

Supplementary Material

“Landowners and Democracy: The Social Origins of Democracy Reconsidered”

World Politics

doi:10.1017/S0043887116000277

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SECTION ONE: CODING DETAILS FOR REGION DUMMIES

To divide the world into regions for the use of region fixed effects and to construct a measure of land redistribution in the regional neighborhood surrounding a country, I follow Hadenius & Teorell (2005), “Assessing Alternative Indices of Democracy, C&M Working Papers 6, IPSA” (available at: <http://www.concepts-methods.org/Files/WorkingPaper/PC%206%20Hadenius%20Teorell.pdf>) and divide the world into ten politico-geographic regions. It is based on both geographical proximity and demarcation by area specialists who have contributed to a regional understanding of democratization. The ten regions are: 1) Eastern Europe and post Soviet Union (including Central Asia); 2) Latin America (including Cuba, Haiti & Dominican Republic); 3) North Africa & Middle East (including Israel, Turkey and Cyprus); 4) Sub-saharan Africa; 5) Western Europe & North America (including Australia & New Zealand); 6) East Asia (Including Japan & Mongolia); 7) Southeast Asia; 8) South Asia; 9; The Pacific (excluding Australia & New Zealand); 10) The Caribbean.

I make some minor adjustments to the Hadenius and Teorell classifications, as follows. I allocate Haiti and Suriname to the Caribbean. I do so on the following basis: neither is Spanish speaking. Moreover, Guyana is in this category, so it makes little sense that neighboring Suriname is not. I also allocate Mongolia to Eastern Europe and the Post Soviet Union because it was in the Soviet Union’s sphere of influence during the Cold War. Historically it also has more in common with Central Asia (which is in Hadenius and Teorell’s category for Eastern Europe and the Post-Soviet Union) than it does with the Pacific or Southeast Asia. I allocate Cyprus and Israel to Western Europe, because the populations of both are of European origin and their political institutions have been clearly shaped by their orientation toward Europe.

SECTION TWO: CODING DETAILS FOR WHEAT-SUGAR RATIO

I follow Easterly (2007) and control for geographical endowments as the $\log(\text{Percent of Land Suitable for Wheat to Percent of Land Suitable for Sugar Cane})$. Because there are some countries where the land suitable for either/both of these crops is zero, I compute the ratio as: $\log((1+\% \text{ land suitable for wheat})/(1+\% \text{ land suitable for sugar}))$. Unlike Easterly, I use the arable land suitable for these crops within 100 miles of the country's largest city to address the possibility that country averages mask a considerable degree of heterogeneity and may be biased by areas that are not populated. In order to calculate the arable land suitable for each crop, I use data from the Food and Agriculture Organization (FAO) GAEZ (2002) dataset. The FAO computes, based on measures of soil characteristics, such as moisture, temperature, chemical composition, depth, texture, and organic matter, a suitability index for a large number of crops. That suitability index (SI) is scaled from 0 (completely unsuitable for that crop) to 100 (the highest possible yield for that crop under rainfed conditions). This is done crop by crop, by parcel, on a global scale. Each of these parcels roughly corresponds to 36 mile by 36 mile squares. I then used the parcel SIs to compute, via triangulation, the average SI for each crop 100 miles in radius from the largest city.

See Easterly, William. 2007. "Inequality does Cause Underdevelopment: Insights from a New Instrument." *Journal of Development Economics* 84: 755-776.

SECTION THREE. ADDITIONAL ROBUSTNESS TESTS

1. OLS Models Separating Democracies and Autocracies

Model 5 in Table 1 introduces an OLS model with country fixed effects using the Polity index as the dependent variable. Measuring a country's level of democracy in a continuous fashion enables these models to retain data from countries that have not experienced regime switching. The Polity index also incorporates information about executive recruitment, political participation, and the political role of the military that is not embedded in Przeworski et al.'s dichotomous regime type measure. However, Model 5 in Table 1 does not examine the impact of Labor-Dependent Agriculture separately on countries that are democracies or separately on countries that are autocracies, which would enable distinguishing whether Labor-Dependent Agriculture plays a differing role in these distinct circumstances.

Table A1 presents three models. Model 1 replicates Model 5 of Table 1 in the manuscript. Models 2 and 3 of Table A1 are models estimated on subsamples of just democracies and just autocracies, respectively. Labor-Dependent Agriculture is negatively tied to a country's Polity score both in the full sample and in exclusively democratic countries. It is not statistically significantly tied to higher or lower Polity scores among autocracies. This supports the dynamic probit results in Table 1 regarding the especially pernicious role of Labor-Dependent Agriculture for democratic duration.

Table A1: Landowners and the Level of Democracy

	Full		
	Sample	Democracies	Autocracies
	Model 1	Model 2	Model 3
Labor-Dependent Agriculture	-51.052*** (8.739)	-50.014*** (10.168)	-7.096 (10.910)
log(Per Capita Income)	-1.198 (2.058)	-6.496*** (1.951)	-2.502 (2.813)
Growth Rate	4.072 (9.336)	-0.982 (4.710)	-9.126 (10.462)
Oil Income Per Capita	0.598* (0.309)	0.907*** (0.241)	1.009** (0.473)
Number of Previous Transitions	-0.074 (2.388)	14.447*** (1.217)	-6.370*** (1.488)
Percent Urban	0.052 (0.067)	0.005 (0.017)	0.221** (0.085)
Percent Dems. in Region	24.112*** (5.559)	1.274 (3.663)	1.636 (7.328)
Year Dummies	YES	YES	YES
Country Fixed Effects	YES	YES	YES
Observations	3143	1830	1310

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ (two-tailed). The dependent variable in all models is the Polity Score, normalized to run from 0 (full autocracy) to 100 (full democracy). All models are estimated via OLS with Driscoll-Kraay robust standard errors with a Newey West correction for serial correlation. All independent variables are lagged one period. Year dummies and country fixed effects are estimated but are not reported.

B. IV Models with Country Fixed Effects

To test whether the Table 1 findings in the manuscript are driven by reverse causation, I build from the country fixed effects models and instrument the key independent variable of Labor-Dependent Agriculture with the log sum of years since 1900 that landed elites were excluded from the ruling executive coalition, with data from Albertus (2015). Coalitional splits should enable political elites to implement economic and social policies that diminish the power of landowners or their ability to marshal cheap labor. However, there is little reason to believe that a past history of these coalitional splits directly influence a country's level of democracy separately from operating on the strength of landowners (see, e.g., Albertus 2015). Although the exclusion restriction is fundamentally untestable, the log number of years of elite splits is statistically insignificant when included in estimating a regression model for a country's Polity score. This provides some limited evidence that this instrument passes the exclusion restriction from an empirical perspective (for a similar approach, see, e.g., Eichengreen and Leblang 2008). Nonetheless, it remains possible that the key variables to be instrumented could still be driven by some unobserved factor. As with any instrumental variables analysis, this would be problematic if these factors were linked to the outcome variable and instruments.

Table A2 presents the results. The coefficient on Labor-Dependent Agriculture in the IV analysis in Model 1 remains negative and statistically significant in the second stage while the first-stage instrument is negative, as predicted, and highly statistically significant. A first-stage F-test also indicated that the instrument passed the commonly used threshold of 10 separating strong from weak instruments (see Staiger and Stock 1997). These findings support Table 1 and previous literature.

The magnitude of the coefficient on Labor-Dependent Agriculture increases over the OLS coefficient in Model 5 of Table 1 in the paper. This suggests that the direction of bias is apparently against my hypothesis. One possible omitted factor in the non-IV models that may confound the association between labor-dependent agriculture and democracy and lead to an underestimate of the true effect is the prevalence of clientelism. Prevalent clientelistic linkages may be positively correlated with labor-dependent agriculture due to the particular structure of the economy or conditions favoring broker networks, making it more likely that landowners can utilize these linkages to win favorable policies. At the same time, clientelism may be negatively correlated with democracy. The politically biased distribution of goods and clientelist relations in a democracy, though not necessarily eliminated, should be more constrained than under autocracy where clientelism can operate to maintain control of citizens. Accounting for this and other potential sources of endogeneity implicitly in the IV framework therefore yields a more accurate estimate of the effect of Labor-Dependent Agriculture on democracy.

The coefficient on log(Per Capita Income) in the second stage is also now statistically significant in the negative direction. This could, however, be driven by the country fixed effects specification dropping a small number of wealthy established democracies in which the Polity score does not vary over this period. Indeed, running an otherwise similarly specified model substituting region fixed effects, which keeps these countries in the regression, renders per capita income positive.

Table A2: IV Analyses of Labor-Dependent Agriculture and Democracy

	First Stage	Second Stage
	Model 1	Model 1
Labor-Dependent Agriculture		-169.867*** (24.721)
log(Per Capita Income)	-0.053*** (0.004)	-6.573*** (2.065)
Growth Rate	0.061*** (0.020)	12.964* (7.881)
Oil Income Per Capita	0.010*** (0.001)	1.515*** (0.579)
Number of Previous Transitions	0.020*** (0.003)	1.080 (1.032)
Percent Urban	-0.001*** (0.0001)	-0.065 (0.049)
Percent Dems. in Region	-0.121*** (0.010)	10.200** (4.712)
First-Stage Instrument (Log Years Elite Splits Since 1900)	-0.034*** (0.002)	
Year Dummies	YES	YES
Country Fixed Effects	YES	YES
Observations	3143	3143

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ (two-tailed). The second-stage dependent variable is the Polity Score, normalized to run from 0 (full autocracy) to 100 (full democracy). Standard errors in parentheses. All independent variables are lagged one period. Year dummies and country fixed effects were estimated but are not reported.

C. Robustness of Main Findings to Focusing on More Agrarian Countries

In order to ensure that the Table 1 statistical analyses are not sensitive to the relational nature of the power of different classes, I test the robustness of the main findings to a subset of country-years where the agricultural population comprises greater than 30% of the total population. I do the same for a subset of country-years where the agricultural population comprises greater than 40% or 50% of the total population. This captures more agrarian economies where landed elites should be stronger vis-à-vis other economic elites (e.g., industrialists) and state actors.

Table A3 presents the results. Models 1-4 of Table A3 replicate Models 1-4 of Table 1 in the manuscript but restrict the sample to country-years where the agricultural population comprises greater than 30% of the total population. The results are similar to those in Table 1 despite the reduced sample, and strengthen in several models. Labor-Dependent Agriculture remains negatively and statistically significantly tied to democratic duration in Models 1B-4B, and the magnitude of the coefficients generally increases. Furthermore, Labor-Dependent Agriculture drops below the 10% level in Models 3A and 4A of Table A3 relative to Models 3A and 4A in the paper. In short, the findings strengthen somewhat under this robustness test.

Model 5 of Table A3 repeats Model 3 but restricts the sample to country-years where the agricultural population comprises greater than 40% of the total population. Again the results for Labor-Dependent Agriculture hold despite the reduced sample, and grow even stronger in substantive terms. Model 6 of Table A3 again repeats Model 3 but now restricts the sample to country-years where the agricultural population comprises greater than 50% of the total population. Yet again the results hold, even though the sample size is reduced by more than 60% relative to Model 3 of Table 1 in the paper.

Table A3: Labor-Dependent Agriculture, Democratic Transition, and Democratic Duration as the Size of the Agriculture Sector Varies

Dependent Variable:	Agricultural Population >30%												Agricultural Pop. >40%				Agricultural Pop. >50%				
	Democratic Transition			Democratic Duration			Model 4B			Model 5A			Model 5B			Model 6A			Model 6B		
	Model 1A	Model 2A	Model 3A	Model 4A	Model 1B	Model 2B	Model 3B	Model 4B	Model 5A	Model 5B	Model 6A	Model 6B	Model 5A	Model 5B	Model 6A	Model 6B	Model 5A	Model 5B	Model 6A	Model 6B	
Labor-Dependent Agriculture	0.517 (0.527)	0.773 (0.728)	1.177 (0.958)	1.349 (1.020)	-1.817*** (0.526)	-2.136*** (0.506)	-2.534*** (0.756)	-2.391*** (0.760)	0.659 (1.029)	-3.589*** (0.817)	0.311 (1.081)	-3.490*** (1.009)	0.659 (1.029)	-3.589*** (0.817)	0.311 (1.081)	-3.490*** (1.009)	0.659 (1.029)	-3.589*** (0.817)	0.311 (1.081)	-3.490*** (1.009)	
log(Per Capita Income)		0.221 (0.173)	-0.073 (0.278)	-0.023 (0.295)		0.035 (0.179)	-0.237 (0.291)	-0.308 (0.334)		0.035 (0.179)	-0.237 (0.291)	-0.308 (0.334)		0.035 (0.179)	-0.237 (0.291)	-0.308 (0.334)		0.035 (0.179)	-0.237 (0.291)	-0.308 (0.334)	
Growth Rate		-5.710*** (1.779)	-6.537*** (2.355)	-6.872*** (2.546)		2.107 (1.731)	3.594** (1.572)	4.813*** (1.626)		2.107 (1.731)	3.594** (1.572)	4.813*** (1.626)		2.107 (1.731)	3.594** (1.572)	4.813*** (1.626)		2.107 (1.731)	3.594** (1.572)	4.813*** (1.626)	
Oil Income Per Capita		-0.259 (0.233)	-0.159 (0.277)	-0.080 (0.318)		-0.059 (0.141)	0.240 (0.169)	1.884* (1.032)		-0.059 (0.141)	0.240 (0.169)	1.884* (1.032)		-0.059 (0.141)	0.240 (0.169)	1.884* (1.032)		-0.059 (0.141)	0.240 (0.169)	1.884* (1.032)	
Number of Previous Transitions		0.370*** (0.071)	0.278*** (0.099)	0.264*** (0.098)		0.056 (0.152)	-0.096 (0.157)	-0.073 (0.158)		0.056 (0.152)	-0.096 (0.157)	-0.073 (0.158)		0.056 (0.152)	-0.096 (0.157)	-0.073 (0.158)		0.056 (0.152)	-0.096 (0.157)	-0.073 (0.158)	
Percent Urban		-0.009 (0.010)	-0.009 (0.012)	-0.011 (0.012)		0.009 (0.010)	0.009 (0.012)	0.005 (0.013)		0.009 (0.010)	0.009 (0.012)	0.005 (0.013)		0.009 (0.010)	0.009 (0.012)	0.005 (0.013)		0.009 (0.010)	0.009 (0.012)	0.005 (0.013)	
ELF		0.040 (0.358)	-0.304 (0.440)	-0.266 (0.498)		0.724** (0.340)	0.660 (0.558)	0.476 (0.529)		0.724** (0.340)	0.660 (0.558)	0.476 (0.529)		0.724** (0.340)	0.660 (0.558)	0.476 (0.529)		0.724** (0.340)	0.660 (0.558)	0.476 (0.529)	
Pc. Dems. in World		1.944** (0.935)				2.908** (1.170)				2.908** (1.170)				2.908** (1.170)				2.908** (1.170)			
Pc. Dems. in Region			-0.144 (0.686)				-0.630 (0.611)	-0.436 (0.689)			-0.630 (0.611)	-0.436 (0.689)			-0.630 (0.611)	-0.436 (0.689)			-0.630 (0.611)	-0.436 (0.689)	
Inequality				-0.120 (0.119)				0.306** (0.141)				0.306** (0.141)				0.306** (0.141)				0.306** (0.141)	
Inequality Sq.				0.001 (0.001)				-0.003** (0.001)				-0.003** (0.001)				-0.003** (0.001)				-0.003** (0.001)	
Year Dummies	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES	
Region Fixed Effects	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES	
Observations	1961	1562	1562	1296	1961	1562	1562	1296	1961	1562	1562	1296	1961	1562	1562	1296	1961	1562	1562	965	

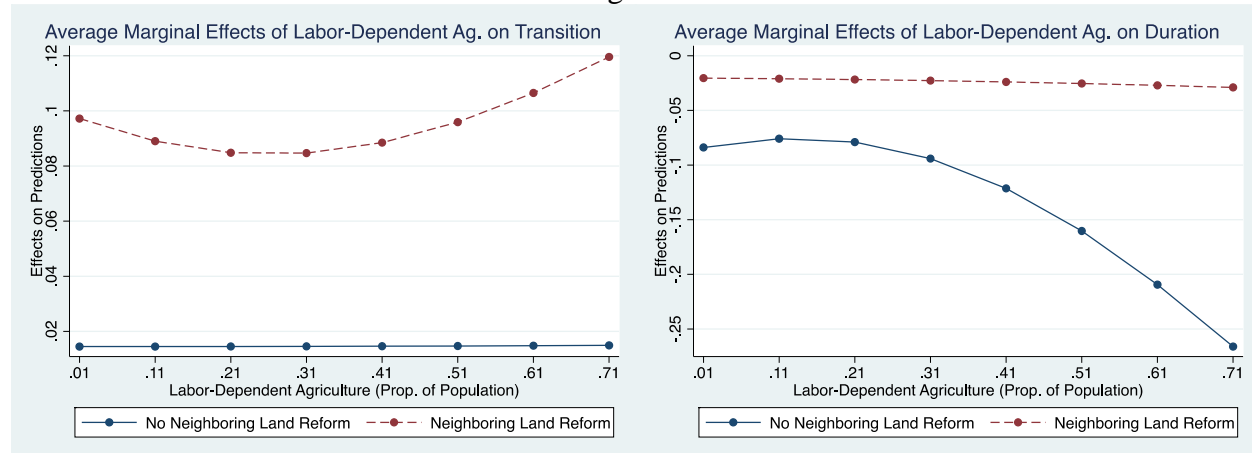
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ (two-tailed). All independent variables are lagged one period. All models are estimated via dynamic probit specifications with standard errors clustered by country in parentheses. Year dummies, region fixed effects and country fixed effects are estimated where indicated but are not reported.

D. Empirical Extensions to Neighboring Land Reform Findings

Labor-dependent landowners should be most capable of successfully pushing for democracy when threatened by neighboring land reform in circumstances where they are members of or allies to the coalition supporting the current authoritarian regime. This gives them greater political influence over regime change. Furthermore, landowners should be more willing to support democracy when state capacity is higher and could be effectively leveraged to expropriate landowners.

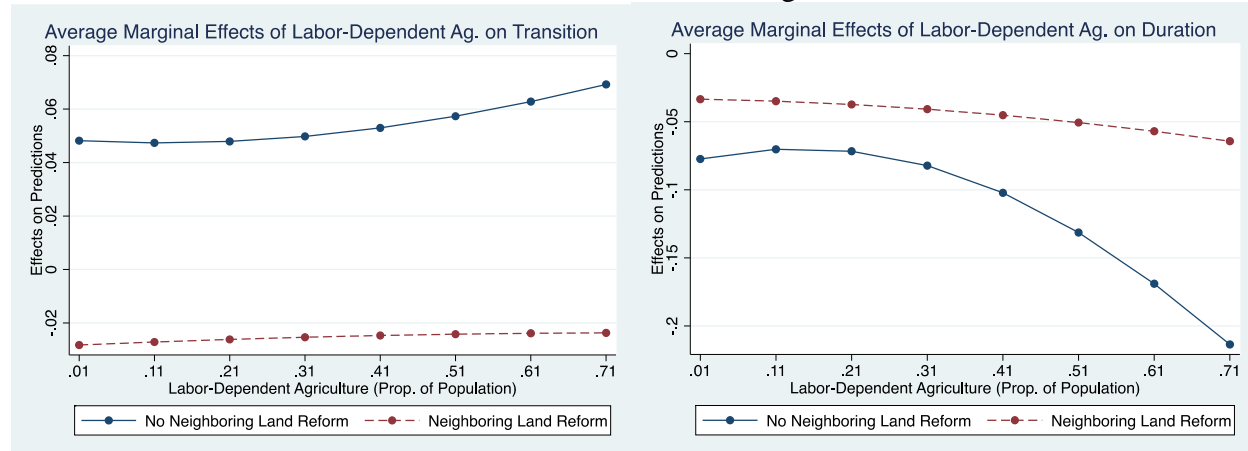
To examine these extensions to the main hypothesis on neighboring land reform in the paper, I tested the robustness of the Table 3 Model 2 findings to several modifications. First, I draw on data on coalitional splits between ruling political elites and landed elites from Albertus (2015) to capture whether ruling political elites *are* landed elites, are appointed by landed elites, or their rule is fundamentally materially supported by landed elites. I then interact the variables for Labor-Dependent Agriculture and Neighboring Land Reform with this dichotomous variable, which I code as “1” when there is a coalitional alliance between ruling political elites and landed elites and “0” otherwise. The resultant interactions capture the intuition that landowners should be more likely to impact democratic transition and duration when they are within the ruling coalition. As in Figure 4b in the manuscript, Figure A1 displays the average marginal effects of labor-dependent agriculture on democratic transition and duration after making these modifications. The results are very similar to those reported in the manuscript and even stronger for democratic transition, indicating that a stronger coalitional position vis-à-vis political elites enables landowners to push for democracy in order to achieve greater policy predictability and institutional constraints.

Figure A1. Marginal Effects of Labor-Dependent Agriculture on Democratic Transition and Breakdown when Landowners are in the Ruling Political Coalition



Redefining the interaction term defined in the context of Figure A1 to capture circumstances when landowners are *excluded* from the ruling political coalition further supports these results. Figure A2 plots the resultant marginal effects from such a model. The impact of labor-dependent agriculture in the presence of neighboring land reform on democratic transition is now flipped, and the impact on democratic duration is more muted than for circumstances in which landowners are members of the ruling coalition.

Figure A2. Marginal Effects of Labor-Dependent Agriculture on Democratic Transition and Breakdown when Landowners are Excluded From the Ruling Political Coalition



In a final extension, I test limiting the sample to country-years with a GDP per capita (in 2000 dollars) of \$1,500 or greater, corresponding to values above the 25th percentile of GDP per capita. Countries above this threshold should have a greater state capacity to expropriate landowners relative to countries below this threshold, although this is far from a hard and fast rule: many large-scale land reforms have taken place in countries with relatively low state capacity such as Zimbabwe in the 1990s, Bolivia in the 1950s and 1960s, Mexico in the 1930s, Ethiopia in the 1970s (Albertus 2015). Figure A3 plots the marginal effects generated from these analyses. Again the results from Table 3 Model 2 in the manuscript hold, and strengthen somewhat for democratic transition. Labor-dependent landowners are more likely to support democracy in the presence of neighboring land reform when the state has a greater capacity to expropriate them.

Figure A3. Marginal Effects of Labor-Dependent Agriculture on Democratic Transition and Breakdown among countries with Higher State Capacity

