

Online Appendix for: Cycles of Fire? Politics and Forest Burning in Indonesia

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A Details on data construction

A.1 Districts

Our starting point for district (*kabupaten*) boundaries is the 2014 version of the Database of Global Administrative Areas (GADM). We manually updated the data accounting for district splits by using a list of subdistricts from publicly available sources to obtain a georeferenced dataset of Indonesian districts in 2018.

A.2 Election data

Throughout, we use the finest district boundaries. Since districts are frequently split but never merge, these are the most recent, 2018, boundaries (Burgess et al., 2012). For districts that existed throughout the entire period, we can use all elections data directly. For the (child) districts that were created over this period through the process of redistricting, we identify parent districts. We assign pre-split elections in the parent district to the geographic area that will become the child district. This guarantees that we capture all relevant information on political cycles in the geographical units considered.

A.3 Land types

The geospatial information on land type classifications is from Global Forest Watch.

A.4 Ignitions

We use data on fire ignitions and burned area from Balboni, Burgess and Olken (2020). They use daily hotspot data from NASA's Moderate Resolution Imaging Spectroradiometer (MODIS) satellites at the level of 1km^2 pixels, and aggregate these to obtain contiguous fires tracked over time. Their dataset contains over 107,000 unique fires within the forest estate, covering all main forest islands of Indonesia for the period October 2000 to January 2016. The variable we use is a count of the number of fires detected within each district-year, at a resolution of 1km^2 .

A.5 Deforested Area

We use deforestation data from Hansen et al. (2013) covering the time period 2001 to 2014. This data has a resolution of 30×30 meters. We aggregate this data up to the 1km^2 level, so that the final outcome variable is a count of deforested 30×30 meter pixels within a 1km^2 pixel. The variable we use is thus deforested area within each district-year.

A.6 Slash and burn

We define a pixel to have experienced slash and burn in year t if (a) there was some deforestation in the pixel in year $t-1$ and (b) there was a fire in the same pixel in year t . This is motivated by the finding in Balboni, Burgess and Olken (2020) that fires are often set in the

year immediately following deforestation. This gives as an outcome variable the number of slash-and-burn-events in a district-year.

B Full regression results by land types

Table B1: Electoral cycle by land types – Ignitions, District and Year FE

	(1) All Forest	(2) Concession	(3) Oil Palm	(4) Fibre	(5) Logging	(6) Unleased	(7) Protected
Election date:							
In 2 years	0.104 (0.086)	0.092 (0.107)	-0.088 (0.112)	0.168 (0.143)	0.221 (0.190)	0.097 (0.098)	0.138 (0.107)
Next year	0.049 (0.080)	0.165 (0.091)	0.040 (0.116)	0.218 (0.115)	0.184 (0.212)	-0.049 (0.090)	-0.059 (0.100)
This year	-0.418 (0.120)	-0.378 (0.145)	-0.515 (0.194)	-0.328 (0.172)	-0.043 (0.255)	-0.441 (0.115)	-0.158 (0.119)
Last year	0.032 (0.083)	0.091 (0.107)	0.019 (0.152)	0.093 (0.110)	0.192 (0.163)	-0.049 (0.076)	0.078 (0.115)
Observations	4218	4218	4218	4218	4218	4218	4218
Mean of DV	17.63	9.04	4.00	4.13	0.90	6.92	3.37
Spatial FE	District						
Temporal FE	Year						
Joint p-value	<0.01	<0.01	<0.01	<0.01	0.157	<0.01	0.149
This vs. last:							
Difference	0.450	0.469	0.534	0.420	0.235	0.392	0.236
p-value	<0.01	<0.01	<0.01	<0.01	0.138	<0.01	0.059

Note: Standard errors clustered at 2018 district level in parentheses.

Table B2: Electoral cycle by land types – Total area burned, District and Year FE

	(1) All Forest	(2) Concession	(3) Oil Palm	(4) Fibre	(5) Logging	(6) Unleased	(7) Protected
Election date:							
In 2 years	0.163 (0.152)	0.160 (0.209)	-0.020 (0.148)	0.256 (0.300)	0.282 (0.240)	0.257 (0.147)	-0.173 (0.151)
Next year	-0.062 (0.143)	0.029 (0.199)	-0.116 (0.212)	0.037 (0.237)	0.180 (0.245)	-0.090 (0.143)	-0.226 (0.144)
This year	-0.541 (0.201)	-0.513 (0.251)	-0.370 (0.237)	-0.741 (0.313)	-0.055 (0.328)	-0.455 (0.182)	-0.420 (0.226)
Last year	-0.035 (0.151)	0.008 (0.204)	-0.014 (0.208)	-0.093 (0.231)	0.244 (0.213)	-0.075 (0.125)	-0.110 (0.182)
Observations	4218	4218	4218	4218	4218	4218	4218
Mean of DV	75.61	41.14	18.08	20.14	2.92	27.12	14.39
Spatial FE	District						
Temporal FE	Year						
Joint p-value	<0.01	0.012	0.054	<0.01	0.063	<0.01	0.331
This vs. last:							
Difference	0.506	0.521	0.356	0.648	0.299	0.380	0.310
p-value	<0.01	0.021	0.114	0.031	0.098	0.042	0.213

Note: Standard errors clustered at 2018 district level in parentheses.

Table B3: Electoral cycle by land types – Slash and burn, District and Year FE

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	All Forest	Concession	Oil Palm	Fibre	Logging	Unleased	Protected
Election date:							
In 2 years	0.066 (0.142)	0.066 (0.144)	-0.179 (0.117)	0.121 (0.203)	0.364 (0.204)	0.088 (0.170)	-0.056 (0.258)
Next year	0.018 (0.098)	0.022 (0.100)	-0.131 (0.102)	0.092 (0.137)	0.083 (0.209)	-0.118 (0.173)	0.029 (0.189)
This year	-0.364 (0.143)	-0.353 (0.145)	-0.587 (0.170)	-0.241 (0.182)	-0.141 (0.281)	-0.620 (0.197)	0.045 (0.268)
Last year	-0.025 (0.115)	-0.014 (0.115)	-0.094 (0.123)	-0.048 (0.132)	0.131 (0.191)	-0.288 (0.193)	0.033 (0.212)
Observations	4218	4218	4218	4218	4218	4218	4218
Mean of DV	3.46	3.30	1.30	1.68	0.33	0.15	0.11
Spatial FE	District						
Temporal FE	Year						
Joint p-value	<0.01	<0.01	<0.01	0.190	0.106	<0.01	0.973
This vs. last:							
Difference	0.338	0.339	0.494	0.192	0.272	0.332	-0.012
p-value	<0.01	<0.01	<0.01	0.119	0.196	0.020	0.956

Note: Standard errors clustered at 2018 district level in parentheses.

Table B4: Electoral cycle by land types – Ignitions, District and Province × Year FE

	All Forest (1)	Concessions			Logging (5)	Unleased (6)	Protected (7)
		All (2)	Oil Palm (3)	Fibre (4)			
Election date:							
In 2 years	0.020 (0.048)	0.018 (0.085)	-0.123 (0.095)	0.226 (0.100)	0.030 (0.251)	0.022 (0.069)	-0.100 (0.115)
Next year	-0.033 (0.056)	-0.000 (0.058)	0.025 (0.076)	0.062 (0.087)	-0.332 (0.233)	-0.066 (0.078)	-0.063 (0.113)
This year	-0.014 (0.075)	-0.013 (0.104)	-0.133 (0.108)	0.181 (0.119)	-0.237 (0.206)	-0.083 (0.090)	-0.078 (0.096)
Last year	0.138 (0.052)	0.163 (0.064)	0.122 (0.084)	0.189 (0.094)	0.021 (0.168)	0.044 (0.049)	0.083 (0.113)
Observations	4218	4218	4218	4218	4218	4218	4218
Mean of DV	17.63	9.04	4.00	4.13	0.90	6.92	3.37
Spatial FE	District	District	District	District	District	District	District
Temporal FE	Prov-year	Prov-year	Prov-year	Prov-year	Prov-year	Prov-year	Prov-year
Joint p-value	<0.01	<0.01	0.100	0.026	0.207	0.035	0.143
This vs. last:							
Difference	0.152	0.176	0.255	0.008	0.258	0.127	0.161
p-value	0.040	0.069	0.019	0.929	0.192	0.105	0.054

Note: Standard errors clustered at 2018 district level in parentheses.

Table B5: Electoral cycle by land types – Total area burned, District and Province × Year FE

	Concessions						
	All Forest (1)	All (2)	Oil Palm (3)	Fibre (4)	Logging (5)	Unleased (6)	Protected (7)
Election date:							
In 2 years	0.081 (0.120)	0.177 (0.177)	-0.078 (0.160)	0.614 (0.228)	0.034 (0.273)	0.140 (0.122)	-0.561 (0.162)
Next year	-0.118 (0.110)	0.012 (0.121)	-0.126 (0.164)	0.387 (0.174)	-0.542 (0.294)	-0.125 (0.128)	-0.278 (0.169)
This year	0.059 (0.144)	0.193 (0.206)	0.143 (0.216)	0.472 (0.283)	-0.327 (0.232)	-0.037 (0.153)	-0.378 (0.163)
Last year	0.190 (0.085)	0.279 (0.119)	0.134 (0.135)	0.465 (0.195)	0.048 (0.182)	0.059 (0.080)	-0.091 (0.189)
Observations	4218	4218	4218	4218	4218	4218	4218
Mean of DV	75.61	41.14	18.08	20.14	2.92	27.12	14.39
Spatial FE	District	District	District	District	District	District	District
Temporal FE	Prov-year	Prov-year	Prov-year	Prov-year	Prov-year	Prov-year	Prov-year
Joint p-value	0.016	0.037	0.353	0.087	0.042	0.013	<0.01
This vs. last:							
Difference	0.130	0.087	-0.009	-0.007	0.374	0.096	0.287
p-value	0.374	0.652	0.969	0.970	0.082	0.450	0.044

Note: Standard errors clustered at 2018 district level in parentheses.

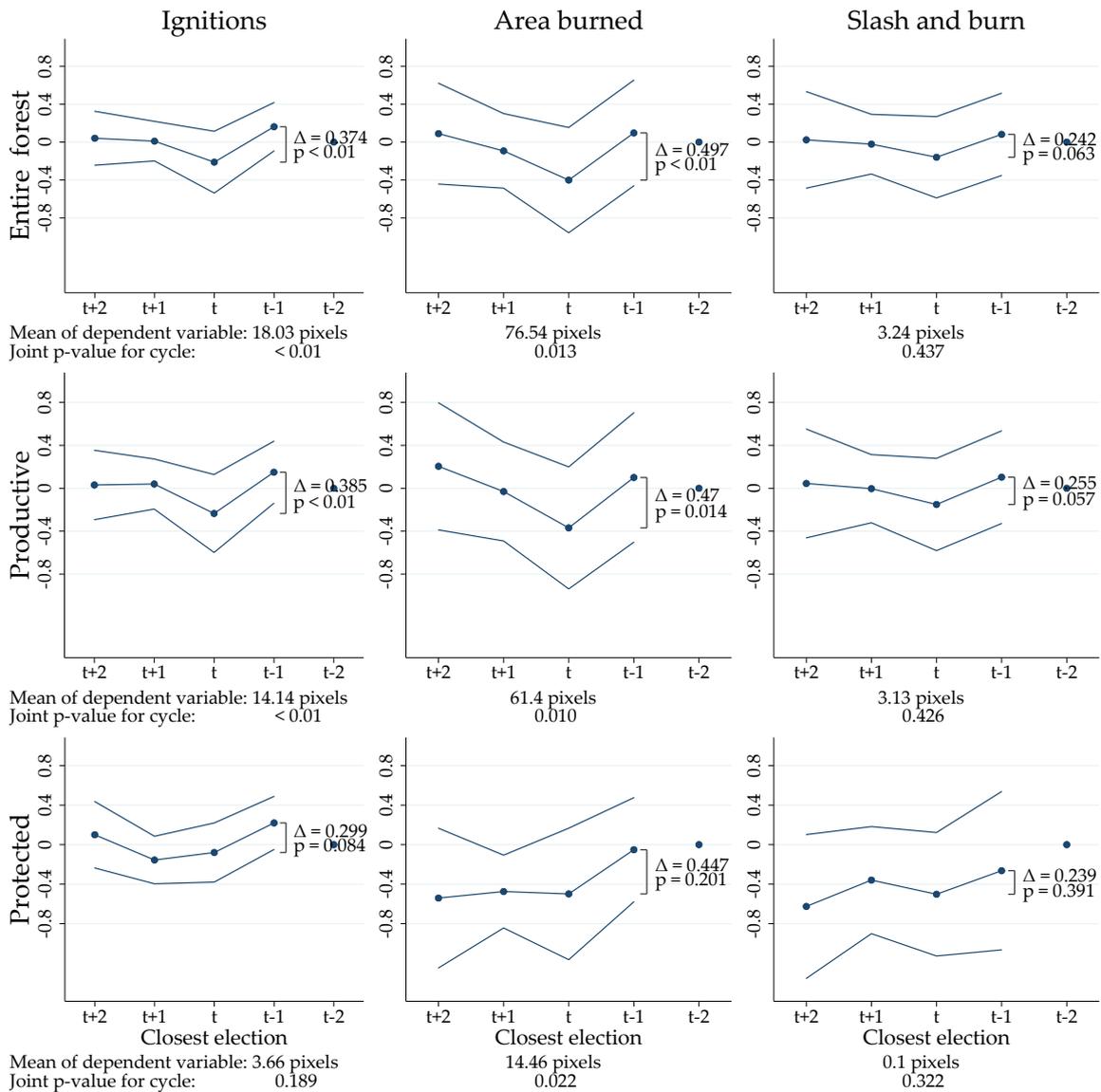
Table B6: Electoral cycle by land types – Slash and Burn, District and Province × Year FE

	Concessions						
	All Forest (1)	All (2)	Oil Palm (3)	Fibre (4)	Logging (5)	Unleased (6)	Protected (7)
Election date:							
In 2 years	0.078 (0.098)	0.076 (0.101)	-0.081 (0.113)	0.269 (0.115)	-0.021 (0.255)	0.045 (0.163)	-0.222 (0.308)
Next year	-0.013 (0.084)	-0.009 (0.086)	-0.090 (0.122)	0.167 (0.100)	-0.399 (0.281)	-0.314 (0.235)	-0.349 (0.279)
This year	0.001 (0.111)	0.013 (0.116)	-0.155 (0.118)	0.268 (0.127)	-0.509 (0.191)	-0.440 (0.219)	0.158 (0.333)
Last year	0.094 (0.066)	0.100 (0.067)	0.077 (0.107)	0.129 (0.090)	-0.163 (0.192)	-0.131 (0.195)	-0.518 (0.204)
Observations	4218	4218	4218	4218	4218	4218	4218
Mean of DV	3.46	3.30	1.30	1.68	0.33	0.15	0.11
Spatial FE	District	District	District	District	District	District	District
Temporal FE	Prov-year	Prov-year	Prov-year	Prov-year	Prov-year	Prov-year	Prov-year
Joint p-value	0.083	0.124	<0.01	0.117	0.055	<0.01	0.022
This vs. last:							
Difference	0.094	0.086	0.232	-0.138	0.346	0.309	-0.676
p-value	0.389	0.448	0.091	0.109	0.175	0.019	0.025

Note: Standard errors clustered at 2018 district level in parentheses.

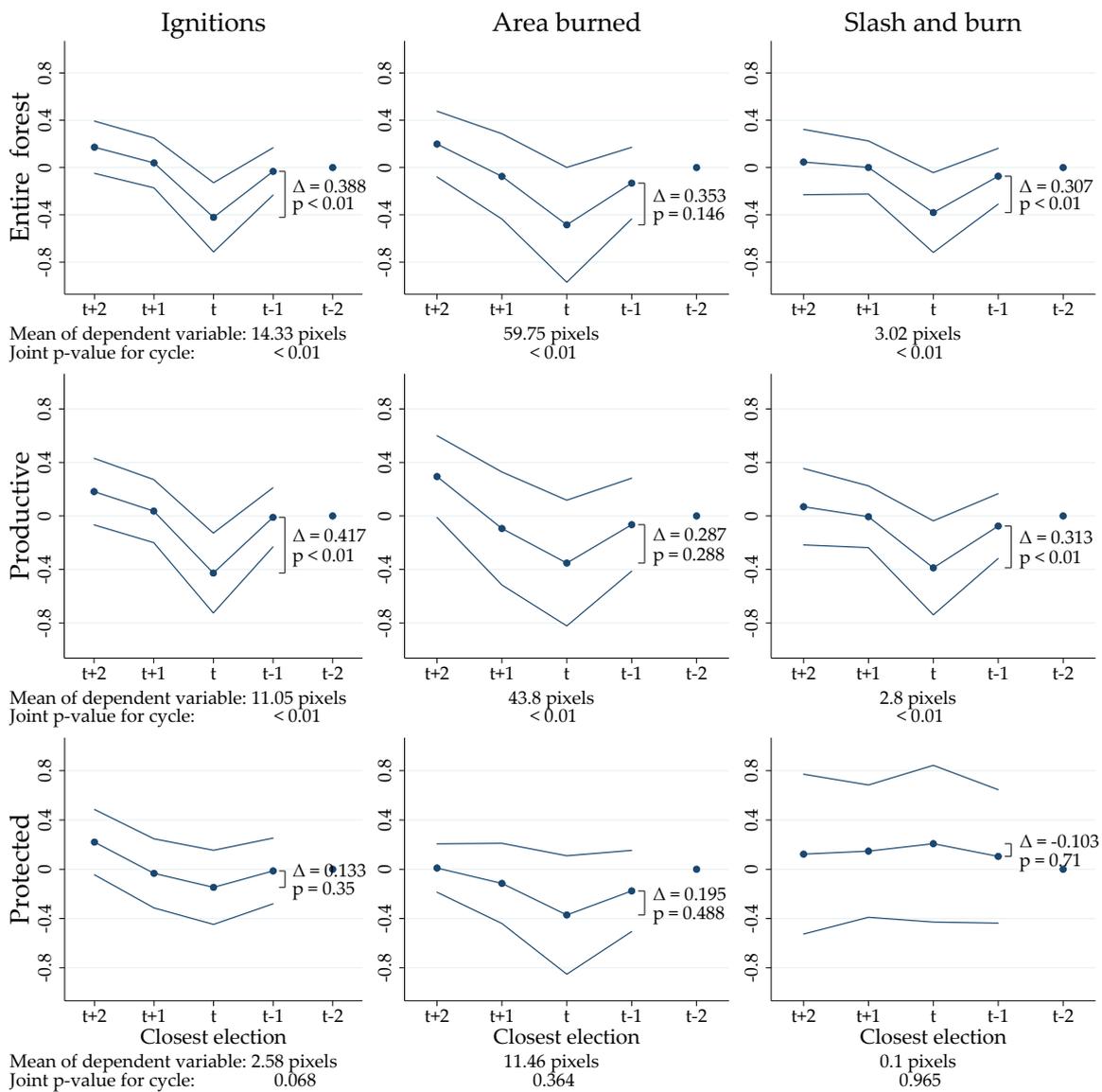
C Robustness for samples depending on splits

We investigate whether the results are driven by either districts that were created by a split during our study time frame ("child districts"), or by districts that experienced a decrease in their area through a part of it splitting off ("parent districts"). The political incentives and dynamics might be very different in these configurations. Figures C1 and C2 show the main results when excluding children districts or parent districts, respectively. Our main result remains robust to dropping either of these from the sample.



Notes: The figures show the coefficients from the Poisson model with 95% confidence bands. The bracket shows the difference between the coefficients on election last year and this year and the p-value of a test of their equality.

Figure C1: Electoral cycles in forest fires: No split children



Notes: The figures show the coefficients from the Poisson model with 95% confidence bands. The bracket shows the difference between the coefficients on election last year and this year and the p-value of a test of their equality.

Figure C2: Electoral cycles in forest fires: No parent districts

D References

- Balboni, Clare, Robin Burgess, and Benjamin A Olken.** 2020. "The Origins and Control of Forest Fires in the Tropics." mimeo.
- Burgess, Robin, Matthew Hansen, Benjamin A Olken, Peter Potapov, and Stefanie Sieber.** 2012. "The Political Economy of Deforestation in the Tropics." *The Quarterly Journal of Economics*, 127(4): 1707–1754.
- Hansen, Matthew C, Peter V Potapov, Rebecca Moore, Matt Hancher, et al.** 2013. "High-Resolution Global Maps of 21st-Century Forest Cover Change." *Science*, 342(6160): 850–853.