of Observation	-0.020 (0.034)	-0.022 (0.087)	-0.063 (0.051)	-0.041 (0.049)	0.003 (0.028)	0.026 (0.056)
Constant	0.123*** (0.029)	0.453*** (0.077)	0.406*** (0.042)	0.170*** (0.045)	0.132*** (0.023)	0.358*** (0.047)
Observations	447	447	447	447	447	447
R <sup>2</sup>	0.001	0.0003	0.003	0.003	0.00001	0.001
Adjusted R <sup>2</sup>	-0.001	-0.002	0.001	0.0003	-0.002	-0.002

*Notes:* Table F.5 presents results from analysis of Ghana's Afrobarometer Round 6 data conducted in 2014. I analyze questions related to potential increase in citizens pressures on MPs within constituencies to deliver public goods as a results of the treatment. For easy analysis and interpretation of results, I coded these questions as dummies indicating whether citizens took the stated action. The specific questions are as follows: Column (1): "During the past year, how often have you contacted any of the following persons about some important problem or to give them your views: A Member of Parliament"; Columns (2)-(3): "Here is a list of actions that people sometimes take as citizens. For each of these, please tell me whether you, personally, have done any of these things during the past year ": Attended a community meeting (Column (2)), and Got together with others to raise an issue (Column (3)). Columns (4)- (5) : "Here is a list of actions that people sometimes take as citizens when they are dissatisfied with government. For each of these, please tell me whether you, personally, have done any of these things during the past year. If not, would you do this if you had the chance?": Joined others in your community to request action from government" (Columns (4)) ; and Contacted a government official to ask for help or make a complaint (Column (5)). Column (6): "Who should be responsible for: Making sure that, once elected, Members of Parliament do their jobs?" [Coding: The voters (1) as oppose to The president/executive or The Parliament/local council, or their political party (0)]. Standard errors are clustered at the constituency level. \*p<0.1; \*\*p<0.05; \*\*\*p<0.01

TABLE F.6. Effect of AIO on the number of candidates and female candidates in 2016

	<i>Dependent variable:</i>	
	Number of candidate (1)	Number of Female candidates (2)
Medium AIO	-0.058 (0.344)	0.199 (0.226)
High AIO	0.258 (0.361)	0.311 (0.209)
Constant	4.308*** (0.247)	0.385** (0.146)
Observations	60	60
R <sup>2</sup>	0.017	0.026
Adjusted R <sup>2</sup>	-0.017	-0.008
<i>Note:</i>	*p<0.1; **p<0.05; ***p<0.01	

## EFFECT OF EXPECTATION OF INTENSE MONITORING ON CDF SPENDING

TABLE G.1. Average legislator CDF spending by intensity of observation and expectation of future high monitoring in 2016

Expenditure category	<i>Intensity of Observation</i>			
	<i>Low</i>		<i>High</i>	
	<i>MP received letter to expect high observation</i>			
	<i>No</i>	<i>Yes</i>	<i>No</i>	<i>Yes</i>
Public goods	60,555 (25,063)	47,405 (33,126)	136,225 (115,993)	144,356 (132,087)
Private goods	43,314 (39,418)	68,621 (60,492)	53,617 (64,456)	70,067 (67,154)
Donations to local groups	12,927 (11,714)	4,769 (7,128)	16,816 (22,861)	17,849 (23,975)
Transfers to local government	1,375 (2,750)	8,958 (19,345)	15,933 (30,258)	22,964 (66,514)
Monitoring and office expense	0 (0)	1,926 (2,717)	4,004 (8,852)	4,781 (9,537)
Unclear purposed expenditure	14,786 (29,572)	31,533 (48,624)	14,888 (35,424)	4,867 (12,633)
Total	132,957 (46,187)	163,213 (104,513)	241,482 (158,274)	264,885 (165,813)
N	4	9	25	21

TABLE G.2. Average treatment effect of letter on other expense categories

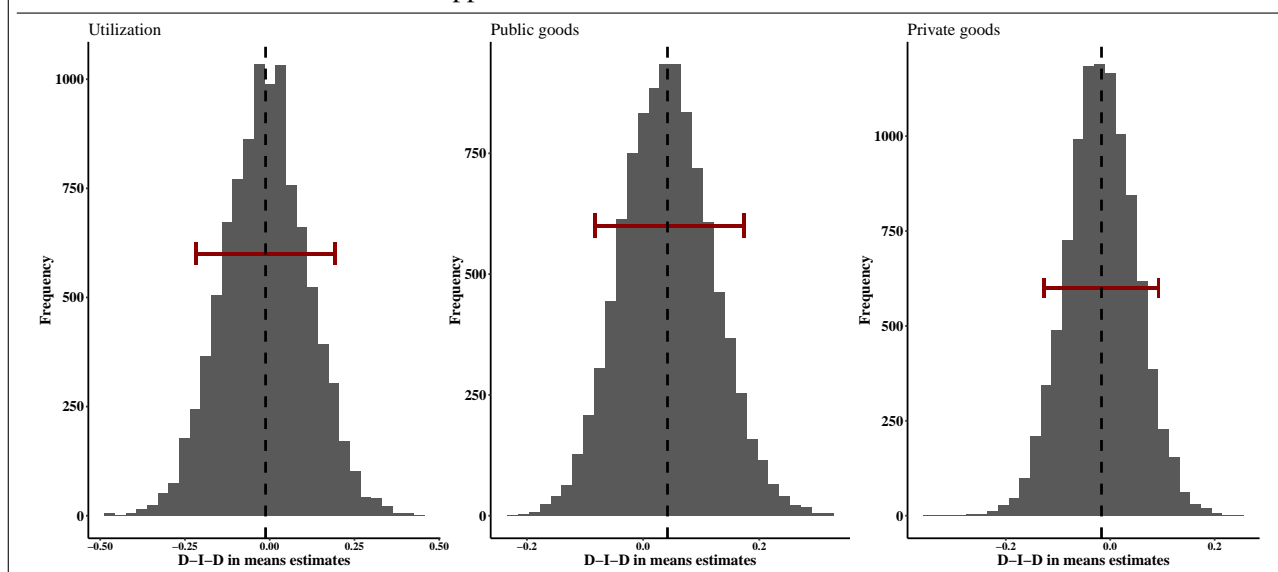
	<i>Dependent variable:</i>			
	Donations to local groups (1)	Transfers to LGs (2)	Monitoring and office expenses (3)	Unclear expenses (4)
Received letter (=1)	-0.0005 (0.012)	0.014 (0.027)	0.002 (0.005)	-0.012 (0.015)
High (medium and high) AIO	0.019** (0.009)	0.028 (0.021)	0.006* (0.003)	-0.034 (0.025)
Constant	0.015 (0.010)	0.003 (0.020)	0.001 (0.003)	0.060** (0.025)
Observations	59	59	59	59
R <sup>2</sup>	0.028	0.016	0.020	0.047
Adjusted R <sup>2</sup>	-0.006	-0.019	-0.015	0.013

Note:

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Notes: Units are weighted by the inverse probability treatment that accounts for the block randomization procedure.  
\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

FIGURE G.1. Distribution of boostrapped estimates of the difference-in-difference in means



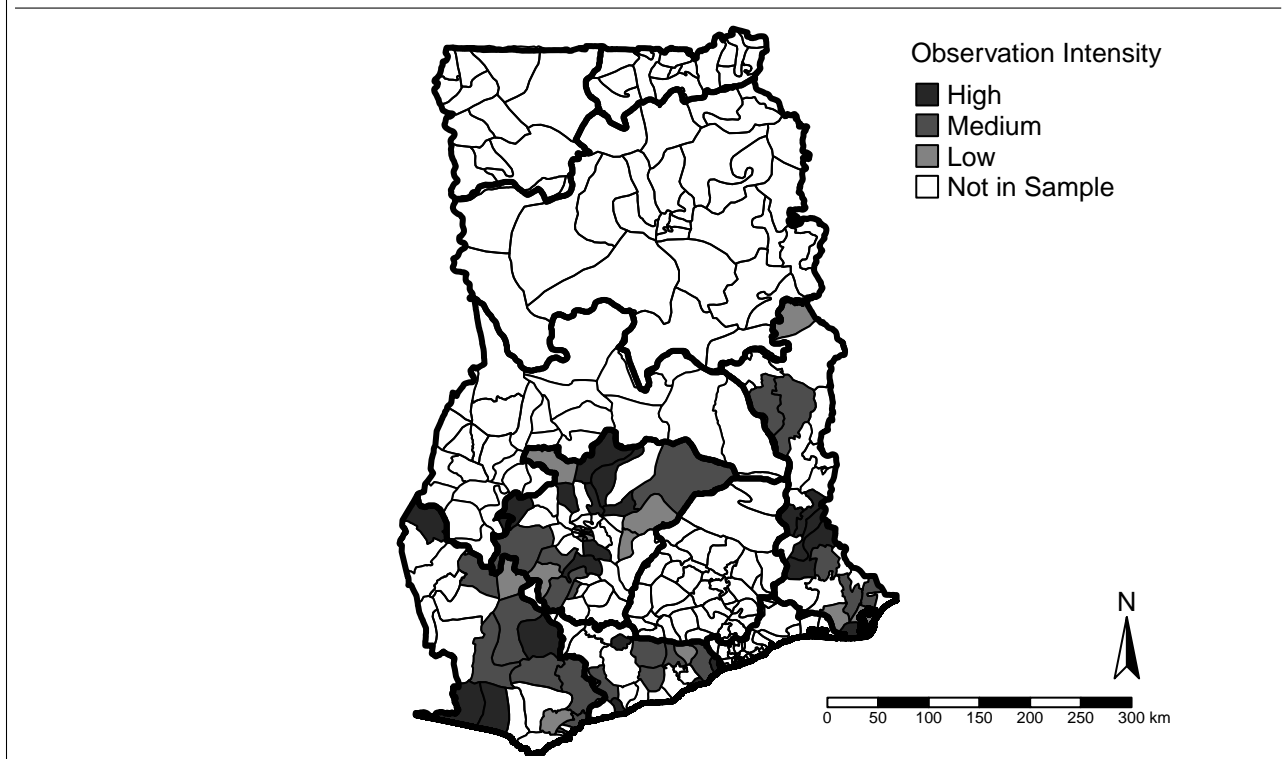
## TOTAL CAUSAL EFFECT OF OBSERVERS ON FRAUD AND VIOLENCE

### Saturation design: two-stage randomization of observers

In this section, I fully describe the research design reported in Asunka et al. (2019). The experimental design involves a two-stage randomization of treatment (i.e., observation). In the first stage, we assigned the 60 constituencies in our study to one of three *intensity of observation (IO)* levels: *low*, *medium*, or *high*. We then randomly sampled 30 percent of polling stations from each of our selected constituencies to form our study sample. In *low* intensity constituencies, CODEO agreed to send observers to 30 percent of polling stations in the sample. In the *medium* and *high* intensities, CODEO deployed observers to 50 percent and 80 percent of polling places of the study samples, respectively. We assigned the 60 constituencies to low IO with 20 percent probability and to medium and high IOs with 40 percent probabilities.<sup>1</sup> Thirteen constituencies were assigned to low IO, while 24 and 23 were assigned to medium and high, respectively. Figure H.1 shows the treatment conditions of constituencies in the sample. CODEO also deployed monitors to the remain constituencies outside our sampled constituencies using their own protocols.

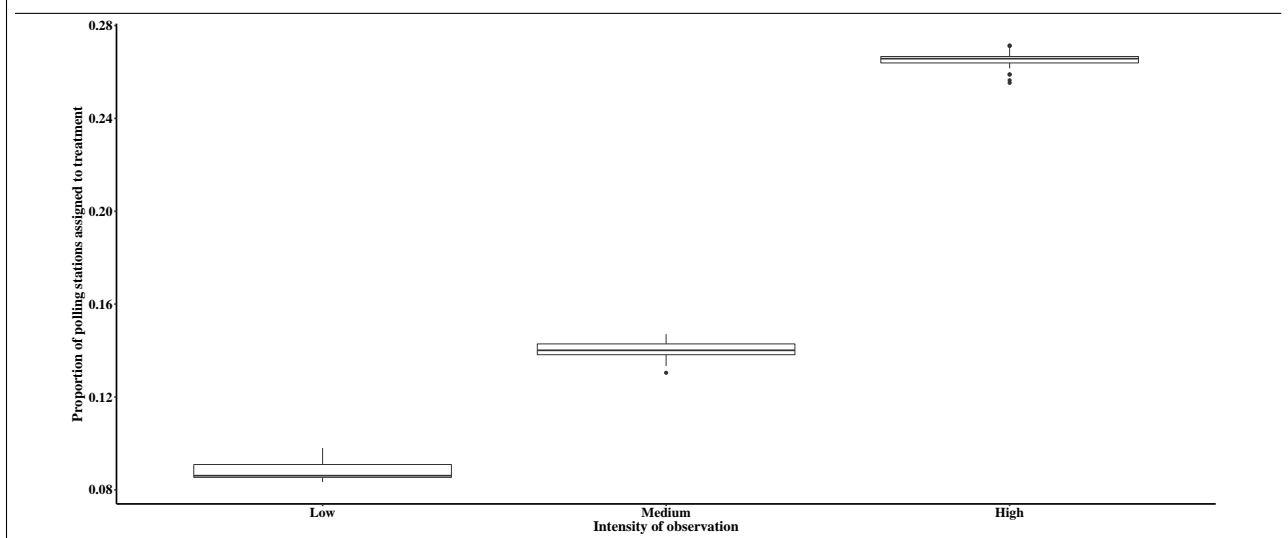
<sup>1</sup>Our decision to adopt these probabilities was based on how we compute spillover effects of observers. See authors for details.

FIGURE H.1. Map of Ghana: treatment conditions of constituencies



In the second stage, we assigned our sampled polling stations nested within each of the 60 constituencies to treatment (i.e., *observation*) with probabilities based on the intensities assigned to their constituencies in the first stage. Therefore, the actual concentration of observers in a constituency is  $m * 0.3 * PS$ , where  $PS$  represent the total number of polling stations in a constituency and  $m \in \{0.3, 0.5, 0.8\}$  represent the assigned intensity of observation. There were 2,310 polling stations in the sample and 1,292 were assigned to treatment. Figure H.2 shows the distribution of the proportion of polling stations in the entire constituencies assigned to receive observers by treatment saturation.

FIGURE H.2. Distribution of the proportion of polling stations in constituencies assigned to treatment by saturation



## Measuring the total causal effect of intensity of observation on electoral fraud

To estimate the total average causal effect of observers at the constituency level,  $TCE$ , I compare the average fraud and violence outcomes for all stations (treated and control) at medium (high) IO constituencies to the average outcome in control units in low IO constituencies. The control stations in the low IO constituencies serve as the estimate of the level of fraud in the absence of observers at a given IO taking into account potential spillover effects. Thus, I calculate the  $TCE(m)$  as follows:

$$TCE(m) = E(Y_{ij}|M_j = m) - E(Y_{ij}|T_{ij} = 0, M_j = low)$$

where  $E(Y_{ij} | M_j = m)$  is the average level of fraud or violence for polling station  $i$  located in constituency  $j$  with intensity of observation  $m \in \{medium, high\}$ .  $E(Y_{ij} | T_{ij} = 0, M_j = low)$  measures the average outcome for all control stations in low IO constituencies.  $T_{ij} = t$  represents the treatment status of polling station  $i$  located in constituency  $j$ , where  $t \in \{treated = 1, control = 0\}$ .<sup>2</sup>

### First-stage results of treatment

Table H.1 reports the treatment effect of IO on fraud and violence. I include the results for indicators of fraud and violence, *turnout* and *intimidation of voters* during voting, reported in (Asunka et al. 2019). To be sure, turnout is not fraudulent in itself. It only serve as an indicator of fraud insofar as they systematically vary with randomly placed observers. That is, in the absence of fraud in the form of multiple voting and ballot stuffing, we should expect similar turnout rates and vote counts for parties, on average, in treated (monitored) and control (unmonitored) polling stations.

Columns (1) and (2) report the TCEs of intensity of the IO on turnout and intimidation of voters in the full sample. Columns (3 and 4) and (5 and 6) breaks these results by levels of electoral competition at the constituency level. These first-stage results (discussed in section on “varying the quality of elections in which politicians are elected”) suggest that increasing the intensity of observation in a constituency reduces overall levels of fraud and violence. Further, they justify using IO as an instrument for the integrity of elections.

<sup>2</sup>Based on the operational structures of political parties in Ghana, we assume that spillover effects will be confined within constituencies. That is, we assume no interference across constituencies.

TABLE H.1. Higher intensity of election observation reduces constituency-level fraud and violence

	<i>Dependent variable:</i>					
	Full sample		Competitive constituencies		Non-competitive constituencies	
	Turnout	Intimidation of voters	Turnout	Intimidation of voters	Turnout	Intimidation of voters
	(1)	(2)	(3)	(4)	(5)	(6)
Medium intensity of observation	-0.056* (0.032)	-0.004 (0.049)	-0.095* (0.054)	0.104 (0.080)	-0.032 (0.034)	-0.069 (0.049)
High intensity of observation	-0.055* (0.030)	-0.054 (0.036)	-0.102* (0.053)	0.015 (0.027)	-0.026 (0.031)	-0.091* (0.048)
Constant	0.889*** (0.027)	0.102*** (0.035)	0.920*** (0.049)	0.039* (0.023)	0.871*** (0.026)	0.135*** (0.047)
Observations	1,622	1,554	667	639	955	915
R <sup>2</sup>	0.005	0.009	0.012	0.025	0.002	0.012
Adjusted R <sup>2</sup>	0.003	0.008	0.009	0.022	-0.0005	0.010

*Notes:* I use two indicators of election-day fraud and violence: *turnout* and *intimidation during voting*. The unit of analysis is the polling station. Columns 1 and 2 shows the results for these two indicators in the full sample while columns 3 and 4, and 5 and 6 shows those for competitive and non-competitive constituencies, respectively. The *Total Causal Effect (TCE)* represents the *overall effect* of observers within constituencies monitored adjusting for potential spillover effects. Standard errors reported in parentheses are clustered at the constituency level. \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ .

## MEASURING RESPONSIVENESS: USE OF CONSTITUENCY DEVELOPMENT FUNDS

I use legislators' spending of their state-provided CDFs as my measure of responsiveness regarding constituency service. I use monthly reports of MPs' expenses to record and classify the type of goods and services to which MPs allocate their funds. Figures I.1 and I.2 provide examples of the expense sheets I coded. These records submitted by the local government (District Assembly) of the MPs are available at the Ghana District Assemblies' Common Fund Administration (DACF) at Accra in Ghana. I coded MPs expenses between 2014 and 2016 that were available in the archives of the DACF office. Between this period I coded 2,160 months of expenditure sheets for 60 MPs. Table I.1 shows the six main expenditure types as well as their sub-categories and my coding rule.

### Summary statistics of expenses

Table I.2 presents the summary statistics of MPs' use of their CDF in general (total spending) and across different expenditure categories (Panel A). The total amount of funds that MPs expect in any particular fiscal year is contained in a legislation referred to as the District Assemblies Common Fund Formula, which is passed each year. Funds are then released to MPs in four tranches during the fiscal year. In anticipation of these disbursements, MPs may provide benefits to their constituencies and reimbursed their creditors when funds are released. When MPs make direct purchases, the FA deducts the amount used before transferring the remaining (net amount) to MPs' CDF account managed by their local governments. These deductions are reflected in the records submitted by the DA and often *unclear* what goods were purchased or who the target beneficiaries.

Table I.2 Panel B shows the summary statistics of the dependent variables used in my analysis, which I created using the data on expenditure. *Utilization* measures the proportion of allocated funds (i.e., GHC 1, 264, 987) spent between 2014 and 2016. *Public Goods* and *Private Goods* measures the proportion of allocated funds used by an MP to provide public and private goods, respectively.



FIGURE I.1. Exhibit 1: MPs' CDFs expenditure sheet

JUNE 2014 ASSEMBLY: MAMPOWA MUNICIPAL

**MENTS** **C**

Date	Payee	Particulars of Payments	Folio	P.V. No.	Chq. No.	Bank
16-01-14	Boateng Yao Ousu & Stephen	Being financial assist- ance to students		01	640307	1200.00
6-01-14	Boateng Yao Ousu & Stephen	Being payment in resp- ect of Ashanti Mps foot- ball club.		02	640308	1500.00
6-01-14	Boateng Yao Ousu & Stephen	Being donations to churches		03	640309	2500.00
16-01-14	K. Ofori Bwomoh	Being payment to supp- ort of the mosque project		04	640310	2200.00
6-01-14	K. Ofori Bwomoh	Being payment of finan- cial assistant to students		05	640311	1700.00
6-01-14	Blessed Home Super Cement	Being 100 bags of Cement in support of the constru- ction of Teachers quarters at Kyekwesent		06	640312	2294.25
16-01-14	C.R.A	5% WHT			640313	120.75
13-01-14	C.R.A	5% WHT			640317	126.00
6-01-14	Geoff Gye	Being 100 bags of Cement in support of const- ruction of a community centre for Bosoforo		07	640314	2294.25
6-01-14	C.R.A	5% WHT			640315	120.75
14-01-14	Edwin Baidoo	Being payment in res- pect of a 10-seater KVIP place of convenience for Kyekwesent community		08	640318	19000.00
14-01-14	C.R.A	5% WHT			640319	1000.00
21-01-14	N.L.B	Bank charges				60.00
						33090.00
		Bal c/d				34116.00
						9285.64
						43401.64

Notes: MPs' CDFs expenditure sheets are month-by-month reports of itemized spending by an individual legislator. These sheets are submitted by MPs' local governments to the national fund administrator.

FIGURE I.2. Exhibit 2: MPs' CDFs expenditure sheet

**ASSEMBLY: SIKYERE KUMA**  
**MENTS C**

Date	Payee	Particulars of Payments	Folio	P.V. No.	Chq. No.	Bank
02/10/14	Guidon Appiah (Charles Appiah)	Being financial support to charter Appiah (blind) to complete his house project.		02/10/14	687462	200.00
02/10/14	Herbert A. Boateng	Being financial assistance, a student at Offinso Coll. of Edu.		02/10/14	687464	400.00
02/10/14	Seedorf Amakohene	Being financial assistance, a student of University of Ghana		03/10/14	687465	300.00
13/10/14	Dadecase Community	Being financial support for electricity extension project		04/10/14	687466	700.00
12/10/14	Dadecase Community	Being financial support for renovation of D/A 'A' JHS Block		05/10/14	687467	1,200.00
13/10/14	Akrofozo Community	Being financial support for toilet project		06/10/14	687468	1,000.00
13/10/14	Akrofozo Unit Committee	Being financial support for completion of toilet project		07/10/14	687469	1,000.00
15/10/14	Pepease Community	Being financial assistance for the construction KVIP		08/10/14	687470	1,000.00
20/10/14	Ester Gyekye	Being financial assistance, a student at SDA College of Education		09/10/14	687471	400.00
20/10/14	Tweneboah Koduah S.H.S	Being financial assistance to Daga Salomey A. a student at T.K.S.H.S.		10/10/14	687472	300.00
20/10/14	Tweneboah Koduah S.H.S	Being financial assistance to Osei Francis.		11/10/14	687473	300.00
20/10/14	Ejisu S.H.S	Being financial assistance to Frank Adu Poku.		12/10/14	687474	300.00

Notes: MPs' CDFs expenditure sheets are month-by-month reports of itemized spending by an individual legislator. These sheets are submitted by MPs' local governments to the national fund administrator.

TABLE I.1. Classification of MPs' spending of Constituency Development Funds

Type	Categories	Criteria
<b>Public goods</b>	Education	Construction or repair of school buildings, extra classes for schools, mock exams for final year students, and textbooks and other school supplies distributed to schools.
	Health	Construction or repair of local clinics, clearing of community dumpster, immunization exercises, and health awareness programs.
	Repair and construction	Road, bridges, water pumps, and purchase of construction materials to support community initiated projects (electoral area is specified).
	Safety and Security	Police operations (i.e., providing security for community events) and providing street lights or replacing street bulbs.
<b>Personal goods</b>	Education	Scholarship for "needy but brilliant" students, including scholarships for education abroad. Also include sponsorship for apprenticeships (driving school, hairdressing, and dressmaking).
	Health	Medical bills for individuals (including medical surgeries).
	Business	Support constituents to start their own businesses including farms and retail shops.
	Needy	Replacing roofing sheets, and pocket money (general financial assistance).
<b>Donation to groups</b>	Religious/traditional authorities	Donation to church fundraising activities (e.g., church building and annual harvest). Donation to traditional festivals, funerals, and repairs of the chief's palace.
	Youth organizations	Sponsor capacity building workshops and soccer tournaments.
<b>Transfers to District Assembly</b>	Organization of national events locally	Payment for national events held locally, including independence day celebration and national farmers' day celebration.
	Operational cost	Repair works on local government buildings and infrastructure, fuel local government vehicles and maintenance of machinery. Transfers to local government account often stated as a loan.
<b>Monitoring and Office Expense</b>	Monitoring of MPs' project	Paid directly to MPs to cover their inspection of projects in their constituency.
	Office expense	Office building rent, operational expenses, and staff salary for MPs' office in the constituency.
<b>Unclear Purpose Expenditure</b>	Beneficiary or purpose of payment is unclear	Examples include: MP direct purchase (e.g., TV sets, cutlasses, etc.) for which the Fund Manager deducted amounts; purchase of building materials for which the purpose was not stated; purchase of motorbikes with no stated beneficiary or purpose; purchase of food items (e.g., bags of rice, oil etc.) with no stated beneficiaries; and transfers to individuals or business organizations with no stated service provided or materials supplied.

TABLE I.2. Summary statistics of MPs' use of their CDFs between 2014 and 2016

Statistic	N	Mean	St. Dev.	Min	Max
		GHC	GHC	GHC	GHC
<b>Panel A: CDF Spending</b>					
Public goods	60	290,414	233,426	0	1,169,500
Private goods	60	128,136	91,951	0	447,886
Donation to local groups	60	31,201	37,499	0	185,489
Transfers to local government	60	37,391	66,637	0	344,885
Monitoring and office expenses	60	8,371	13,826	0	60,681
Unclear purposed expenditure	60	26,703	42,834	0	198,811
<i>Total spending</i>	60	522,216	283,345	111,400	1,308,597
<b>Panel B: Dependent variables</b>					
<i>Utilization</i>	60	0.415	0.223	0.088	1.034
Public goods	60	0.231	0.184	0.000	0.925
Private good	60	0.102	0.072	0.000	0.354
Donation to local groups	60	0.025	0.030	0.000	0.147
Transfers to local government	60	0.030	0.053	0.000	0.273
Monitoring and office expenses	60	0.007	0.011	0.000	0.048
Unclear expenses	60	0.021	0.034	0.000	0.157

Notes: Table I.2 shows the summary statistics of the use of CDFs by MPs. Part A presents the summary statistics of legislators' itemized expenses as well as their total expenditure in actual amounts. Part B shows the proportion of available funds between 2014 and 2016, GHC 1,264,987 that were used up by MPs in general (*Utilization*) as well as on the different expenditure types. Amounts are in Ghana Cedis (GHC)(the exchange rate was  $GHC3.72 = \$1$  in August 2014 according to <http://freecurrencyrates.com/en/exchange-rate-history/USD-GHS/2014/yahoo>).

## INTERVIEWS WITH MPS

I conducted interviews with 47 out of 60 MPs in my sample between November 2015 and January 2016. The purpose of these interviews was twofold. First, it was to assess MPs' responsiveness to their constituents indicated by how they report allocating their time. Second, it was to examine some potential mechanism that drives the results in this study. I show some of the interview results on the latter in testing the mechanisms section above. In this section, I report on the first. The results broadly support the findings presented in the paper that MPs elected in intensely monitored constituencies provide greater constituency services.

Table J.1 shows MPs' self-reported levels of provision of constituency services (Part A) and legislative activities (Part B). In Part A, I show results for the following: (1) the percentage of MPs' times spent in the constituency (during parliamentary sessions); (2) number of times they visit their constituency in a year; (3) whether they have applied for external funds to support constituency development projects; and (4) whether they organize monthly meetings to listen to constituents demands. In Part B, I report results on whether an MP has spoken frequency (7 or more) during their term in office on: (1) National policy or project implementation issues; and (2) Constituency development issues.

The results show that MPs elected from intensely monitored constituency report to spend a higher proportion of their time in their constituencies compared to those elected from low-intensity observation constituencies. They also visit more annually. Also, representatives elected from high-integrity elections report to seek external funds to support projects in their constituencies and organize meetings frequently (monthly) to listen to their constituents concerns. While not all estimates on these indicators are statistically significant, they appear substantively large. Together, these results suggest that high-election integrity increases the level of effort legislators exert in constituency services. However, while those elected in intensely-monitored elections also appear to report slightly more activities in the legislature, these differences are neither substantively nor statistically significant.

TABLE J.1. Higher-intensity of observation increases MPs' constituency services, but have no effect on MPs' legislative activities

	Full sample (1)	Actual Intensity of Observation		ITT (4)
		Low (2)	High (3)	
<b>Constituency Services</b>				
Percentage of MPs' time spent in constituency	41 (11.34)	34.33 (10.57)	43.29 (10.8)	8.95** (3.17)
# of MP visits to constituency annually	38.35 (12.03)	33.82 (15.01)	39.77 (10.8)	5.95 (5.09)
MP applied for donor funds to support constituency	0.28 (0.45)	0.17 (0.39)	0.31 (0.47)	0.15 (0.14)
MP organizes monthly constituents' meeting	0.62 (0.49)	0.4 (0.52)	0.69 (0.47)	0.29 (0.19)
<b>Legislative Activities</b>				
National policy or project implementation	0.38 (0.49)	0.25 (0.45)	0.43 (0.50)	0.18 (0.16)
MP raise concerns of constituency	0.38 (0.49)	0.33 (0.49)	0.40 (0.50)	0.07 (0.17)
N	47	12	35	

*Note:* Table J.1 presents result from a survey of MPs on their constituency services and legislative activities. A standard instrument was used to conduct these interviews with the help of research assistants. Columns (1)-(3) report the means and standard deviation (in parentheses) for each MPs self-reported activities in the Full sample, and Low and High intensely-monitored constituencies, respectively. Columns (4) report the average ITT effects (difference in means) of the treatment with robust standard errors (HC2). \* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$

Table J.2 display results for how MPs report spending their time on the top three activities that take the most of their time when they visit their constituency. I provided MPs with six items (and they were free to add other activities). I gave MPs the following options: holding a one-to-one meeting with constituents; holding community with constituents; holding meetings with community leaders; holding meetings with party executives; inspecting constituency projects; and attending social events such as funerals, religious activities, traditional festivals, etc. They were first to choose the three activities and then divide their 100 percent working time to these three things. For most of these activities, I find no significant difference among MPs across the treatment who chose them, suggesting they dedicate a similar amount of time. Interesting, among the few MPs who chose “inspecting constituency projects” as one of their three key activities, those elected in intensely-monitored constituencies spend a higher percentage of their time on this activity. They, however, dedicate less time to social events such as funerals and church services. These results support my claim that high-integrity elections encourage legislators to exert a higher effort in providing public goods (works) to their constituents.

TABLE J.2. When visiting their constituency, MPs elected from higher-intensity observation districts spend more time on inspecting constituency development projects, and less on attending social events

	<i>Intensity of Observation</i>			
	Full sample (1)	Low (2)	High (3)	ITT (4)
Holding one-to-one meeting with your constituents	38.32 (12.42)	36.30 (10.55)	39.29 (13.35)	2.99 (4.61)
Holding community meeting with your constituents	34.77 (14.70)	30.38 (16.47)	36.36 (14.07)	5.99 (6.94)
Holding meetings with community leaders	19.09 (4.91)	15 (7.07)	20 (4.33)	5 (7.23)
Holding meetings with party executives	34.82 (13.83)	32.50 (11.90)	35.33 (14.48)	2.83 (7.72)
* Inspecting constituency projects	26.33 (10.23)	10 ( )	29.60 (7.13)	19.60** ( )
Attending events such as funerals, church services, durbars (festivals), etc.	32.71 (12.54)	38.55 (12.14)	30.57 (12.19)	-7.98* (4.46)

*Note:* Table J.2 presents results from a survey of MPs on how they divide their time when they visit their constituencies. MPs were provided with all the activities in the table and asked to choose the top three that took most of their time. They were then asked to allocate what proportion of their time they assigned to their top three choices. The specific question was: "When in your constituency, which THREE of the following activities take up the most of your time? Please tell me what percentage of your time you spend on each of these three:." Table J.2 Columns (1)-(4) reports the means and standard deviations (in parentheses) of the time MPs report they allocate to each of these activities, if they selected it as one of their top three, in the Full sample, and Low, Medium, and High intensely monitored constituencies, respectively. Columns (5) and (6) report the ITT effects of intensity of observation in Medium and High IO constituencies, respectively along with robust standard errors. \* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$



## POWER ANALYSIS FOR MAIN EFFECTS

In this section, I use simulations to estimate the probability of detecting statistically significant effects of the various hypothesized effects in my main analysis. With the benefit of observing the outcomes in the control group (i.e., the mean and standard errors), I specified hypothesized effects between zero and 30 percent and estimated the statistical power for each. Figures K.1 and K.2 shows the power for two and three treatment arms. In the latter, I take an experiment as generating significant effects when the coefficients associated with medium and high are both greater than zero and their associated  $p$ -values are also  $\leq 0.05$ . The parameters (i.e., outcomes in control reported in Table E.2) for estimating the statistical power were as follows:

- Number of simulations = 10,000
- Utilization  $\rightarrow N \sim (\mu = 0.266, sd = 0.032)$
- Public goods  $\rightarrow N \sim (\mu = 0.111, sd = 0.019)$
- Private goods  $\rightarrow N \sim (\mu = 0.096, sd = 0.021)$

However, I am aware of the potential pitfalls of using post-hoc estimates from a single experiment to estimate the power of the results of the same study. The key idea is that because the estimates from this single study represent a noisy measure of the relevant parameters to conduct a power analysis, it may lead to over-optimism about the statistical power (see a discussions on this issues by Andrew Gelman: <https://statmodeling.stat.columbia.edu/2019/01/13/post-hoc-power-calculation-like-shit-sandwich/>).

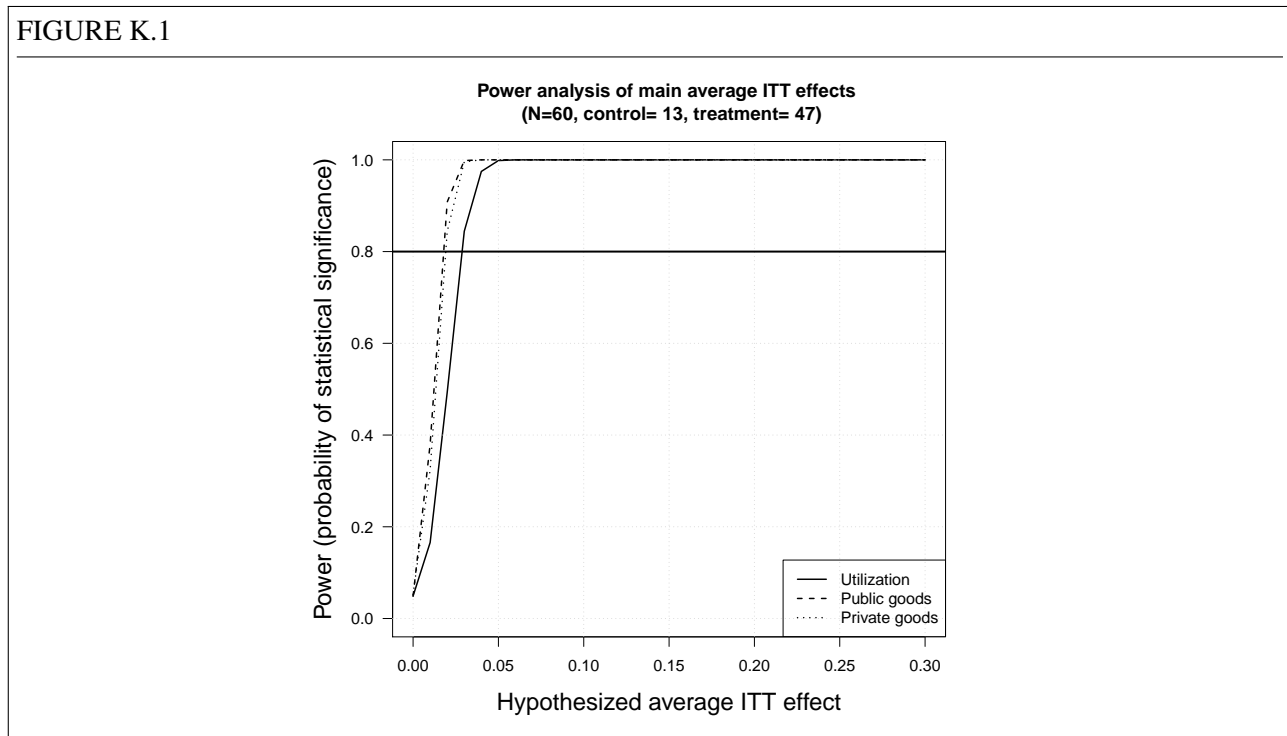
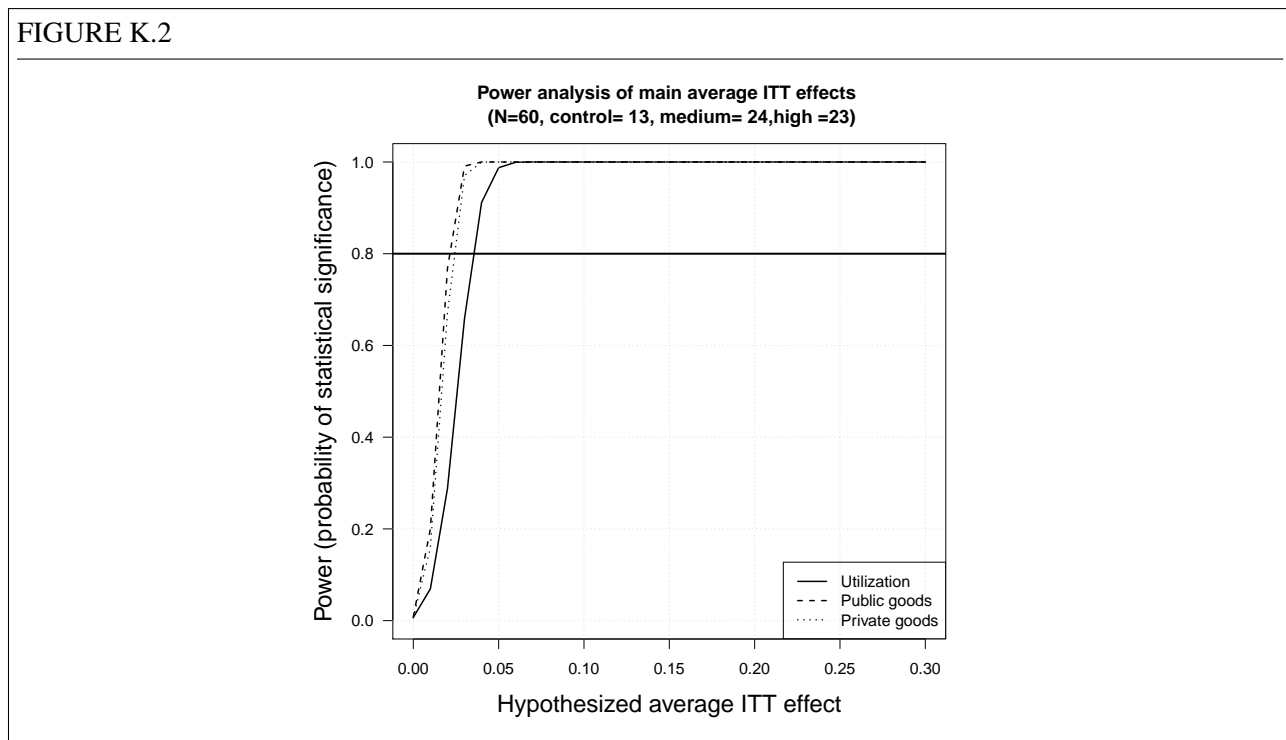


FIGURE K.2



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