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In spite of the inexorable march of democracy around the globe, just how democratic institutions affect human well-being is open to debate. The evidence that democracy promotes prosperity is neither strong nor robust. Moreover, which aspects of policy making and human well-being are promoted by democracies is still a subject of debate.[1]

Even if correlations between democracy and outcome measures can be found, there is an overriding difficulty of interpreting them as causal effects. Whether democracy matters, per se, or simply serves as a proxy for societal and political development presents a difficult problem for research in this area. Thinkers such as Seymour Martin Lipset (1959) have argued that democracy can thrive only when conditions are right. If this is correct, then becoming democratic may serve only as a proxy for these hard-to-measure cultural and societal preconditions.

This paper explores these issues further by reconsidering the link between democracy and health using panel data from a cross section of countries. The data show a strong (conditional) correlation between life expectancy and democracy. This relationship is robust to controlling for the initial level of human capital as well as political histories. The data also suggest that health policy interventions are superior in democracies.

I. Background

Human history has witnessed remarkable increases in life expectancy alongside increases in prosperity. Samuel H. Preston (1975) showed that this relationship is nonlinear, with the largest gains in life expectancy being associated with increases in income per capita at low incomes. These increases in life expectancy can be traced to three factors, all of which are associated with increases in prosperity, although the direction of causation is hard to establish.[2]

First, there are reductions in malnutrition and improvements in infrastructure such as clean water supply and improved sanitation facilities. Second, and very important in recent history, there is medical intervention through control (due to immunization and insecticides) and treatment of infectious diseases using antibiotics (see, for example, Davidson Gwatkin, 1980). Third, there are improvements in knowledge and lifestyle. Angus S. Deaton (2004, p.109) notes that "health improvement ultimately came from the globalization of knowledge, facilitated by local political, economic, and educational conditions." The literature to date has focused more on the latter influences (education and economics) rather than the political foundations of increased life expectancy.

There are three main theoretical differences between democracies and autocracies that we might expect to influence health issues. The first concerns representation. Daron Acemoglu and James Robinson (2005) focus on who controls political office, modeling autocracy as a dictatorship of the rich and democracy as a dictatorship of the poor or middle classes. In this view, health indicators will improve if public health is

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[1] See, for example, Casey B. Mulligan et al. (2004).

[2] See Acemoglu and Simon Johnson (2005).

more of a priority for groups who dominate under a democracy compared to those who gain political influence in an autocracy. An effect on health seems plausible in this view, to the extent that the rich have less interest in public solutions to health problems.

A second view of the difference between democracy and autocracy emphasizes accountability structures. Democracies demand accountability to a broad set of citizens at regular intervals, whereas autocrats are accountable only to a smaller group such as the military. Moreover, autocrats typically repress political opposition and the media to stifle public policy debate. This view also predicts that greater attention will be paid to health issues in democracies since failure to do so should result in leaders being removed from office—this link being weaker in autocracies.

A third difference between democracies and autocracies concerns the process of political selection, with democracies having stronger mechanisms for selecting competent and honest leaders to implement policy. To the extent that health interventions are supported by skilled and incorruptible political leaders, democracies should lead to better health outcomes than autocracies.

There are conflicting views about whether democracy affects policy and economic performance. Adam Przeworski and Fernando Limongi (1993) review empirical research on the effect of democracy on economic growth, concluding that the correlation is weak and not robust. Torsten Persson and Guido Tabellini (2005) try a novel econometric approach, finding some support for the proposition that persistent democracy is associated with improvements in economic performance.

There is a small literature that looks at the relationship between life expectancy and democracy in cross-country data. Alvaro Franco et al. (2004) report a positive correlation between life expectancy and democracy (see also Ramesh Govindaraj and Ravindra Rannan-Eliya, 1994). David A. Lake and Matthew A. Baum (2001) relate democracy to a variety of public health interventions.

II. Evidence

We use panel data across countries from the 1960s to the 2000s. We begin by showing there is a strong and robust correlation between life expectancy at birth and democracy after controlling for income. Our basic specification uses data for every fifth year between 1962 and 2002. We estimate an equation of the form:

$$(1)\quad h_{srt} = \alpha_r + \beta_t + \gamma_1 d_{srt} + \gamma_2 D_{srt} + \theta_1 y_{srt} + \theta_2 (y_{srt})^2 + \mathbf{x}'_{sr}\boldsymbol{\lambda} + \varepsilon_{srt}$$

where h_{srt} is some health indicator in country s, in region r, and in year t; α_r is a region dummy variable; β_t is a year dummy variable; y_{srt} is income per capita in country s, in region r, averaged over years $t-4$ to t; and $\mathbf{x}_{sr}$ is other time invariant exogenous variables such as legal origins and political history. The variables (d_{srt}, D_{srt}) are measures of democracy.[3] The first is a contemporaneous measure denoting the fraction of democratic years between year $t-4$ and t, while D_{srt} is a longer-term one denoting the fraction of democratic years since 1956, until year t.[4] The variable ε_{srt} is an error for which we compute robust standard errors clustered at the country level. The main concern in interpreting results stems from the possibility that, as argued by Lipset (1959), there are social and cultural factors that evolve and make it easier for democratic institutions to be supported. If such factors exist, then we would spuriously attribute a direct effect of democracy on outcomes.

Table 1 presents the basic results. In column 1, we look solely at the partial relationship with contemporaneous democracy, finding that being democratic is associated with a 3.5-year increase in life expectancy. In column 2, we add income per capita measures. After controlling for income, the democracy effect falls to around two years, but remains positive and significant. Column 3 adds the fraction of democratic years since 1956. The data suggest that it is more permanent democratic transitions that matter and the contemporaneous democracy effect is no longer significant, although an F-test indicates that the two democracy variables are jointly significant. The point estimate suggests that a country that has been democratic for the whole period, from 1956 through year t, has a

[3] A country year is defined as democratic if variable POLITY2 from the POLITY IV database is positive.

[4] Philip Keefer (2005) and Persson and Tabellini (2005) argue that longer-lived democratic experience is important.

TABLE 1—HEALTH AND DEMOCRACY

	Life expectancy at birth			Infant mortality
	(1)	(2)	(3)	(4)
Dependent variable				
DEMOCRACY since $t-4$	3.55*** [1.26]	2.44** [0.96]	−0.24 [1.14]	−2.09 [5.36]
INCOME		1.75*** [0.22]	1.61*** [0.22]	−9.19*** [1.15]
INCOME squared		−0.05*** [0.01]	−0.05*** [0.01]	0.32*** [0.04]
DEMOCRACY since 1956			5.39*** [1.65]	−17.41** [8.17]
F-test			7.297	4.482
p-value			0.001	0.013
Controls:				
Legal origins	YES	YES	YES	YES
Regions	YES	YES	YES	YES
Year dummies	YES	YES	YES	YES
Countries	160	146	145	146
Observations	1,309	999	996	543
Adjusted R^2	0.991	0.994	0.994	0.921

Notes: Robust standard errors clustered at country level are reported in brackets. The sample years are every fifth year from 1962 to 2002 for columns 1–3 and every tenth year from 1960 to 2000 for column 4. DEMOCRACY is the fraction of democratic years for the specified period. INCOME is per capita income (in thousand constant 1996 international dollars) averaged over years $t-4$ to t. Germany drops from the sample for columns 3 and 4 because DEMOCRACY since 1956 is difficult to measure. The null for *F*-test is that coefficients on DEMOCRACY since $t-4$ and since 1956 are both zero.

* Significant at 10 percent.

** Significant at 5 percent.

*** Significant at 1 percent.

life expectancy that is more than five years higher than a country that has been autocratic since 1956. To put this in perspective, this point estimate "explains" 3.5 of the 13.7-year life expectancy difference between Ghana (democratic for 11 out of 47 years) and the United States (always democratic) in 2002. In column 4, we report the results from regressing infant mortality on the same set of regressors as in column 3. This shows countries that have been democratic since 1956 have fewer infants dying before reaching the age of one, by about 17 per 1,000 live births (about one-fourth of the sample mean), than countries that have been continuously autocratic since 1956.

Table 2 looks at the possibility that democracy is correlated with existing values and, hence, not picking up an institutional effect. In column 1, we include country fixed effects. In this case, the democracy effect is no longer present. It could be symptomatic of some omitted common factor driving both democracy and life expectancy. In column 2, we confine the within-country analysis to a balanced panel of 21 countries that have made a consolidated democratic transition in the period that we look at, i.e., a single switch to democracy, which is maintained until 2002. For this subgroup of countries, the significant democracy effect remains and is larger (by two years) than the effect seen in Table 1, column 3. Table 2, column 3, returns to the basic specification studied in Table 1 and adds measures of political history as controls. Specifically, it includes the fraction of years between 1900 and 1955 for which the country was democratic, and the fraction of years in the same period for which the country was a colony. Neither of these is significant, although the effect of democratic years since 1956 remains.

Column 4 controls for the stock of education in the population above 15 years of age in 1960, using data from Robert Barro and Jong-Wha Lee (2001). Prerequisites for democracy are likely to be correlated with human capital, and Edward L. Glaeser et al. (2005) have recently argued that education affects the sustainability

TABLE 2—ROBUSTNESS TO LIPSET'S HYPOTHESIS
(The dependent variable: Life expectancy at birth)

	(1)	(2)	(3)	(4)
DEMOCRACY since 1956	0.08	7.65**	5.49***	4.09**
	[1.02]	[3.26]	[1.45]	[1.60]
INCOME	0.28*	0.37	1.62***	1.48***
	[0.15]	[0.55]	[0.23]	[0.26]
$(\text{INCOME})^2$	−0.01***	−0.03	−0.05***	−0.05***
	[0.00]	[0.03]	[0.01]	[0.01]
DEMOCRACY for 1900–1955			−0.92	−2.98
			[1.59]	[1.97]
COLONY for 1900–1955			0.57	1.71
			[1.13]	[1.25]
SCHOOLING in 1960				1.19***
				[0.41]
Controlled dummies:				
Countries	YES	YES	NO	NO
Legal origins	NO	NO	YES	YES
Regions	NO	NO	YES	YES
Years	YES	YES	YES	YES
SE clustered?	NO	NO	YES	YES
Countries	145	21	144	92
Observations	996	189	993	752
Adjusted R^2	0.998	0.998	0.994	0.995

Notes: Robust standard errors (clustered at country level for columns 3 and 4) are reported in brackets. The sample years are every fifth year from 1962 to 2002. Column 2 restricts the sample to those countries, observed for all the nine sample years, that were nondemocratic in 1956, democratized only once by 2002, and have been democratic ever since. COLONY is the fraction of colonial years for the specified period. SCHOOLING is the average years of schooling in the population aged over 15. Yemen is dropped from the sample for columns 3 and 4 as it is difficult to obtain DEMOCRACY for 1900–1955 and COLONY for 1900–1955. Germany is dropped from the samples for all columns (see notes for Table 1).

* Significant at 10 percent.

** Significant at 5 percent.

*** Significant at 1 percent.

of democratic institutions. Education is positively related to life expectancy. The democracy variable remains positive and significant, however, although slightly smaller in size compared to column 3 in Table 1.[5]

Finally, Table 3 looks for evidence of differences in policy priorities between democracies and autocracies. In columns 1 and 2, we investigate the difference in sanitation and clean water supply between democratic and nondemocratic countries. These two health infrastructures prevent deaths caused by diarrhea, typhoid, and cholera. We see that the percentage of the population with access to improved sanitation facilities and improved water sources is higher by about 15 points (25 percent of the sample mean) and about 11 points (14 percent of the sample mean), respectively, in permanent democracies since 1956 than in permanent autocracies.

In columns 3 and 4, we explore the relationship between democracy and immunization. The latter is mainly a key preventive measure against airborne infectious diseases.[6] We find the percentage of children aged 12 to 23 months who received DPT (diphtheria, pertussis, and tetanus) vaccination before the age of one is

[5] The longer version of this paper shows that the results are robust to including a wide array of other variables as well as alternative ways of measuring democracy.

[6] As immunization data are observed annually, we replace h_{srt} in equation (1) with a health indicator averaged over the period from $t-4$ to t, where t is a five-year interval between 1985 and 2000. We also substitute D_{srt-5} for D_{srt} to avoid the overlap between the two variables.

TABLE 3—DEMOCRACY AND OTHER HEALTH OUTCOMES

	Sanitation	Clean water	Immunization		Health spending
			DPT	Measles	
	(1)	(2)	(3)	(4)	(5)
Dependent variable					
Sample mean (s.d.)	58.63	76.83	70.24	68.67	319.84
	(28.85)	(20.75)	(25.39)	(24.02)	(470.14)
DEMOCRACY since 1956	14.93**	10.76**	8.80**	0.55	161.38*
	[6.72]	[4.70]	[3.53]	[3.30]	[95.28]
DEMOCRACY for 1900–1955	−0.82	−0.38	−0.88	5.78	191.58**
	[6.66]	[4.21]	[4.01]	[4.12]	[75.73]
COLONY for 1900–1955	6.45	−0.82	−4.37	−5.05*	−97.37*
	[4.05]	[3.78]	[2.71]	[3.04]	[53.08]
Controls:					
INCOME	YES	YES	YES	YES	YES
$(\text{INCOME})^2$	YES	YES	YES	YES	YES
Legal origins	YES	YES	YES	YES	YES
Regions	YES	YES	YES	YES	YES
Year dummies	YES	YES	YES	YES	YES
Countries	108	112	145	145	145
Observations	183	190	486	484	145
Adjusted R^2	0.957	0.976	0.956	0.959	0.947

Notes: Robust standard errors are reported in brackets. The sample years are 1990 and 2002 for columns 1 and 2, every fifth year during 1985 to 2000 for columns 3 and 4, and 2000 for column 5. For columns 3 to 5, the dependent variable is the mean value over the period from four years before to the present year, and DEMOCRACY since 1956 is the value for year $t - 5$. Germany and Yemen are dropped from the sample (see notes for Tables 1 and 2).

* Significant at 10 percent.

** Significant at 5 percent.

*** Significant at 1 percent.

higher by about nine points (more than 10 percent of the sample mean) in democracies compared to autocracies. For measles vaccination, democracy variables are not significant, while former colonies have lower immunization rates.[7]

Finally, column 5 investigates the relationship between democracy and government health expenditures per capita (excluding expenditures on water and sanitation provision). The specification is the same as in columns 3 and 4, with data available only for the year 2000. This suggests that governments in "permanent" democracy spend around $160 (in purchasing power parity terms) per person more on health than those in "permanent" autocracy.

III. Conclusion

Our results suggest that there is a robust correlation between democratic institutions and health, resulting in greater life expectancy in democracies. The fact that these results are robust to including education and political history as regressors, or including country fixed effects in a sample of countries that made a consolidated transition to democracy during our sample period, is encouraging to the view that political institutions matter.

The results contribute to a growing body of the literature that takes political economy factors seriously in understanding human well-being. The challenge now is to take this agenda beyond broad cross-country comparisons and into the detailed workings of political and bureaucratic behavior under different systems of government.

[7] See Lake and Baum (2001) and Varun Gauri and Peyvand Khaleghian (2002) for related results.

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