

Online Appendix: Land, opportunism, and displacement in civil wars: Evidence from Colombia

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1 HOUSEHOLD SURVEY

1.1 Source of Data, Sampling Frame

Data used in the rural household analysis come from a survey collected in March and June of 2017 as part of USAID’s performance evaluation of the Land and Rural Development Programme (LRDP), which had been operating in the following departments/regions: Cauca, Tolima, Meta, Cesar, and Montes de Maria. The LRDP is a multi-faceted development program that include efforts to address challenges in rural areas bearing on land restitution for displaced victims of the war, the formalization of land tenure, and broader rural development. Program interventions varied, but largely focused on improving bureaucratic capacity and cooperation among government agencies that interact with these policy areas. More details of the program are available in Section 2 of ([Huntington et al., 2017](#)).

The survey data used in this paper come from the quantitative portion of the performance evaluation of the LRDP, which aimed to assess the effectiveness of the LRDP at the halfway point of its lifespan. As part of this evaluation, approximately 1,548 rural households were selected across 50 municipalities that included locations where the LRDP had been operating and other, comparable municipalities. The decision-making process underlying where the LRDP chose to operate involved a number of factors, but largely centered on need related to restitution and formalization, conflict-exposure, low development, and rurality. In terms of selecting municipalities for evaluation, a subset of the municipalities where the LRDP had been active were randomly selected, and then using data on municipal characteristics, a set of comparable municipalities were identified through matching. The result is a set of

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municipalities characterized by high rurality, high exposure to conflict, and a high incidence of poverty. More details available in Annex 1 of (Huntington et al., 2017).

Moving from the municipality to the household, rural parts of the municipality were emphasized for data collection, in particular *veredas* (or ‘villages’) within municipalities. Village selection was largely random, though in some municipalities where the LRDP was active specific villages were chosen because of their relevance to the LRDP program. Roughly 15 households in each village were surveyed. Enumerators performed random-walks through the village until the specified number of surveys were completed in each village. In terms of sample diversity, the sample frame involved quotas on gender and age, though not for ethnicity. That said, many respondents do belong to minority ethnic groups in Colombia, especially Afro-Colombian (10% of sample) and indigenous (13% of sample). More details available in Annex 1 of (Huntington et al., 2017).

Once in the field, there were a few unexpected constraints. In a small number of cases, cost constraints prevented traveling to very remote or poorly connected villages. There were also a few instances where it was deemed too dangerous to survey a particular village. In these instances, a new village was chosen at random that had a high chance of having similar characteristics. These constraints are not out of the ordinary for survey work in rural Colombia. More details on page 239 of (Huntington et al., 2017).

The resulting data captures a random sample (though I note a few constraints, above) of households in rural and highly conflict-afflicted regions of the country. Importantly for the purposes of the study, the survey covered places both with and without palm-oil production. However, the survey was not designed to be representative of rural areas nor conflict areas writ large. The survey is instead representative of the municipalities that participated in the performance evaluation of the LRDP, which as noted, skew poorer, more rural, and with more extensive histories of conflict. Thus, while the sampling frame has some key advantages for studying the effects of palm-oil, caution must be used in generalizing the results to the national-level.

Figures A.1 and A.2 present distributions of sample characteristics in the survey and from the last two years of the rural portion of data from Colombia collected by LAPOP, respectively. In contrast to the survey, the item used to measure displacement in LAPOP asks respondents whether a *family member* was displaced during the conflict, so direct comparison is not perfect. Overall, there is a fair amount of overlap in these distributions, though the sample (by design) captures a much larger proportion of people who were displaced.



Figure A.1: Sample respondent characteristics from survey.

Implementation, Data Quality, and Ethical Considerations

Participants took the survey in or near their home. An informed consent form was read to participants outlining the purpose of the study, steps taken to protect the confidentiality of their responses, and potential risks faced by participating. Participants were assured that their protection was voluntary. They were also informed that their responses would be shared through public publication in a way that protected their identity. Participants received no benefit or expectation of participation and were instructed that they could end the interview at any time. Enumerators administered the survey using tablets, and the interview lasted approximately 45 minutes to an hour. Participants who agreed to participate gave consent orally, and consent was recorded in the tablet. The survey included modules on topics in restitution, land tenure, land formalization policy, and other questions bearing on rural development. The full instrument is available in Appendix 3 of (Huntington et al., 2017).

In terms of data quality, enumerators received four days of training on best practices in survey collection, including sampling methodology, and electronic data collection using

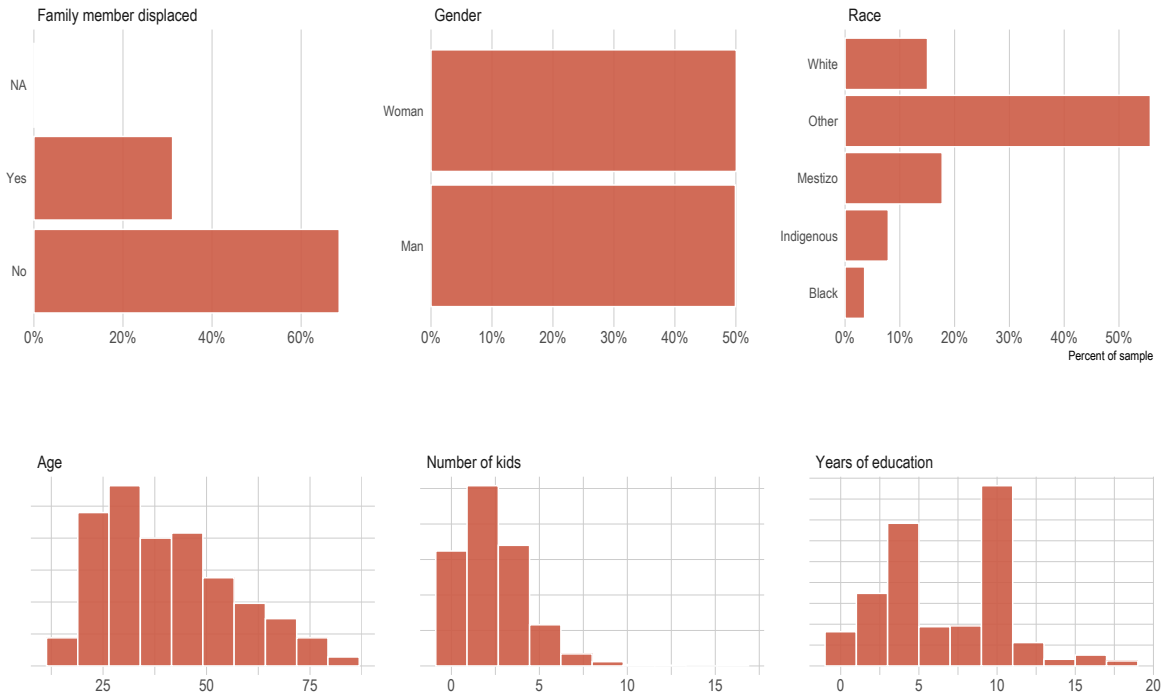


Figure A.2: Respondent characteristics from rural portion of LAPOP Colombia surveys in 2018, 2019.

platforms and Survey CTO (the survey platform selected for electronic data collection). On the field, enumerators received spot-checks by supervisors, phone verification by the survey team of answers with a random subset of participants, and data quality checks by the performance evaluation team (e.g., plausible length of time answering questions; geo-location while collecting survey). More details on page 102 of ([Huntington et al., 2017](#)).

Data collection received IRB approval from Duke University in March 2017 (#E0060). I have no reason to expect the survey adversely affected participants, though I recognize the difficulty people can face in discussing painful memories. Given that the survey instrument touches on sensitive subjects, the survey procedure involved ensuring that others were not present during the interview who might overhear, to the best extent possible. Enumerators also received training on ethics in survey research and research with human subjects, which explicitly included training on not ‘pushing’ participants for answers on questions deemed sensitive. Participants were not paid or compelled to participate in the survey. The survey also did not differentially benefit or harm any particular group. Finally, given the setting, some participants can be considered vulnerable or marginalized. As a result, great care was taken to remove identifying information from the data and ensure respondent anonymity

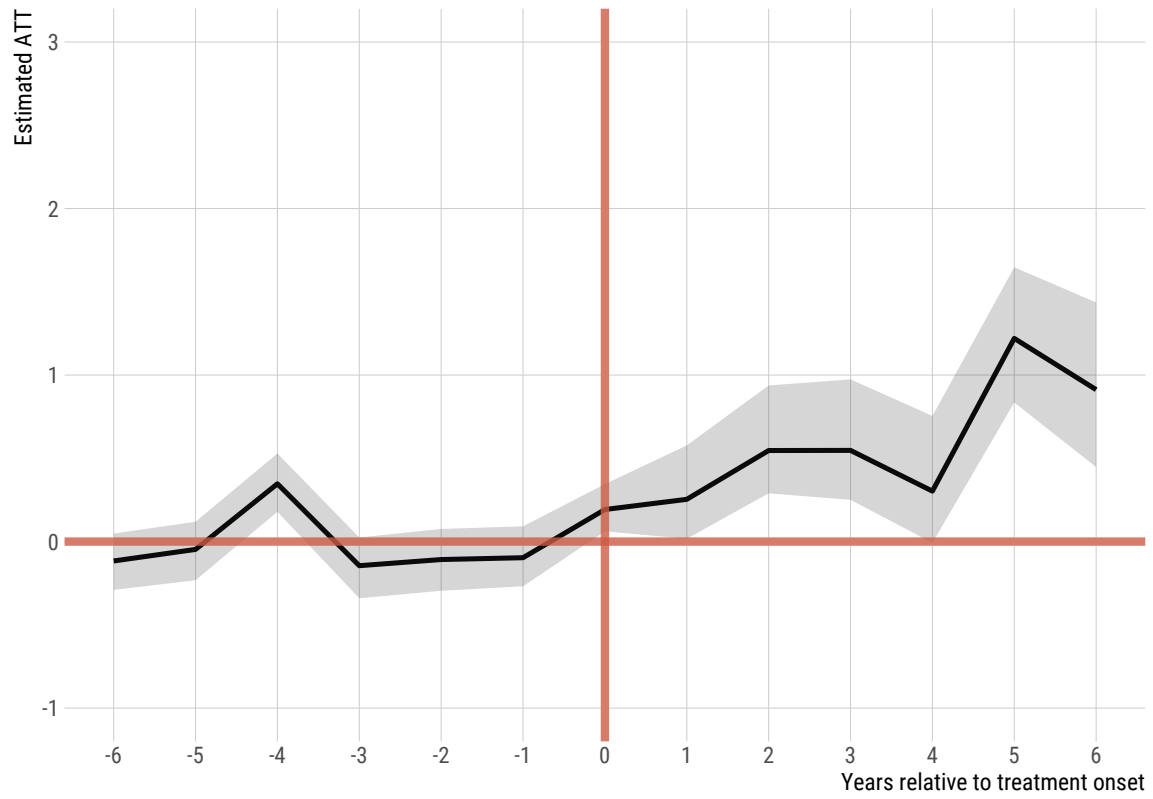


Figure A.3: Results using generalized synthetic control method.

both in data storage and analysis.

2 ADDITIONAL RESULTS

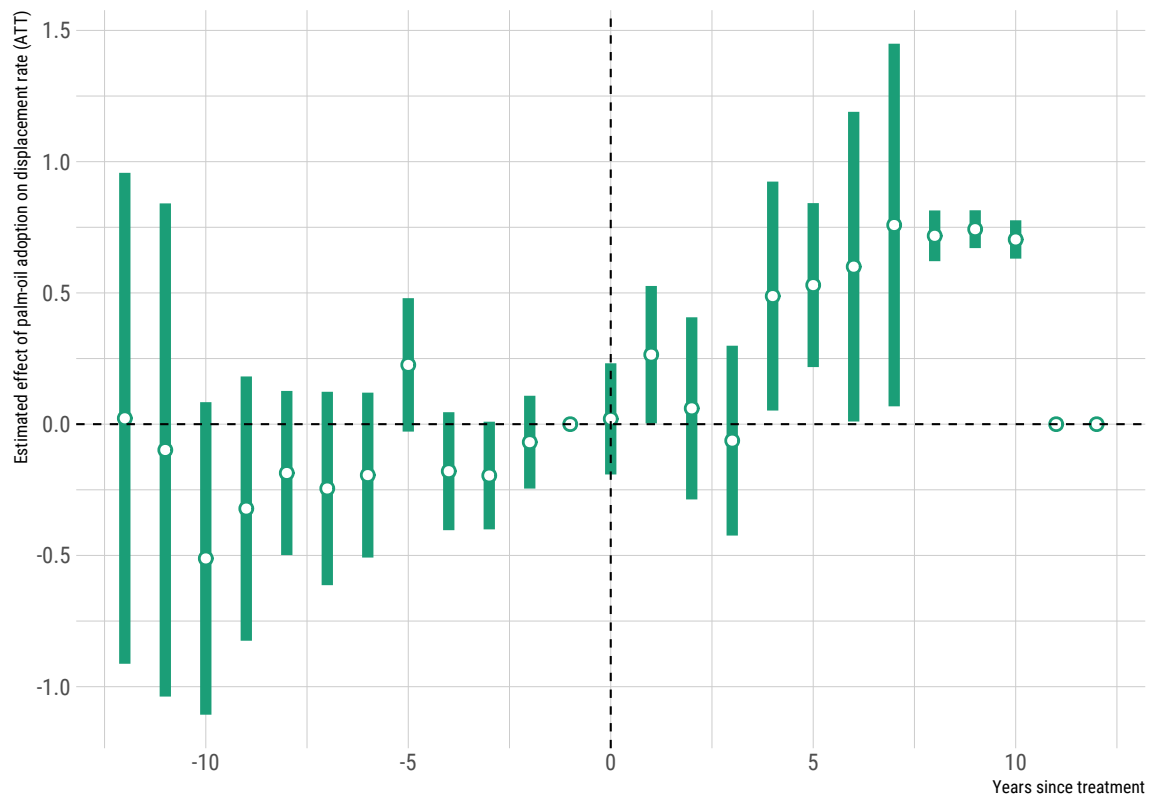


Figure A.4: Results using methodology in Sun and Abraham (2020).

Table A.1: Negative binomial hierarchical model with random intercepts for year and municipality. All non-binary covariates standardized to have mean 0 and standard deviation of 1.

	<i>Dependent variable:</i>
	Count of displaced people
Intercept	4.685*** (0.355)
Palm-oil	0.571*** (0.174)
FARC attacks	0.098*** (0.015)
Coca	0.312*** (0.093)
Population	−0.025 (0.040)
Municipal poverty	0.630*** (0.146)
Distance to Bogota	0.217 (0.137)
Violent conflicts during 'La Violencia'	0.539 (0.351)
Observations	1,971
<i>Note:</i>	*p<0.1; **p<0.05; ***p<0.01

Table A.2: Alternative modeling specifications. Model 1 includes year interacted controls for municipal population and poverty. Model 2 uses time-varying guerrilla attacks as the outcome variable.

	<i>Dependent variable:</i>	
	Displacement rate (inv-sine) (1)	Guerrilla attacks on civilians (inv-sine) (2)
Palm-oil plantation	0.331*** (0.113)	0.036 (0.070)
Observations	14,192	14,192

Note:

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

Table A.3: Survey model results.

	<i>Dependent variable:</i>					
	Displaced? Logit	Displaced by force Logit	Displaced for land Logit	Displaced by paramilitaries Logit	Restitution opponent? Logit	Amount of land OLS
Intercept	-0.262 (0.345)	-0.421 (0.407)	-0.908 (0.582)	-0.097 (0.503)	1.433 (1.368)	6.370 (11.506)
Palm oil	0.320** (0.127)	0.342** (0.147)	0.338* (0.196)	0.544*** (0.176)	0.513 (0.437)	7.601* (4.063)
Age	0.006 (0.004)	0.005 (0.005)	0.004 (0.007)	0.007 (0.006)	-0.029 (0.018)	0.336** (0.141)
Education	-0.024 (0.015)	-0.035* (0.018)	-0.034 (0.025)	-0.001 (0.021)	-0.113* (0.066)	0.270 (0.480)
Has child	0.198*** (0.062)	0.259*** (0.073)	0.130 (0.097)	0.204** (0.085)	-0.128 (0.225)	4.651** (1.952)
Sex	-0.130 (0.106)	-0.276** (0.125)	-0.133 (0.179)	-0.427*** (0.156)	-0.239 (0.404)	-2.767 (3.583)
Household size	-0.020 (0.036)	-0.054 (0.043)	-0.068 (0.061)	-0.054 (0.052)	-0.025 (0.130)	-1.801 (1.202)
Sample: Observations	Full 1,522	Full 1,209	Displaced 731	Displaced 731	Seeking Restitution 144	Displaced 700

Note:

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

Table A.4: Effect of palm-oil growth on wages. Model includes municipal and year fixed effects, and controls for: respondent gender, marital status, education, and a time-varying measure of municipal coca cultivation.

	<i>Dependent variable:</i>
	Respondent wages, logged
Palm oil plantation	0.085** (0.042)
Woman	-0.104*** (0.018)
Married	0.105*** (0.010)
Education (yrs)	0.060*** (0.003)
Coca	0.074* (0.039)
Observations	25,112
R ²	0.185
Adjusted R ²	0.176
Residual Std. Error	0.658 (df = 24859)
<i>Note:</i>	*p<0.1; **p<0.05; ***p<0.01

Table A.5: Regression results for current municipal restitution need. Outcomes are the estimated amount of land registered for restitution according to different databases, measured in thousands of hectares. Data source: Professor Ana Maria Ibañez of Universidad de los Andes.

	<i>Dependent variable:</i>			
	Full sample (1)	Excluding SNR (2)	Excluding SNR, Catastro (3)	Inverse-sine trans. (4)
Intercept	-16.674 (16.749)	-17.768 (13.392)	-13.949 (11.559)	-1.582** (0.719)
Palm presence	11.874*** (2.223)	8.474*** (1.778)	7.069*** (1.534)	0.898*** (0.095)
Poverty (NBI)	0.055 (0.049)	0.058 (0.039)	0.053 (0.034)	0.005** (0.002)
Coca	1.876 (3.181)	1.695 (2.543)	0.789 (2.195)	1.345*** (0.136)
Distance to Bogota	-0.008* (0.005)	-0.006* (0.004)	-0.006* (0.003)	-0.00001 (0.0002)
FARC presence	0.033 (0.086)	0.035 (0.069)	0.023 (0.060)	0.022*** (0.004)
AUC presence	0.096 (0.066)	0.084 (0.053)	0.069 (0.046)	0.018*** (0.003)
Size of area	0.539*** (0.023)	0.466*** (0.019)	0.426*** (0.016)	0.008*** (0.001)
Rural population (%)	3.608 (3.492)	2.453 (2.792)	2.109 (2.410)	0.055 (0.150)
Altitude (log)	0.266 (0.509)	0.071 (0.407)	-0.00004 (0.351)	-0.033 (0.022)
Municipal GDP per capita (log)	0.240 (1.003)	0.513 (0.802)	0.413 (0.692)	0.040 (0.043)
Average land plot size (logged)	3.149*** (0.719)	2.434*** (0.575)	1.806*** (0.496)	0.424*** (0.031)
Observations	1,047	1,047	1,047	1,047
R ²	0.483	0.513	0.527	0.634
Adjusted R ²	0.477	0.508	0.522	0.630

Note:

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

2.1 *The Endorsement Experiment*

Three endorsement experiments were administered to measure respondent support for the FARC. These experiments were administered out of concern that respondent fear, social desirability bias, and non-random refusal to participate would bias measures of rebel support (Lyall, Blair and Imai, 2013). Policy questions were selected to be: a) plausible or existing policy questions in domestic Colombian politics; b) relevant to the rural context, to maximize probability that respondents have opinions or intuitions about them; c) policies that the FARC either has or would plausibly endorse.

The mechanics of the endorsement experiment is as follows: a randomly-selected half of all respondents are asked to express their opinion toward a policy, which they are told has been endorsed by the FARC (treatment group). The other respondents are asked for their opinion, without the FARC endorsement (control group). Higher levels of support under the treatment condition is interpreted as evidence of support for the endorsing actor.

The three policy questions are the following:

- A recent proposal [TREATMENT: by the FARC] calls for shifting away from importing foodstuffs from foreign countries and instead producing food domestically, so that the majority of food consumed in the country is made by Colombians. How do you feel about this proposal?
- A recent proposal [TREATMENT: by the FARC] calls for redistributing land from large landholders, in order to give landless peasants greater access to land. The proposal would mean that anyone who owns very large tracts of land might be subject to having some of it taken away. How do you feel about this proposal?
- A recent proposal [TREATMENT: by the FARC] calls for the legalization of coca cultivation in Colombia. This proposal would allow coca cultivators to sell coca legally, and has been argued will end the drug trade and the need for counter-narcotics efforts on the part of the state. How do you feel about this proposal?

To analyze whether underlying support for the FARC varies substantially across palm and non-palm areas, I simply interact the treatment indicator with an indicator of whether the respondent is from a palm-growing region.

Table A.6: Endorsement experiment results.

	<i>Dependent variable:</i>		
	Land Reform	Coca Legalization	Food Policy
	(1)	(2)	(3)
Constant	3.473*** (0.047)	2.588*** (0.044)	4.043*** (0.039)
Treatment	-0.091 (0.066)	-0.076 (0.062)	0.001 (0.056)
Palm oil	0.173* (0.100)	-0.219** (0.095)	0.193** (0.085)
Palm oil X Treatment	-0.152 (0.142)	0.069 (0.135)	-0.200* (0.120)
Observations	1,499	1,470	1,515

Note:

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

REFERENCES

- Huntington, Heather, Nicole Walter, David Varela, Ana Montoya and Juan F. Tellez. 2017. Mid-Term Performance Evaluation of the Land and Rural Development Program. Technical report The United States Agency for International Development.
- Lyall, Jason, Graeme Blair and Kosuke Imai. 2013. “Explaining support for combatants during wartime: A survey experiment in Afghanistan.” *American Political Science Review* 107(04):679–705.
- Sun, Liyang and Sarah Abraham. 2020. “Estimating dynamic treatment effects in event studies with heterogeneous treatment effects.” *Journal of Econometrics* .