Supplemental Information for: Under the Roof of Rebels: Civilian Targeting after Territorial Takeover in Sierra Leone

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1 Overview

This Supplemental Information contains descriptive statistics for all matching covariates used in the research note (for full matching statistics and estimates for all time-space windows see end of SI). The material first reports different model specifications for the matched wake analysis (MWA) on civilian targeting that can be associated with the RUF (main model presented in the research note). Whenever a model in this SI uses the same modeling choices as the model presented in the research note, difference-in-differences regression is weighted by the number of treatment cases compared to control cases and matched on counts of previous treatment and control events, it is reported **in bold**. This is true even when the model is fit on a different subset of data. However, the modeling assumptions will be the same for all models presented in bold. In addition, models for data subsets are reported: We fit multiple models for all three main rebel groups in Sierra Leone, for areas that are either far or close from the capital; for areas where diamond mines are close-by or not, and for only precisely reported events. Robustness tests are also provided by reporting models that only use ACLED events and alternate space-time windows. We also provide a qualitative assessment of our dependent events in ACLED and GED data to provide more background on the violence against civilians conducted by the RUF.

2 Descriptive Statistics

This section presents the distribution and correlation of the 5 matching covariates used in the research note. Furthermore, the empirical cumulative distribution function of civilian fatalities in the UCDP One Sided Violence Dataset is reported. In addition, it presents the distribution of population density compared to the location of treatment, control, and dependent events.

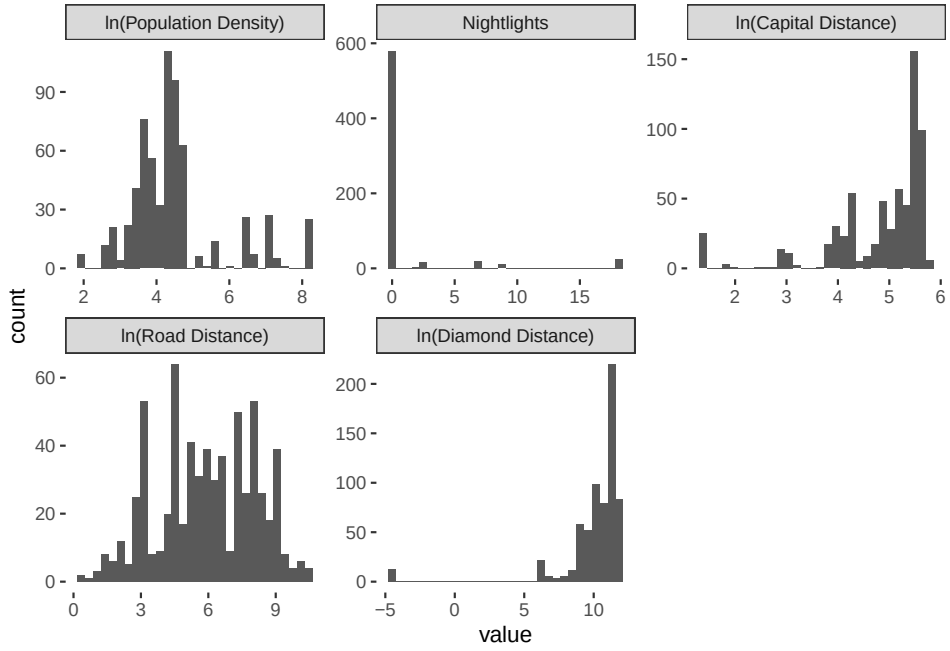


Figure 1: Distributions of matching covariates.

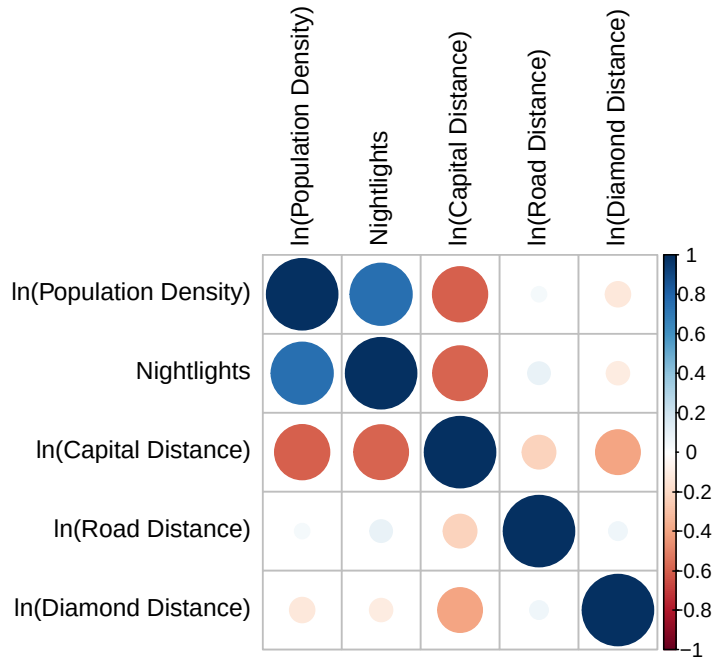


Figure 2: Correlation of matching covariates.

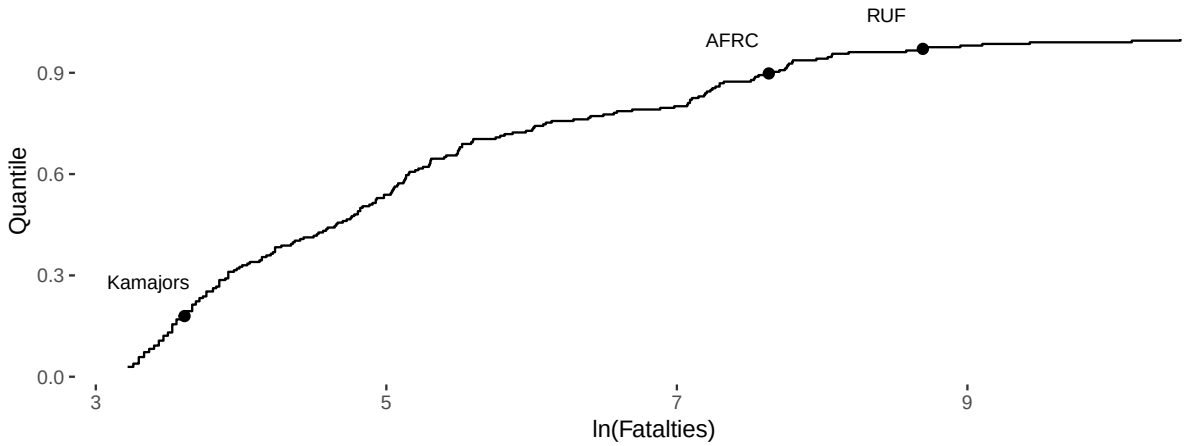


Figure 3: Empirical CDF of civilian fatalities inflicted by each rebel group in the UCDP One Sided Violence Data.

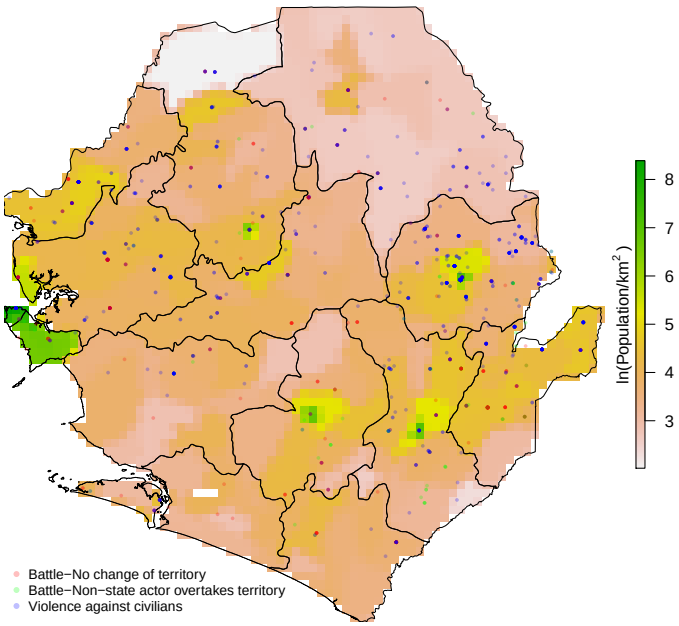


Figure 4: Distribution of (logged) population density in km^2 and events. Chiefdom boundaries in black.

3 In-Text Results

This section presents any numerical results or data descriptions presented in-text in the research note.

- Total count of civilian targeting events in ACLED on 8. 5: 1004
- Total count of civilian targeting events in GED on p. 8: 318
- Total count of civilian targeting events in ACLED and GED on p. 8: 1322
- Number of duplicate civilian targeting events identified by `meltt` and excluded from our analysis: 18
- Count of RUF civilian targeting events in ACLED in footnote 4: 674
- Count of RUF civilian targeting events in GED in footnote 4: 143
- Count of RUF civilian targeting events in ACLED and GED in footnote 4: 817
- Total count of civilian targeting events by peacekeeping forces in footnote 5: 59
- Number of unique groups in ACLED in footnote 5: 16
- Overlap of events between ACLED and GED on p. 17: 0.0138037

4 RUF Targeting

This section presents results from models that test the effect of RUF territorial takeover on subsequent civilian targeting by the RUF. This means that the dependent variable is only civilian targeting events that can be attributed to the RUF. After presenting the frequency of treatment, control, and dependent events in the dataset, we report different model specifications.

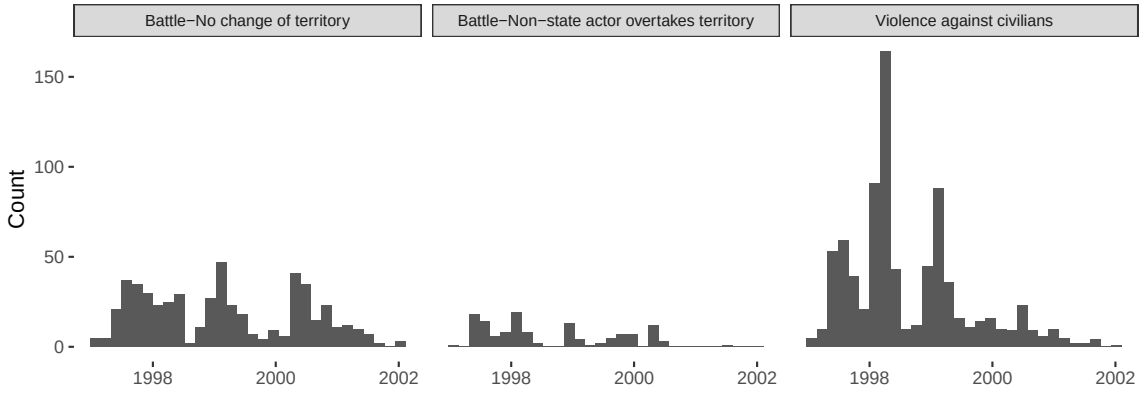
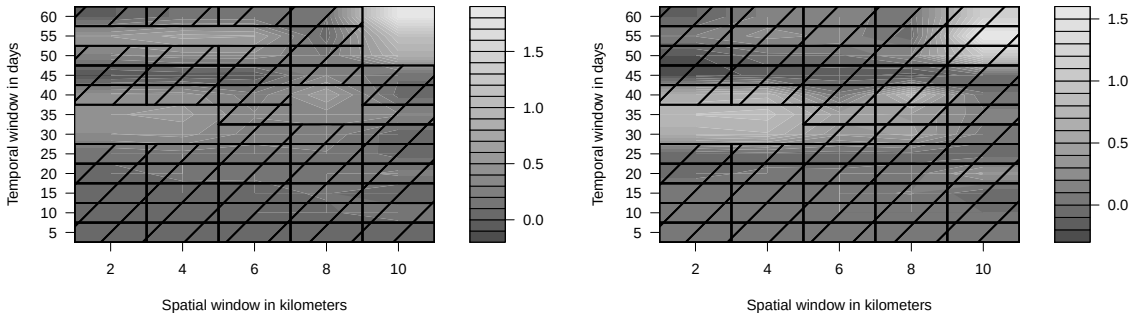
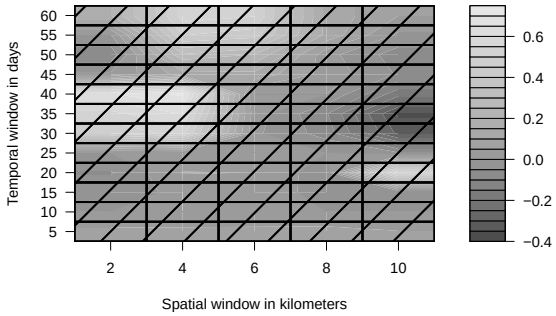


Figure 5: Frequency of treatment, control, and dependent events.

From upper left to bottom right, the matched wake analysis included (1) no weighting or controlling for overlapping events, (2) controlling for previous treatment and control events, (3) omitting overlapping wakes, (4) weighting to account for unbalanced treatment, **(5) weighting and controlling for previous events**, (6) weighting and omitting overlapping events. As this is the data sample used in the paper, Figure (5) in this section replicates the model presented in the paper.




Temporal window in days
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Spatial window in kilometers
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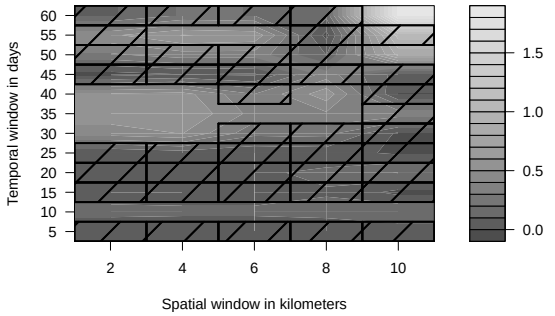
0.0
−0.2
−0.4


Temporal window in days
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Spatial window in kilometers
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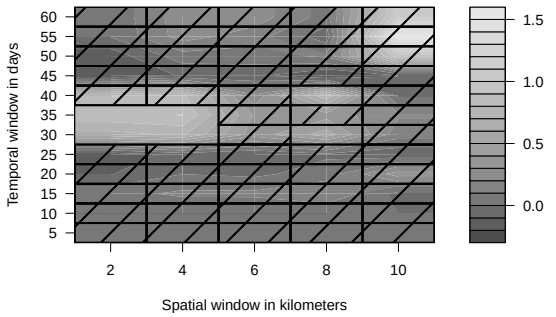
Temporal window in days
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Spatial window in kilometers
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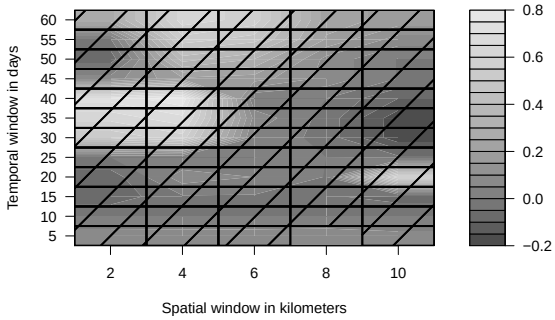
0.5
0.0


Temporal window in days
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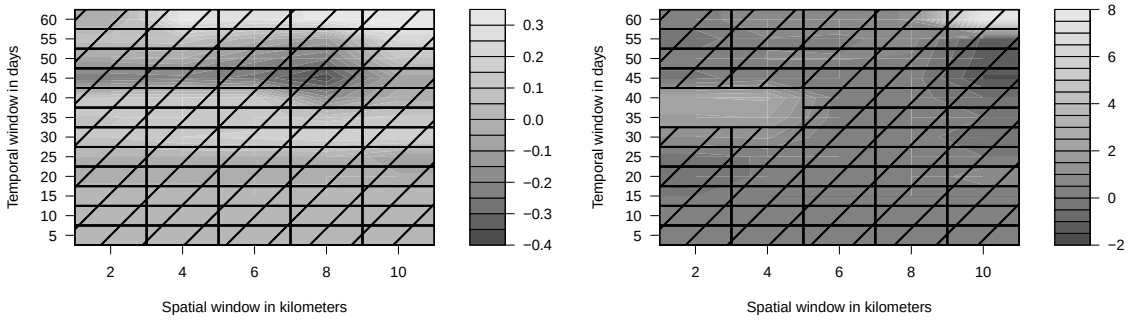
Spatial window in kilometers
0.8
0.6
0.4
0.2
0.0
−0.2

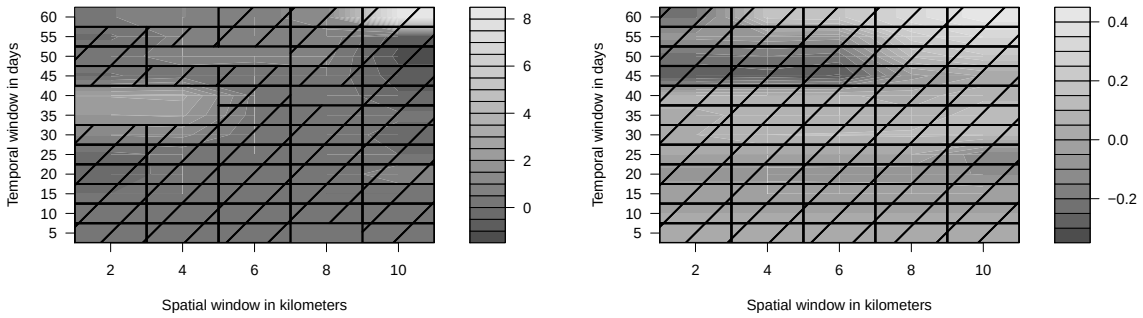
5 Subset Analysis, splitted by distance to capital

This section presents results for splitting the data into two subsets depending on the median distance to the capital. The effect of territorial capture on subsequent RUF civilian targeting is shown for **(1) observations under the median distance to the capital only** and **(2) observations above the median distance to the capital**. Both regressions are weighted to account for unbalanced treatment and control events; and matching on previous events is included. This subsetting shows that we observe a positive treatment effect only if events take place far from the capital. This is likely the case because the government often retakes territory close to the capital before rebels can establish control.



6 Subset Analysis, splitted by distance to next diamond mine

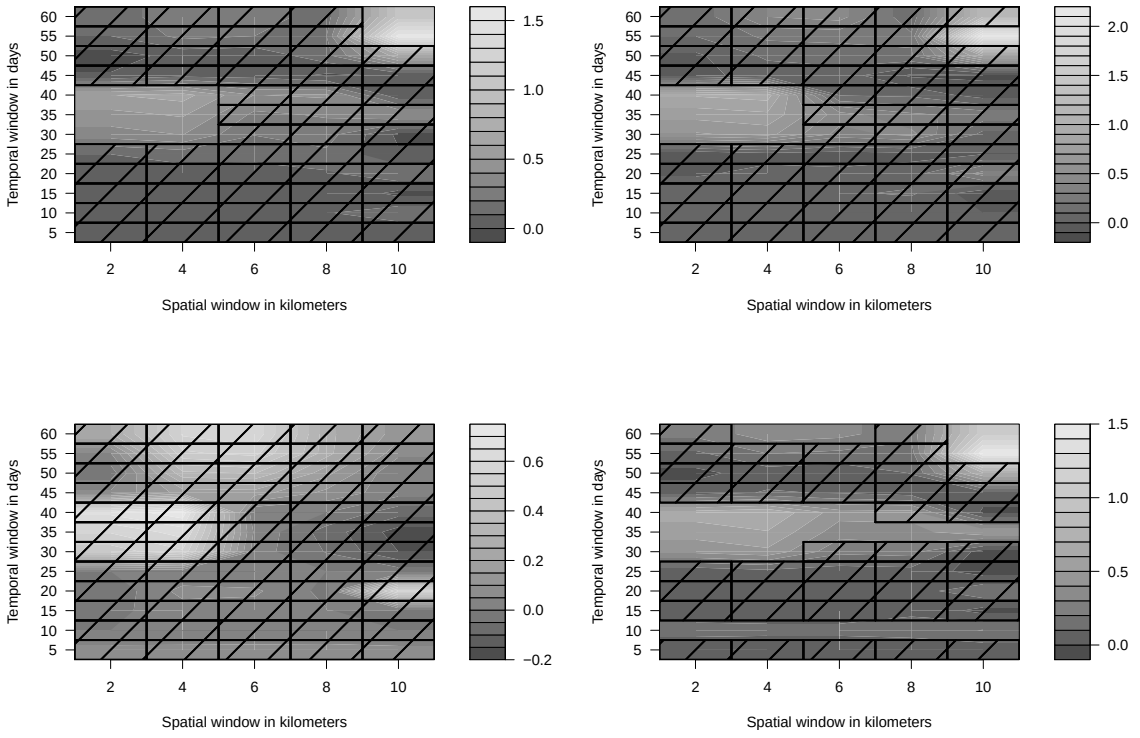
This section presents results for splitting the data into two subsets depending on the median distance to the next diamond mine. The effect of territorial capture on subsequent RUF civilian targeting is shown for **(1) observations under the median distance to diamond mines** and **(2) observations above the median distance to diamond mines**. Both regressions are weighted to account for unbalanced treatment and control events; and matching on previous events is included. With this subsetting we aim to explore if our mechanism holds true for regions with and without diamond resources as this might change incentives for the RUF to attack civilians. Indeed we find that the RUF conducted more attacks against civilians in areas where they could extract resources, violently forcing civilians to work in mines. This suggests that transition periods are only particularly violent if civilian support is not the main resource rebel groups rely on.

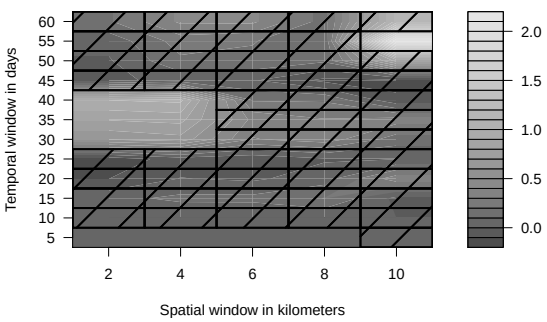


7 Subset Analysis, reduced to precisely reported events

This section presents the effect of territorial capture on subsequent RUF civilian targeting for precisely reported events only. In terms of data quality in ACLED and GED, an in-depth comparison for two country years, Algeria 1997 and Burundi 2000, has shown that there can be huge differences. It was shown that for Algeria 1997 52 % of events and for Burundi 2000 25 % of events in ACLED suffered one or more problems, such as incorrect region and/or location (administrative level 1 and 2), incorrect geoprecision code (i.e. events were given a code not corresponding to actual location information), double-coded and missing events, compared to 5 and 2 %, respectively, for GED (Eck 2012, 131). This led to for example locating an event 150 km away from its actual location since villages/towns had the same name but were in different regions. Furthermore, ACLED by default uses the provincial capital as location if a news article only mentions the province name whereas GED uses the centroid point if available and the provincial capital only if this point is missing. Related to this it was shown that the geoprecision code, which ranges from 1-3 for ACLED and 1-7 for GED and 1 meaning exact location information for both datasets, was inaccurate in 29 % of events for Algeria and in 18 % of events for Burundi. As a result, ACLED may introduce systematic bias by attributing events to provincial capitals when in fact they took place in rural areas (Eck 2012, 132). In fact for Africa 1997-2010 ACLED has the highest value of geoprecision for 77 % of violent events whereas GED has this level only for 29 %. Quite a few countries show levels of well above 90 % geoprecision which seems to be driven by the above mentioned practice given the three-level process employed for GED to ensure accuracy and given that fighting often takes place outside urban areas.

The models presented in this sections use data that was restricted to ACLED events where either the exact town or a small part of a region are known (ACLED geo-precision codes 1 & 2). From the GED data, only events where the exact point or a maximum of ca. 25 km precision around a point was known were included (GED geo-precision codes 1 & 2). The plots show the matched wake analysis for (1) no weighting or controlling for overlapping events, (2) controlling for previous treatment and control events, (3) omitting overlapping wakes, (4) weighting to account for unbalanced treatment, **(5) weighting and controlling for previous events**, (6) weighting and omitting overlapping events.




Temporal window in days
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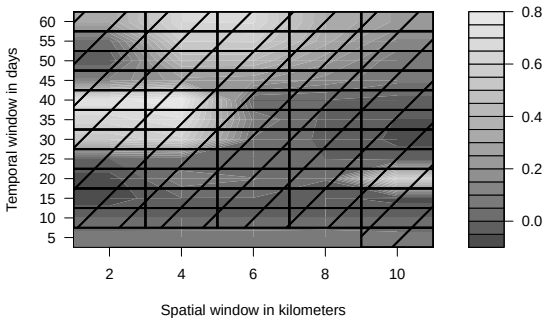
Spatial window in kilometers
2.0
1.5
1.0
0.5
0.0


Temporal window in days
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15
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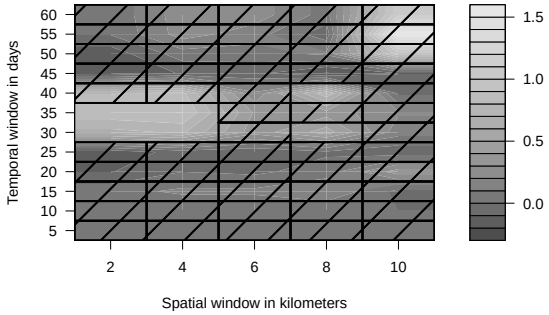
Spatial window in kilometers
0.8
0.6
0.4
0.2
0.0

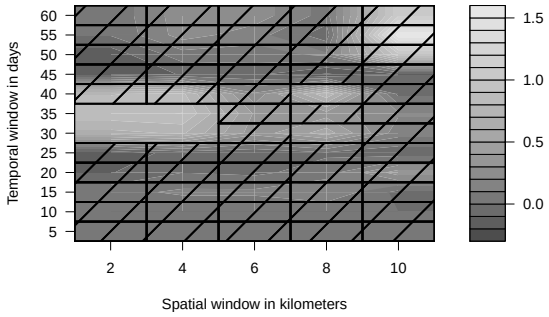
8 Alternate Event Aggregation Rules

In this section we present results using alternate rules in the `meltt` package to aggregate civilian targeting events from GED and ACLED. In our main analysis presented in the paper, we treat any events that are similar in type as the same event if they occurred within 10 days and 10k of each other. To test the sensitivity of our results to this coding choice, we present an analysis with (1) **a more restrictive aggreation rule (5 days and 5km)** and (2) **a more permissive one (15 days and 15km)**. The restrictive rule identifies 13 duplicated events, the permissive one identifies 27, compared to 18 in our main analysis. This corresponds to a 0.0099693%, 0.0207055%, and 0.0138037% overlap in events for each aggregation rule.

Restrictive analysis (5 days and 5km)



Permissive analysis (15 days and 15km)



9 All Civilian Targeting

This section presents results from models that test the effect of RUF territorial takeover on subsequent civilian targeting by all of the three main rebel groups (RUF, AFRC, and Kamajors). This means that the dependent variable is only civilian targeting events that can be attributed to any of these three actors. We first present the frequency of events in the data before turning to the different models fitted.

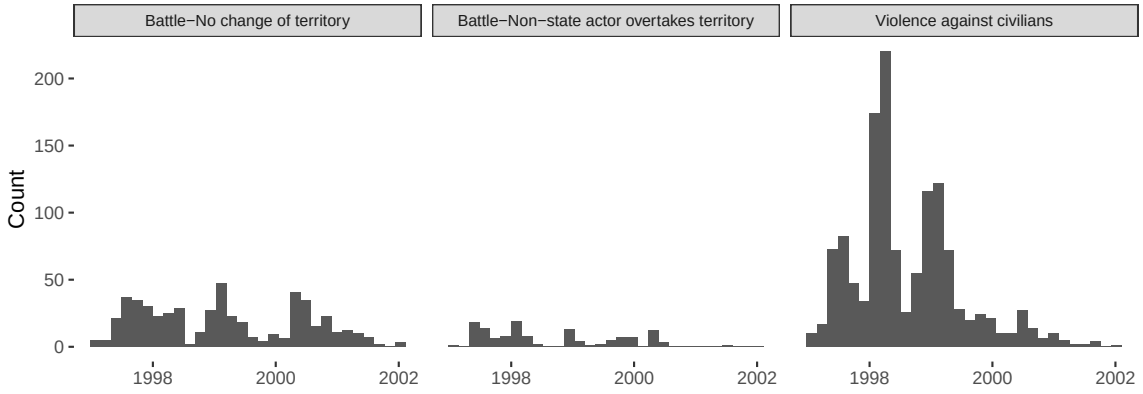
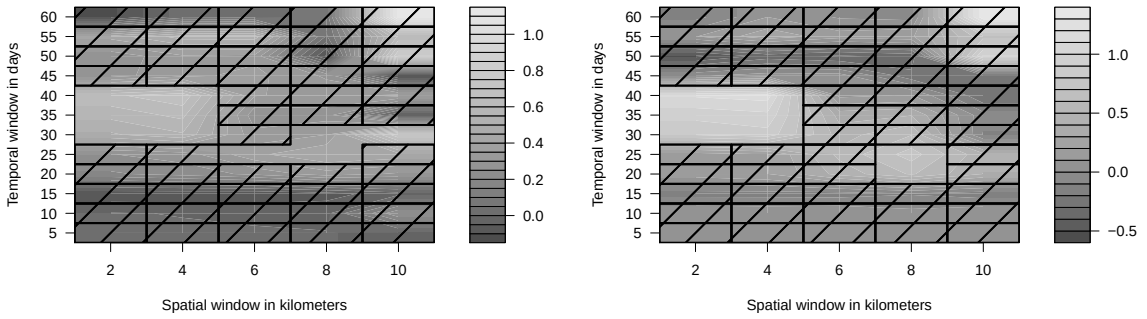
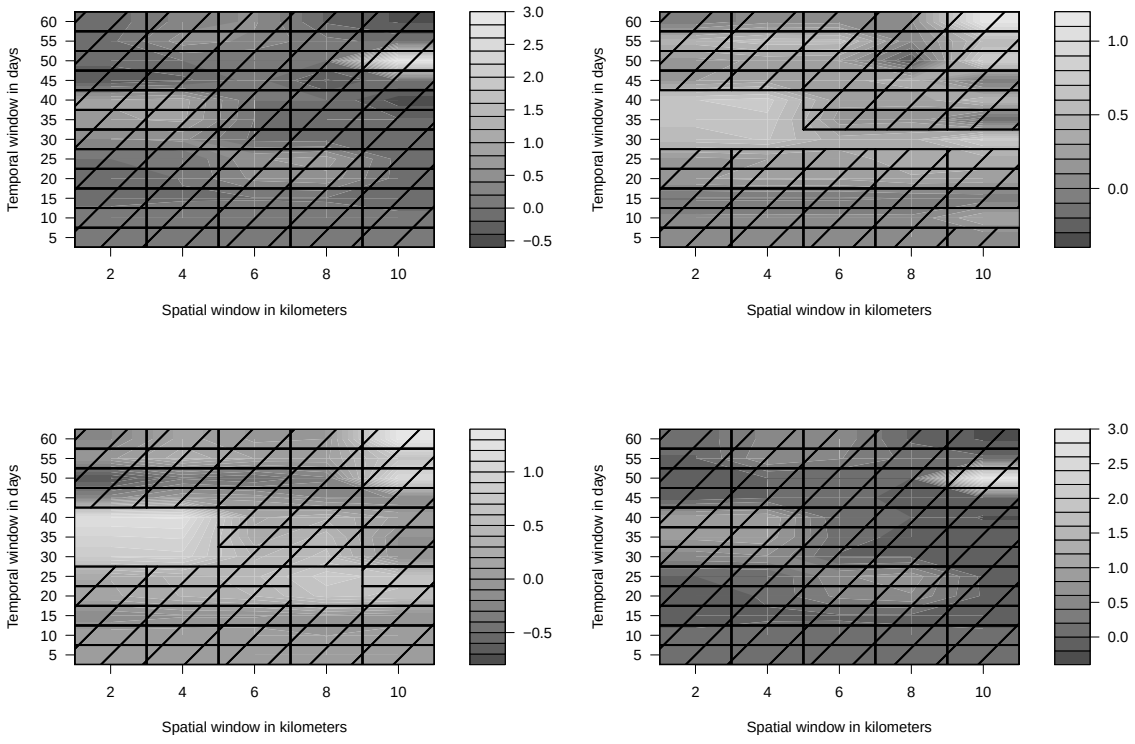


Figure 6: Frequency of treatment, control, and dependent events; all main rebel group events.

The matched wake analysis was specified with (1) no weighting for inbalance or controlling for previous events, (2) controlling for previous treatment and control events, (3) omitting overlapping wakes, (4) weighting to account for unbalanced treatments, **(5) weighting for addressing inbalance and controlling for previous events**, (6) weighting and omitting of overlapping wakes. The point estimates are substantively similar to the models using exclusively RUF civilian targeting, but far fewer space-time window combinations produce statistically significant results. This suggests that including civilian targeting by the other two groups merely adds random noise to the model. Estimates remain unbiased but efficiency goes down; resulting in larger standard errors, and fewer significant combiations. Accordingly, we argue that civilian targeting by a group can be explained by that group's specific strategic actions.




Temporal window in days
Spatial window in kilometers
Temporal window in days
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Temporal window in days
Spatial window in kilometers
Temporal window in days
Spatial window in kilometers

10 ACLED Events Only

This section presents results from models that test the effect of RUF territorial takeover on subsequent civilian targeting using only events included in ACLED. This means that the dependent variable is civilian targeting events that can be attributed to the RUF, but there are fewer civilian targeting events included in the data because events from GED are not merged in. The number of treatment and control events remains unchanged because they both come from ACLED.

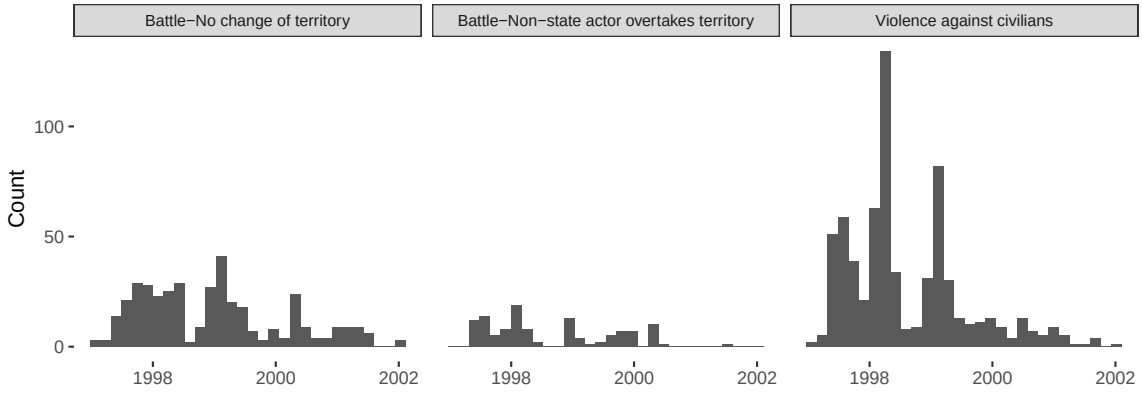
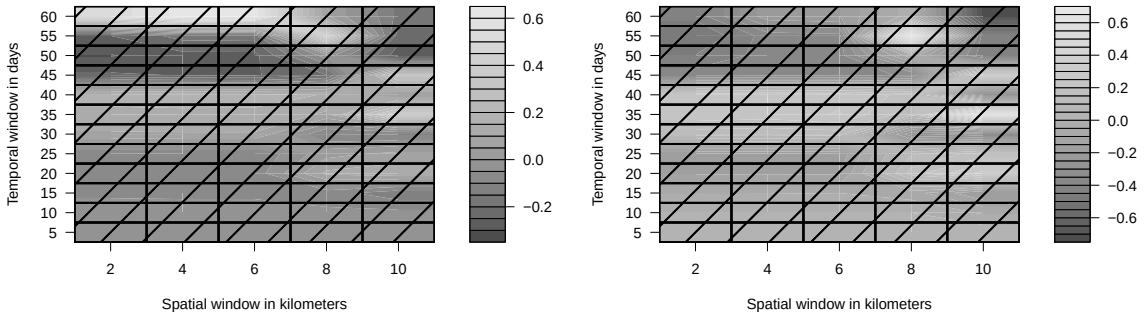
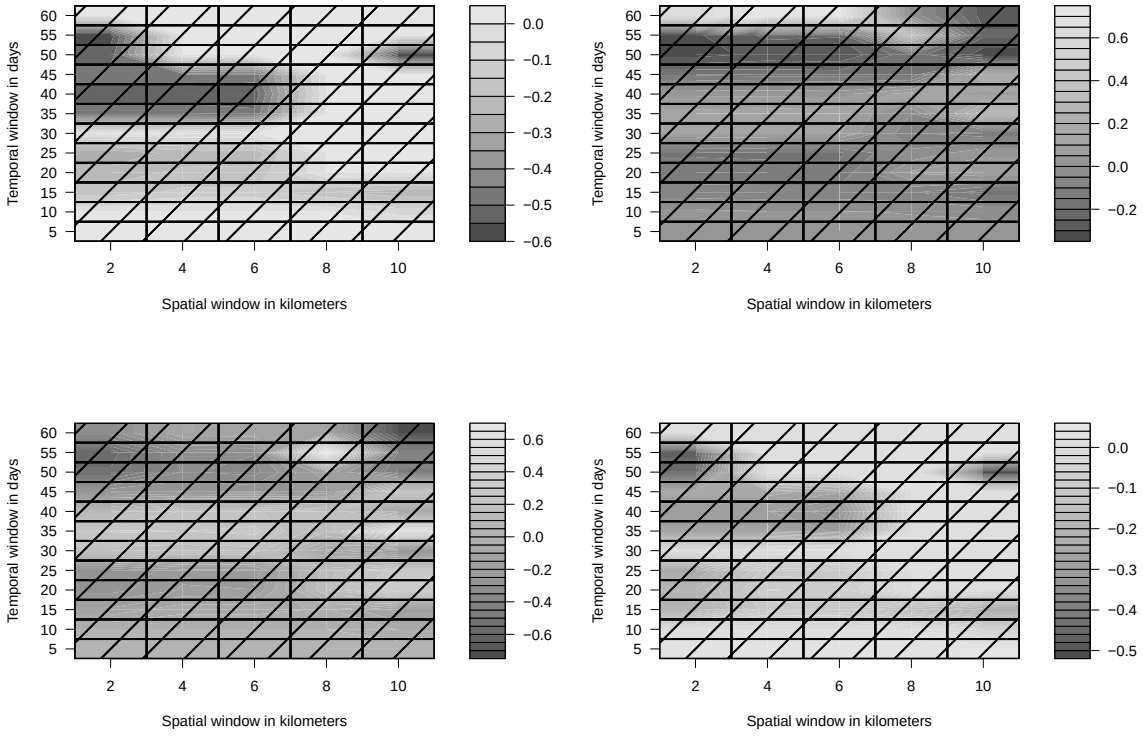


Figure 7: Frequency of treatment, control, and dependent events; only ACLED events.

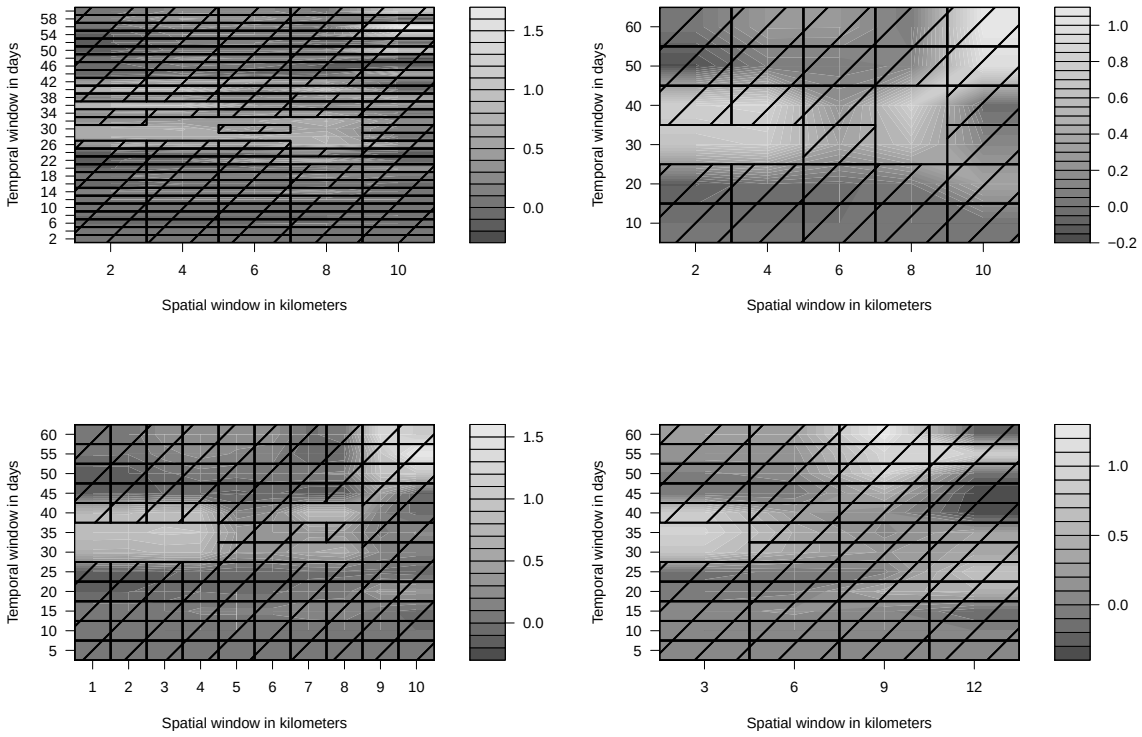
From upper left to bottom right, the MWA for ACLED events only was specified with (1) no weighting or controlling for previous events, (2) controlling for previous treatment and control events, (3) ommitting overlapping wakes, (4) weighted to account for unbalanced treatment, **(5) weighted to account for unbalance and controlled for previous events**, (6) weighted and ommiting of overlapping wakes. We do not find significant results if only ACLED data is used.




Temporal window in days
Spatial window in kilometers
Temporal window in days
Spatial window in kilometers
Temporal window in days
Spatial window in kilometers
Temporal window in days
Spatial window in kilometers

11 Alternate Space Time Windows

This section presents results from models that use finer and coarser spatial and temporal resolutions in the construction of the space time windows. The main model specification as presented in the research note was used (weighted to account for unbalanced treatment and controlling for previous treatment and control events). From upper left to bottom right, the windows were chosen the following: **(1) two day window**, **(2) ten day window**, **(3) 1km spatial window**, (4) **3km spatial window**.



12 Qualitative assessment of civilian victimzation

To complement our quantitative analysis, we provide a random extract of our data on civilian targeting as recorded by ACLED and GED to illustrate how the RUF interacted with civilians in their territory. The table below displays 25 dependent events of civilian victimization and provides a short description of what happened during this event based on news sources. In general, ACLED uses "(1) information from local, regional, national and continental media is reviewed daily; (2) NGO reports are used to supplement media reporting in hard to access cases; (3) regionally focused news reports and analyses are integrated to supplement daily media reporting" (see ACLED codebook 2017, 30). GED, on the other hand, uses "1. global newswire reporting 2. global monitoring and translation of local news performed by the BBC 3. secondary sources such as local media, NGO and IGO reports, field reports, books etc" (see Croicu/Sundberg 2017, 12). Specific sources are "Reuters News, Agence France Presse (in English), Associated Press, Xinhua (in English) as well as BBC Monitoring" (see Croicu/Sundberg 2017, 12). Overall, a broad variety of sources is used to code event data but these sources might be biased on various dimensions (e.g. urban-rural dimension) and we cannot account for this. The accounts below stem from No Peace Without Justice and only refer to RUF-conducted attacks against civilians.

Date	Description	Motive for civilian killings
15/02/1998	A man was killed with melted rubber after theft of diamond.	Punishment of non-compliance
16/03/1999	Fight between RUF factions led to civilian collateral damage.	Collateral damage
24/03/1998	RUF forces coming to Yeanoh shoot and killed civilians.	Unclear indiscriminate violence
15/11/1999	RUF abducted civilians; one civilian appointed to settle disputes.	Use of civilians to make revenue
23/06/2000	Peacekeeper accidentially bombed houses, RUF recruited 15 children.	Collateral damage/ Recruitment
27/05/1997	RUF killed civilian man in response to his complaints.	Punishment of non-compliance
01/05/1998	Abduction and displacement of civilians around territorial capture.	Unclear indiscriminate violence
01/01/2000	Abduction of more than 500 people to mine.	Use of civilians to make revenue
15/05/1998	Civilians accused of being government supporters were burnt.	Punishment of non-compliance
07/04/1998	"Operation No Living Thing" kills multiple civilians.	Unclear indiscriminate violence
30/06/2000	RUF trained young civilians for attacks and raped women.	Use of civilians to make revenue
04/04/1998	Civilian deaths during "Operation No Living Thing".	Unclear indiscriminate violence
01/01/1999	RUF killed almost all civilians in town.	Unclear indiscriminate violence
01/06/1998	Civilians captured.	Unclear indiscriminate violence
01/07/1997	RUF killed all young men, women, and children.	Unclear indiscriminate violence
31/12/1999	Abduction of NGO workers.	Unclear indiscriminate violence
31/01/1998	Killing of civilians during fightings between local rebels.	Collateral damage
15/05/1997	RUF killed accused government supporters.	Punishment of non-compliance
01/03/1998	Civilian deaths during "Operation No Living Thing".	Unclear indiscriminate violence
15/06/2000	RUF attacked and killed people to loot property.	Use of civilians to make revenue
30/09/1999	Existence of a "killing field".	Unclear indiscriminate violence
01/01/1999	Civilian was killed for "being rude" to RUF.	Punishment of non-compliance
15/11/1998	Killing of civilians that were accused of hating the RUF.	Punishment of non-compliance
24/10/2000	Exact incident unclear.	Unclear indiscriminate violence
15/12/1998	Looting of property and killing of civilians.	Unclear indiscriminate violence

Table 1: Qualitative assessment of events of civilian victimization

13 Matching Statistics

See full matching statistics on next page.

Time	Space	Estimate	P-value	Adj R2	Control events (pre)	Treatment events (pre)	L1 (pre)	CS (pre)	Control events (post)	Treatment events (post)	L1 (post)	CS (post)
5.00	2.00	0.06	0.14	0.47	519	131	0.77	14.40	159	55	0.36	100.00
5.00	4.00	0.06	0.14	0.47	519	131	0.78	13.90	156	54	0.37	100.00
5.00	6.00	0.06	0.14	0.48	519	131	0.78	13.60	156	53	0.36	100.00
5.00	8.00	0.06	0.11	0.45	519	131	0.78	13.40	156	52	0.37	100.00
5.00	10.00	0.05	0.24	0.70	519	131	0.79	12.80	148	50	0.37	100.00
10.00	2.00	0.00	1.00	0.00	519	131	0.81	10.40	117	44	0.30	100.00
10.00	4.00	0.00	1.00	0.00	519	131	0.82	10.00	114	43	0.31	100.00
10.00	6.00	0.00	1.00	0.00	519	131	0.82	9.80	114	42	0.30	100.00
10.00	8.00	0.00	1.00	0.00	519	131	0.83	9.70	108	41	0.31	100.00
10.00	10.00	0.00	1.00	0.00	519	131	0.84	8.90	100	38	0.29	100.00
15.00	2.00	0.06	0.62	0.12	518	130	0.84	10.20	134	55	0.49	61.30
15.00	4.00	0.12	0.31	0.15	518	130	0.85	9.60	133	54	0.51	57.10
15.00	6.00	0.12	0.31	0.15	518	130	0.85	9.40	133	53	0.50	57.10
15.00	8.00	0.20	0.10	0.30	518	130	0.86	8.80	121	49	0.49	60.70
15.00	10.00	-0.03	0.56	-0.01	518	130	0.88	8.00	106	44	0.48	62.70
20.00	2.00	-0.11	0.39	0.64	518	130	0.86	8.70	115	48	0.46	59.30
20.00	4.00	-0.00	0.99	0.69	518	130	0.87	8.10	114	47	0.47	55.00
20.00	6.00	-0.02	0.85	0.67	518	130	0.87	7.80	113	45	0.47	54.20
20.00	8.00	0.05	0.64	0.80	518	130	0.88	7.00	102	41	0.46	55.80
20.00	10.00	0.35	0.17	0.71	518	130	0.89	6.90	90	37	0.47	61.70
25.00	2.00	-0.17	0.19	0.70	518	130	0.87	7.80	107	45	0.46	58.20
25.00	4.00	-0.06	0.61	0.75	518	130	0.87	7.50	108	45	0.47	54.40
25.00	6.00	-0.08	0.49	0.74	518	130	0.88	7.10	107	43	0.47	53.60
25.00	8.00	-0.02	0.87	0.85	518	130	0.89	6.00	96	38	0.46	54.20
25.00	10.00	-0.07	0.46	0.05	518	130	0.90	5.70	84	33	0.46	59.50
30.00	2.00	0.66	0.02	0.45	517	130	0.84	9.60	99	44	0.43	60.70
30.00	4.00	0.72	0.01	0.44	517	130	0.84	9.80	100	45	0.43	58.60
30.00	6.00	0.34	0.11	0.37	517	130	0.84	9.00	108	48	0.49	46.40
30.00	8.00	0.55	0.01	0.48	517	130	0.86	7.80	99	43	0.51	45.20
30.00	10.00	0.14	0.36	0.10	517	130	0.88	6.60	88	36	0.50	48.10
35.00	2.00	0.88	0.01	0.40	517	130	0.85	9.20	92	41	0.44	61.10
35.00	4.00	0.90	0.01	0.39	517	130	0.85	9.40	93	42	0.45	58.90
35.00	6.00	0.39	0.08	0.59	517	130	0.86	8.30	90	38	0.46	56.60
35.00	8.00	0.36	0.18	0.32	517	130	0.87	7.10	99	44	0.57	37.70
35.00	10.00	0.21	0.63	0.24	517	130	0.89	6.00	101	41	0.64	29.30
40.00	2.00	0.79	0.10	0.25	517	130	0.86	8.90	98	43	0.51	50.00
40.00	4.00	0.82	0.09	0.25	517	130	0.86	9.10	99	44	0.52	48.50
40.00	6.00	0.22	0.47	0.61	517	130	0.86	8.10	97	41	0.53	44.60
40.00	8.00	0.79	0.05	0.27	517	130	0.88	6.90	106	53	0.63	28.40
40.00	10.00	-0.03	0.87	0.02	517	130	0.89	5.80	97	45	0.66	25.90
45.00	2.00	-0.17	0.55	0.22	516	130	0.86	8.60	97	41	0.50	50.00
45.00	4.00	-0.09	0.76	0.23	516	130	0.85	8.80	98	42	0.50	48.40
45.00	6.00	-0.08	0.81	0.19	516	130	0.86	8.00	97	40	0.51	45.30
45.00	8.00	-0.21	0.46	0.00	516	130	0.87	6.90	109	50	0.62	30.20
45.00	10.00	-0.10	0.61	0.00	516	130	0.90	5.30	93	46	0.66	26.20
50.00	2.00	-0.16	0.62	0.19	515	130	0.86	8.50	94	45	0.52	45.60
50.00	4.00	0.06	0.87	0.15	515	130	0.86	8.70	95	45	0.53	42.90
50.00	6.00	0.06	0.87	0.13	515	130	0.86	7.90	94	43	0.54	40.00
50.00	8.00	0.12	0.60	0.01	515	130	0.88	6.60	102	50	0.62	29.10
50.00	10.00	0.97	0.17	0.19	515	130	0.90	5.80	92	45	0.66	27.50
55.00	2.00	0.01	0.98	0.17	515	130	0.86	8.40	88	43	0.49	48.40
55.00	4.00	0.25	0.35	0.18	515	130	0.86	8.60	87	43	0.49	46.90
55.00	6.00	0.14	0.60	0.17	515	130	0.86	7.80	86	41	0.51	43.80
55.00	8.00	-0.06	0.87	-0.00	515	130	0.88	6.50	101	50	0.62	28.70
55.00	10.00	1.57	0.11	0.13	515	130	0.90	5.20	95	49	0.69	23.60
60.00	2.00	0.02	0.95	0.06	515	130	0.87	7.90	86	41	0.49	46.90
60.00	4.00	0.26	0.54	0.05	515	130	0.87	8.20	87	42	0.50	46.90
60.00	6.00	0.26	0.56	0.04	515	130	0.87	7.40	86	40	0.52	43.80
60.00	8.00	0.06	0.87	0.01	515	130	0.88	6.40	103	50	0.64	27.50
60.00	10.00	1.08	0.23	0.02	515	130	0.90	5.40	84	43	0.64	29.30

Table 2: Full matching statistics and representation of results

14 Computing Environment

- R version 3.6.2 (2019-12-12), `x86_64-w64-mingw32`
- Locale: `LC_COLLATE=English_United Kingdom.1252`, `LC_CTYPE=English_United Kingdom.1252`, `LC_MONETARY=English_United Kingdom.1252`, `LC_NUMERIC=C`, `LC_TIME=English_United Kingdom.1252`
- Running under: `Windows 10 x64 (build 18362)`
- Matrix products: default
- Base packages: base, datasets, graphics, grDevices, methods, stats, tcltk, utils
- Other packages: cem 1.1.19, corrplot 0.84, dplyr 0.8.3, ggplot2 3.2.1, lattice 0.20-38, MASS 7.3-51.4, mwa 0.4.1, raster 3.0-7, reshape2 1.4.3, rJava 0.9-11, sf 0.8-0, sp 1.3-2, xtable 1.8-4
- Loaded via a namespace (and not attached): assertthat 0.2.1, backports 1.1.5, class 7.3-15, classInt 0.4-2, codetools 0.2-16, colorspace 1.4-1, combinat 0.0-8, compiler 3.6.2, crayon 1.3.4, crosstalk 1.0.0, DBI 1.1.0, digest 0.6.23, e1071 1.7-3, evaluate 0.14, farver 2.0.3, fastmap 1.0.1, glue 1.3.1, grid 3.6.2, gtable 0.3.0, highr 0.8, htmltools 0.4.0, htmlwidgets 1.5.1, httpuv 1.5.2, jsonlite 1.6, KernSmooth 2.23-16, knitr 1.27, labeling 0.3, later 1.0.0, lazyeval 0.2.2, leaflet 2.0.3, lifecycle 0.1.0, lubridate 1.7.4, lwgeom 0.1-7, magrittr 1.5, MatchIt 3.0.2, meltt 0.4.0, mime 0.8, munsell 0.5.0, nlme 3.1-142, pillar 1.4.3, pkgconfig 2.0.3, plyr 1.8.5, promises 1.1.0, purrr 0.3.3, R6 2.4.1, randomForest 4.6-14, rappdirs 0.3.1, Rcpp 1.0.3, reticulate 1.14, rgdal 1.4-8, rlang 0.4.2, rmarkdown 2.1, scales 1.1.0, shiny 1.4.0, shinyjs 1.1, stringi 1.4.5, stringr 1.4.0, tibble 2.1.3, tidyr 1.0.0, tidyselect 0.2.5, tools 3.6.2, units 0.6-5, vctrs 0.2.1, withr 2.1.2, xfun 0.12, yaml 2.2.0, zeallot 0.1.0