

ONLINE SUPPLEMENT  
to article in

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## **Workers of the Less Developed World Unite? A Multilevel Analysis of Unionization in Less Developed Countries**

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To address the comparability of union membership across less developed countries (LDCs), and to be certain our results are robust, we conducted a variety of sensitivity analyses. Though we estimated all sensitivity analyses for all models, Table S1 displays only the final models to be concise.<sup>1</sup> First, we reestimated the models after excluding potentially unique countries. Model 1 drops the six countries that are more than one standard deviation above or below the overall mean: Belarus, El Salvador, Morocco, Russia, Tanzania, and Ukraine. In addition, we reestimated the models after dropping China (Model 2), and countries with severely restricted workers' rights using Cingranelli and Richards's (1999, 2006) index of "worker rights" (Model 3).<sup>2</sup> Across Models 1 to 3, our conclusions remain largely robust. The main differences are that the effects of debt service, gender, having low education, and being a member of the unskilled manual proletariat become insignificant after restricting the sample to countries where workers' rights are "fully protected" or "somewhat restricted." While there are minor fluctuations in odds ratios and significance levels from the full sample, both the individual- and country-level results are quite similar.

Next, we reestimated the final model after dropping various classes of workers to appreciate the heterogeneity that exists across unions within LDCs (e.g., trade associations versus craft or industrial unions). In separate models, we exclude unclassified workers (Model 4), the "working class"—manual and informal proletariat—(Model 6), the "middle class"—managers/executive, professional and elite workers, and the nonmanual proletariat—(Model 7), and the informal proletariat (Model 8). Also, we change the reference class to the nonmanual proletariat (Model 5). There is little change in the odds-ratios and significance levels for the country-level variables across these models. At the individual-level, the effects of education and age remain generally robust, although low education is not significant when excluding the "middle class" and high-education is not significant when excluding the "working class." For the class variables, while there is some fluctuation as the reference changes, substantively the results remain similar. Professional/elite workers, the nonmanual proletariat, and the skilled manual proletariat are relatively more likely to be unionized, and the unskilled and informal proletariat are less likely.

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<sup>1</sup> Another robustness check we performed was an OLS model of the 39 LDCs using the country means in union membership as the dependent variable. In the final model, ex-communist and inflation remain significantly positive ( $p < .05$ ) and IMF agreement ( $p < .10$ ) and debt service remain significantly negative ( $p < .05$ ). These conclusions are consistent if we drop the relatively high and low unionization cases.

<sup>2</sup> In a valuable innovation, Cingranelli and Richards (2006) use U.S. State Department Reports to code countries. The worker rights index focuses on: freedom of association at the workplace; the right to bargain collectively with employers; the prohibition of the use of any form of forced or compulsory labor; a minimum age for the employment of children; and acceptable work conditions with respect to minimum wages, hours of work, and occupational safety and health (though the greatest weight is given to the rights of association and to organize/bargain collectively). In this sensitivity analysis, we only include countries where worker rights are "fully protected" or "somewhat restricted" and exclude those "severely excluded." Ideally, we would exclude those somewhat restricted as well, but there is an insufficient number of fully protected countries.

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**Table S1.** Sensitivity Analyses for Final Models of Union Membership in Less Developed Countries: Odds Ratios and T-Scores Displayed

	Model 1 <sup>a</sup>	Model 2 <sup>b</sup>	Model 3 <sup>c</sup>	Model 4 <sup>d</sup>	Model 5 <sup>e</sup>	Model 6 <sup>f</sup>	Model 7 <sup>g</sup>	Model 8 <sup>h</sup>
<b>Country Level</b>								
Ex-communist	2.782*** (4.759)	3.606*** (5.049)	2.966*** (4.317)	3.668*** (5.201)	3.655*** (5.189)	3.155*** (4.533)	3.703*** (4.794)	3.151*** (4.832)
IMF Agreement	.428* (-2.619)	.347** (-2.878)	.280*** (-3.776)	.344** (-2.934)	.349** (-2.899)	.341** (-2.904)	.329** (-2.752)	.350** (-3.031)
Inflation	1.001** (3.198)	1.001* (2.301)	1.002** (2.945)	1.001* (2.292)	1.001* (2.365)	1.001* (2.362)	1.001* (2.187)	1.001* (2.453)
Debt Service / GNI	.951^ (-1.980)	.926* (-2.468)	.965 (-1.184)	.928* (-2.446)	.927* (-2.473)	.930* (-2.341)	.925* (-2.350)	.932* (-2.412)
Intercept	.102*** (-11.710)	.121*** (-8.736)	.100*** (-10.472)	.118*** (-9.209)	.117*** (-9.228)	.170*** (-7.560)	.097*** (-9.267)	.147*** (-8.696)
<b>Individual Level</b>								
Female	.875** (-3.120)	.937^ (-1.726)	.951 (-1.135)	.927* (-1.982)	.940^ (-1.668)	1.051 (.982)	.846** (-3.129)	.954 (-1.221)
Age – Teen	.349*** (-5.195)	.348*** (-6.189)	.354*** (-5.248)	.331*** (-6.262)	.345*** (-6.240)	.313*** (-4.171)	.381*** (-4.707)	.317*** (-6.335)
Age – Young	.608*** (-10.998)	.623*** (-11.807)	.633*** (-9.751)	.627*** (-11.355)	.622*** (-11.964)	.606*** (-9.236)	.633*** (-8.285)	.594*** (-12.414)
Age – Old	.940 (-1.061)	.933 (-1.363)	.987 (-.224)	.931 (-1.356)	.932 (-1.386)	.944 (-.827)	.927 (-1.089)	.944 (-1.093)
Education – Low	.840** (-3.000)	.889* (-2.223)	.920 (-1.367)	.838** (-3.215)	.862** (-2.816)	.972 (-.281)	.832** (-2.985)	.868* (-2.474)
Education – High	1.198** (3.345)	1.175*** (3.320)	1.217*** (3.518)	1.165** (2.994)	1.160** (3.070)	1.172** (2.736)	1.090 (1.070)	1.158** (2.881)
Manager/Executive	1.518*** (4.223)	1.545*** (4.706)	1.588*** (4.120)	.926 (-.983)	.925 (-.992)	1.521*** (4.493)	(dropped)	1.480*** (4.284)
Professional/Elite Worker	1.957*** (7.809)	2.005*** (8.562)	2.112*** (7.993)	1.200** (2.844)	1.200** (2.877)	1.895*** (7.568)	(dropped)	1.913*** (8.021)
Nonmanual Proletariat	1.662*** (5.551)	1.684*** (6.195)	1.708*** (5.430)	(reference)	(reference)	1.576*** (5.170)	(dropped)	1.558*** (5.303)
Skilled Manual Formal	1.729*** (6.561)	1.705*** (6.750)	1.862*** (6.749)	1.030 (.504)	1.027 (.461)	(dropped)	1.702*** (6.476)	1.614*** (6.120)
Proletariat	.787* (-2.364)	.945 (-.619)	.987 (-.126)	.518*** (-8.565)	.506*** (-8.912)	(dropped)	.877 (-1.385)	.790** (-2.583)
Unskilled Manual Formal	.580*** (-5.755)	.545*** (-6.786)	.639*** (-4.376)	.325*** (-14.630)	.323*** (-14.743)	(dropped)	.494*** (-7.824)	(dropped)
Proletariat	(reference)	(reference)	(reference)	(dropped)	.616*** (-5.844)	(reference)	(reference)	(reference)
Unclassified Workers								
N	24,134	28,092	22,504	26,586	28,870	12,755	18,399	23,157
Countries	33	38	31	39	39	39	39	39

Note: All country-level variables are for the year closest to, though not later than, the WVS year.

<sup>a</sup> Dropping countries beyond one standard deviation of cross-country mean of unionization

<sup>b</sup> Dropping China

<sup>c</sup> Dropping countries with severely restricted worker rights

<sup>d</sup> Dropping unclassified workers (reference category: nonmanual proletariat)

<sup>e</sup> Reference category for class schema: nonmanual proletariat

<sup>f</sup> Dropping “working class”

<sup>g</sup> Dropping “middle class”

<sup>h</sup> Dropping informal proletariat

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$  (two-tailed tests). ^  $p < .05$  (one-tailed tests).

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**Table S2.** Descriptive Statistics and Sources for Variables Used in Analyses

	Mean (SD)	Metric / Notes	Source
<b>Country Level</b>			
Ex-communist	.462 (.505)	yes = 1	Marshall, Jaggers, and Gurr (2005)
Polity Combined Score	5.103 (5.220)	min. –10; max. 10 (most democratic)	
Government Expenditures / GDP	20.786 (7.081)	(%)	Heston, Summers, and Aten (2002)
IMF Agreement	.128 (.339)	yes = 1; IMF agreement signed during WVS year	Przeworski and Vreeland (2000)
ILO Fundamental Conventions	6.897 (1.429)	max. 8; total ratifications of the ILO conventions	International Labor Organization (2005)
Real GDP, PPP per capita	6244.263 (3757.949)		World Bank, World Development Indicators (WDI)
Manufacturing / Labor Force	23.517 (9.937)	Percent share of total labor force	WDI
Agriculture / Labor Force	23.912 (21.739)	Percent share of total labor force	WDI
Unemployment	11.229 (8.708)	(%)	WDI
Inflation	79.417 (265.406)	Average of three most recent years	WDI
Inward FDI Stock / GDP	19.276 (13.084)	(%)	UNCTAD
Total Exports / GDP	35.045 (19.283)	(%)	WDI
Raw Materials Exports	35.742 (22.612)	Percent of trade concentrated in raw materials	Statistics Canada (2003)
Total Imports / GDP	40.114 (20.725)	(%)	WDI
Manufacturing Imports	67.183 (11.903)	Percent of merchandise imports	WDI
Trade Openness	75.159 (38.871)	Exports + Imports as % of GDP	
Debt Service / GNI	6.138 (4.232)	(%)	WDI
External Debt / GDP	46.951 (28.818)	(%)	WDI
<b>Individual Level</b>			
Union Membership	.159 (.366)	yes = 1	Inglehart et al. (2005)
Female	.408 (.491)	yes = 1	See above
Age – Teen	.022 (.149)	Age < 20	See above
Age – Young	.392 (.488)	20 < Age < 35	See above
Age – Middle	.430 (.495)	34 < Age < 51	See above
Age – Old	.155 (.362)	Age > 50	See above
Education – Low	.293 (.455)	WVS standardized measure	See above
Education – Middle	.457 (.498)	WVS standardized measure	See above
Education – High	.248 (.432)	WVS standardized measure	See above
Manager/Executive	.063 (.243)	yes = 1	See above
Professional/Elite Worker	.155 (.362)	yes = 1	See above
Nonmanual Proletariat	.145 (.352)	yes = 1	See above
Skilled Manual Formal Proletariat	.211 (.408)	yes = 1	See above
Unskilled Manual Formal Proletariat	.149 (.356)	yes = 1	See above
Informal Proletariat	.198 (.399)	yes = 1	See above
Unclassified	.059 (.236)	yes = 1	See above

*Note:* All country-level variables are for the year closest to, though not later than, the WVS year, unless otherwise noted (N = 28,870 for 39 less developed countries).

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