December 31, 2023

TITLE: Land Reform versus Repression in Counterinsurgency:
Evidence from El Salvador
JCR-21-0247.R1

SUBJECT: Tables 2, 3, 4 estimated with standard errors clustered on *municipio*

One reviewer pointed out that the significant Breusch-Pagan test suggests that there is an issue of heteroskedasticity in the models, which would suggest clustering standard errors on the *municipio* unit of analysis. In the final manuscript, we did not cluster standard errors on *municipio* because the STATA "sureg" command does not allow that. After some more research, we found that some researchers use the postestimation command "suest" to generate models with clustered standard errors. To generate these models, we first estimate separate regression equations for each model SUR model. Then, we use "suest" command that includes both both regression models and clusters them on the *municipio* unit of analysis. The following example of how we do this is below:

```
reg y x1 x2 x3
est store Model 1
reg y x4 x5 x6
est store Model 2
suest Model 1 Model 2, cluster(departmento)
```

A discussion of this issue with SUR models in STATA and the solution we adopted can be found at

https://www.statalist.org/forums/forum/general-stata-discussion/general/1398586-sureg-estimation-with-robust-standard-errors

We implemented this strategy, clustering standard errors on *municipio,* for Tables 2, 3, 4 from the paper "Land Reform versus Repression in Counterinsurgency: Evidence from El Salvador". The resulting tables are at the end of this memo.

The findings in these tables do not alter the conclusions presented in the revised version of the manuscript. To the extent that there are differences, those differences strengthen our conclusions:

There is still robust support across all three elections for Huntington's "land reform as counterinsurgency" proposition (H1a). With standard errors clustered on *municipio*, we still find "a significant positive relationship between the share of households receiving Phase III land reform benefits and the share of votes for the pro-reform PDC: the larger the share of Phase III beneficiaries in a *municipio*, the larger the share of the vote for the PDC relative to right-wing parties." As with the original Tables, this finding holds whether or not control variables are included in the models.

There is still robust support for our qualification (H2a) that “right-wing violence can weaken the popular support for the regime that land reform otherwise would generate. For all three elections, the number of victims of right-wing violence is negatively associated with the share of votes for the PDC. The more death squad killings there were in a municipio, the lower the share of votes for the PDC relative to other parties. This relationship holds across all three elections and regardless of whether or not control variables are included in the equations.”

Our findings of the different effects of Phase I versus Phase III of the land reform program still hold: “For all three elections, the share of households receiving Phase I benefits had no relationship to the relative share of votes for PDC or the relative share of blank and defaced ballots.” While the sole exception to this conclusion in the original tables was for the PDC vote share for the 1984 election with no controls, in the tables with standard errors clustered on *municipio*, the sole exception is the 1982 election with no controls. As with the exception in the original tables, the exception in the tables below is significant only for a two-tailed test ($p < .10$). Otherwise, the null finding on the effects of Phase I holds regardless of whether or not controls are included.

The findings regarding the impact of rebel violence are more robust in these new tables than in the original tables. In the original tables, “Rebel violence had a statistically significant impact on the relative vote share for the PDC only in the 1984 presidential runoff election (Table 4) and only in the version with no control variables; once controls were added, the relationship failed to achieve statistical significance even for a two-tailed test.” When standard errors are clustered on *municipio*, we find a statistically significant relationship between the number of rebel attacks and the PDC vote share for all three elections, both with and without controls. These findings add strength to our conclusion that, contrary to H3a, the effect of rebel violence “is in the opposite direction of our expectations: a higher number of rebel attacks was associated with an increase in the vote share for the reformist party (PDC) relative to that of the other parties on the ballot. Our expectation was that rebel violence would intimidate voters into withholding support for the PDC. To the extent that it had any effect on voter behavior, it increased their likelihood of voting for the PDC versus right- wing parties.”

With respect to the relationship between rebel violence and the share of blank and defaced ballots, we found a significant positive relationship only in the 1984 presidential runoff election. In the new models with standard errors clustered on *municipio*, we found significant positive relationships between the number of rebel attacks and *both* the share of votes for the PDC *and* the share of blank and defaced ballots in the 1982 and 1984 runoff elections (with and without controls). In the 1984 general election, we found a positive relationship between the number of rebel attacks and the share of votes for the PDC but not for the share of blank and defaced ballots.

The fairly robust positive relationship between the number of rebel attacks and the share of votes for the PDC *and* the share of blank and deface ballots suggests that rebel violence did affect voter behavior: the higher the number of rebel attacks in a municipio, the larger the share of votes for the PDC *and* the larger the share of blank and defaced

ballots. More simply, the larger the number of rebel attacks in a municipio, the lower the share of votes for the “old guard” parties of the right. This suggests that higher levels of rebel violence may have weakened the ability of the right to intimidate voters into voting for the parties that opposed land reform and democratization.

TABLES WITH ROBUST STANDARD ERRORS CLUSTERED ON MUNCIPIO

Table 2. 1982 Constituent Assembly Election: Land reform, violence, and support for PDC vs. FMLN

	MODEL 1		MODEL 2	
Variables	**PDC vote share**	**Blank/defaced vote share**	**PDC vote Share**	**Blank/defaced vote share**
Death Squad Killed 79-82	***-.0011851[c]***	-.0006879	***-.0012199[c]***	-.0010112
	(.0006009)	(.0012244)	***(.0005851)***	(.0012778)
Rebel Attacks 79-82	***.0011848[a]***	***.0012675[b]***	***.0008117[c]***	***.0008741[d]***
	(.0002987)	***(.0004326)***	***(.0003351)***	***(.0004955)***
% Phase I beneficiaries	***.0093297[d]***	.0014817	.0085896	.0034865
	(.0052845)	(.0035254)	(.0053285)	(.0038179)
% Phase III beneficiaries	***.1104369[a]***	***.0937412[a]***	***.1140343[a]***	***.100232[a]***
	(.0275796)	***(.0187776)***	***(.0339704)***	***(.0216823)***
% smallholders			.0059665	-.0115837
			(.0220635)	(.0174209)
% Lease with promise to sell			.0273405	-.0000274
			(.0257066)	(.0194685)
% Simple Lease			.0035265	-.0130191
			(.023053)	(.0183595)
% Mixed: own/lease			.003769	-.0139928
			(.0216625)	(.0169128)
% resident workers (*colonos*)			.0063998	-.0133156
			(.0224216)	(.017753)
% Mixed: free/lease			.0221412	-.0101025
			(.02328)	(.0191514)
% Free Labor			-.0020245	***-.035277[c]***
			(.0224716)	***(.0179387)***
Log(population,1971)	***.2290831[a]***	***.1586491[c]***	***.320517[a]***	***.238256[c]***
	(.0487504)	***(.064478)***	***(.0689504)***	***(.0964515)***
Total farms, 1971			***-.0001305[b]***	-.0000687
			(.0000424)	(.0000572)
Constant	***-2.838481[a]***	***-3.12061[a]***	***-4.039836[d]***	-2.370784
	(.4504866)	(***.5762725)***	***(2.269247)***	(1.953799)
Observations	231		231	

Robust Standard errors clustered on *municipio* in parentheses.

[a] p<0.001, [b] p<0.01, [c] p<0.05 [d] p<0.10 (two-tailed test)

Table 3. 1984 Presidential Election: Land reform, violence, and support for PDC vs. FMLN

	MODEL 1		MODEL 2	
Variables	**PDC vote share**	**Blank/defaced vote share**	**PDC vote Share**	**Blank/defaced vote share**
Death Squad Killed 79-84	***-.0008253[c]***	-.0002718	***-.0007987[b]***	***-.0003236[d]***
	(.0003336)	(.0001731)	***(.000312)***	***(.0001898)***
Rebel Attacks 10/79-03/84	***.0014862[a]***	***.0004317[a]***	***.000744[a]***	.0001942
	(.0001738)	***(.0001155)***	***(.0002067)***	(.0001785)
% Phase I beneficiaries	.0099394	.0026611	.0045017	.002752
	(.0066411)	(.0038312)	(.0052129)	(.0040884)
% Phase III beneficiaries	***.1040169[a]***	.0193048	***.0986134[a]***	***.0298251[d]***
	(.020481)	(.0141653)	***(.0262236)***	***(.0180049)***
% smallholders			***.035577[a]***	.007155
			(.0106781)	(.0111638)
% Lease with promise to sell			***.0532031[b]***	.020075
			(.0170586)	(.0128822)
% Simple Lease			***.0363437[b]***	.004505
			(.0115613)	(.0115566)
% Mixed: own/lease			***.0271235[b]***	.0036502
			(.0105807)	(.102814)
% resident workers (*colonos*)			***.0385086[a]***	.0062087
			(.0116881)	(.0113038)
% Mixed: free/lease			***.0437211[a]***	.0127175
			(.0131644)	(.0128908)
% Free Labor			***.032129[b]***	-.0033556
			(.0114554)	(.0112954)
Log(population,1971)	***.3397272[a]***	.0180746	***.4821285[a]***	.0821535
	(.0453192)	.0406475	***(.0672377)***	(.0683336)
Total farms, 1971			***-.0002169[a]***	***-.0000778[d]***
			(.0000483)	***(.0000424)***
Constant	***-3.976523[a]***	***-1.804645[a]***	***-8.53234[a]***	***-2.86511[c]***
	(.4154642)	***.3776677***	***(1.177048)***	***(1.242823)***
Observations	203		203	203

Robust Standard errors clustered on *municipio* in parentheses.

[a] p<0.001, [b] p<0.01, [c] p<0.05 [d] p<0.10 (two-tailed test)

Table 4. 1984 Presidential Runoff Election:
Land reform, violence, and support for PDC vs. FMLN

	MODEL 1		MODEL 2	
Variables	**PDC vote share**	**Blank/defaced vote share**	**PDC vote Share**	**Blank/defaced vote share**
Death Squad Killed 79-82	***-.000887[b]***	***-.0002917[d]***	***-.0008865[b]***	***-.0003468[d]***
	(.0003181)	***(.0001649)***	***(.0003084)***	***(.0001836)***
Rebel Attacks 79-82	***.0017316[a]***	***.0011305[a]***	***.0009725[b]***	***.0008095[c]***
	(.0003041)	***(.0003273)***	***(.000333)***	***(.0003326)***
% Phase I beneficiaries	***.0105782[c]***	.0036272	.0043655	.0034356
	(.0051187)	(.0035174)	.0034761	(.0035818)
% Phase III beneficiaries	***.0606236[b]***	-.0066161	***.0496946[d]***	.0062268
	(.0230527)	(.020288)	***(.0286877)***	(.0230661)
% smallholders			***.0345477[c]***	.0102122
			(.0154928)	(.183247)
% Lease with promise to sell			***.0502173[c]***	.0108845
			(.0198245)	(.0231407)
% Simple Lease			***.0371901[c]***	.0083255
			(.0161503)	(.0188135)
% Mixed: own/lease			***.0266599[d]***	.0072177
			(.0150258)	(.0173408)
% resident workers (colonos)			***.0362333[c]***	.0089875
			(.0159011)	(.0182776)
% Mixed: free/lease			***.041765[c]***	.0123825
			(.0174036)	(.0200136)
% Free Labor			***.0339578[c]***	.0025778
			(.0158103)	(.0183838)
Log(population,1971)	***.3373288[a]***	***.1218737[a]***	***.4789406[a]***	***.2169656[a]***
	(.0412749)	***(.0337126)***	***.0556454***	***(.0451075)***
Total farms, 1971			***-.0002129[a]***	***-.0001065***
			(.0000415)	***(.0000298)***
Constant	***-3.460428[a]***	***-2.984038[a]***	***-7.961316[a]***	***-4.617038[c]***
	(.3802509)	***(.3201162)***	***(1.593436)***	***(1.87685)***
Observations	220		220	

Robus Standard errors clustered on municipio in parentheses.
[a] p<0.001, [b] p<0.01, [c] p<0.05 [d] p<0.10 (two-tailed test)