

Supplemental Material ('Appendix')

Health Cost of Autocratization

Appendix A. Descriptive Statistics

Table A1 presents the descriptive statistics of the major variables used in this paper. For comparability, only the observations used for the benchmark model are reported.

Table A1: Descriptive Statistics for the panel data

Variable	Mean	SD	Min	Max
autocratization	0.019	0.135	0	1
horizontal autocratization	0.015	0.121	0	1
vertical autocratization	0.016	0.126	0	1
leftist government	-0.074	0.455	-2.155	2.235
gender quota	0.665	1.276	0.000	4.000
democratic Legacy	2.744	0.760	0.408	4.108
growth rates	4.251	5.345	-62.076	64.070
ln(GDP)	25.084	1.968	20.129	30.617
ln(GDP per capita)	8.391	1.546	5.390	11.626
ln(Infant Mortality)	2.947	1.106	0.642	4.956
ln(female Life Expectancy)	71.885	9.811	36.078	86.854
ln(Total Health Expenditure, % of GDP)	1.725	0.431	-0.176	2.982
ln(Government Health Spending)	13.962	2.532	8.340	21.222
Pre-paid Private Health Expenditure / total	0.075	0.078	0	0.493
Out-of-pocket Health Expenditure / total	0.367	0.198	0.034	0.876

Appendix B. Robustness check for the benchmark panel data analysis

We implement four robustness checks for the benchmark panel data analysis result reported in Column 2 of Table 2. First, we use alternative health spending data solely focused on government health expenditure. Although we believe that resource reallocation can take various forms (hence our comprehensive health spending variable), government revenue is undoubtedly the place where our hypothesized effect of autocratization is to be observed. We use the percentage of government health spending in the entire health expenditure so as to obtain comparability across countries (IHME 2020). We also add two variables—pre-paid private spending and out-of-pocket spending—that should directly condition the relative size of government health spending. Because the relative size of government spending in the current year is a direct function of these two variables in the current year (and perhaps last year's too given how fiscal decisions are made), we lagged these two variables by two years. The result reported in Column 1 of Table A2 confirms that the benchmark result is not altered when this alternative dependent variable is used.

Our second robustness check concerns the sensitivity of our independent variable to alternative democracy data. We construct a discrete event data following Dresden and Howard (2016), who record any country-year where fair electoral competition, respect for civil liberty, or executive constraint was compromised as an observation of 'democratic backsliding.' Unlike Dresden and Howard, who focus on executive elections, we also include legislative elections in our analysis such that we have a more comprehensive coverage of backsliding episodes where the cases of executive branches damaging the competitiveness of legislative elections are also counted. Since an observable election-related event might not effectively capture the timing of an actual backsliding episode, we code this backsliding variable as one if a backsliding event is observed in the five years preceding the current year. This coding rule reflects our understanding of autocratization that can happen over a certain period of time and runs in parallel with the primary measure of autocratization where an accumulation of declines in the democracy index over a period of continuous years is recognized. Column 2 of Table A2 reports the result of replacing the primary autocratization variable with the alternative backsliding dummy discussed above. Again, the result is comparable to Column 2 indicating that our primary finding is not sensitive to the different measurement or dataset for the autocratization variable.

The last two robustness checks concern vertical accountability. As shown in Table 1, EDI reflects vertical accountability extensively. However, some aspects of vertical accountability, particularly the public's 'input' into the government featured prominently in our theoretical discussion, might not be sufficiently reflected in EDI. To see if this concern is warranted, we constructed two autocratization variables based on V-dem data. One is *vertical accountability (participation)*, which is coded one only when an autocratization episode involves a reduction in 'civil society participation' of V-dem. The other is *vertical accountability (assembly)*, coded one only if an autocratization episode coincides with an encroachment on the freedom of association. Columns 3 and 4 of Table A2 report the results

using these variables. The benchmark negative effect of autocratization is unaltered, indicating that the autocratization variable does in fact appropriately capture our idea of vertical accountability.

Table A2: Robustness Check for Panel Data Analysis

	(1)	(2)	(3)	(4)
	gov't spending	backslide	Vertical (partici.)	Vertical (association)
Autocratization	-0.015* (0.009)	-0.010** (0.005)	-0.045** (0.018)	-0.022* (0.013)
Leftist Govt	-0.006 (0.010)	0.000 (0.013)	0.002 (0.013)	0.004 (0.013)
Gender Quota	0.003 (0.003)	0.012** (0.004)	0.011** (0.004)	0.011** (0.004)
Democratic Legacy	0.280** (0.107)	0.094 (0.070)	0.085 (0.068)	0.084 (0.068)
Growth Rates	-0.001 (0.000)	0.000 (0.001)	-0.000 (0.001)	0.000 (0.001)
ln(GDP)	0.280** (0.087)	-0.248** (0.098)	-0.253** (0.099)	-0.251** (0.099)
ln(GDP per capita)	0.399** (0.093)	-0.150* (0.089)	-0.135 (0.090)	-0.139 (0.089)
Pre-paid private spending _{t-2}	-0.888** (0.210)			
Out-of-pocket spending _{t-2}	-0.760** (0.140)			
Country fixed	✓	✓	✓	✓
Year fixed	✓	✓	✓	✓
trend	✓	✓	✓	✓
<i>N</i>	3043	2423	2424	2424
Years	1997-2017	2000-2015	2000-2015	2000-2015
<i>R</i> ²	0.999	0.947	0.949	0.949

* $p < 0.10$, ** $p < 0.05$. OLS estimates with panel-corrected standard errors in parentheses. A panel- specific first-order autocorrelation (PSAR1) is applied.

Appendix C. Complementary Analysis on Infant Mortality Building on Kudamatsu (2012).

We draw on the benchmark model of Kudamatsu (2012)—Model 2 of Table 3 in page 1305 in particular—where we replaced the treatment variable with a dummy of autocratization. All the covariates from the original model, including the crucial mother fixed effect, are applied. As the linear probability model estimates reported in the first column of the Appendix Table A3 suggest, autocratization tends to increase the likelihood of a newborn dying within the first 12 month of its birth.

Further building on Kudamatsu (2012), we also ran a model that narrows down the scope of the sample to the mothers who gave birth to 1) at least two children and 2) at least one child was born after the autocratization so as to highlight the ‘within-mother variation.’ The estimates reported in the second column indicate that the devastating effect of autocratization on infant mortality remains significant—though slightly weaker—when the scope is limited to the cases around the autocratization. Given the ‘local’ nature of this analysis, the estimates are comparable to the RDD models estimates.

Table A3. Infant Mortality (died in the first year) using Demographic and Health Surveys (DHS)

	(1)		(2)	
	Full Sample		At least one child born after autocratization	
Autocratization	0.016**	(0.007)	0.360*	(0.177)
Democracy before 1990	0.004	(0.005)	0.744**	(0.217)
Girl	-0.014**	(0.001)	0.002	(0.019)
Multiple Children	0.231**	(0.010)		
<i>N</i>	615541		1459	
Number of mothers	159807		651	
Mother fixed effects	✓		✓	
Cohort-Year fixed effects	✓		✓	
Country Fixed effects	✓		✓	
Sibling dummies	✓		✓	
<i>R</i> ²	0.021		0.103	

Standard errors in parentheses, clustered over countries. * $p < 0.10$, ** $p < 0.05$. Using the data employed in Kudamatsu (2002).

Appendix D. Correlations between different autocratization measures.

Table A5 reports the correlations between different autocratization measures used in this paper. *Autocratization* is the primary autocratization variable in the paper. *Vertical autocratization* is the same as the one used in Column 3, Table 2. *Vertical autocratization (civil society)* and *vertical autocratization (assembly)* are the one used in Columns 3 and 4, Table A2, respectively. *Horizontal autocratization* is the same as the one used in Column 4, Table 2.

Table A5. Correlations between different measures of autocratization

	auto.	vertical auto.	vertical auto. (civil society)	vertical auto. (assembly)	horizontal auto.
autocratization	1				
vertical autocratization	0.9298	1			
vertical autocratization (civil society)	0.7271	0.7820	1		
vertical auto. (assembly)	0.8276	0.8901	0.7674	1	
horizontal autocratization	0.8927	0.8246	0.6767	0.7449	1

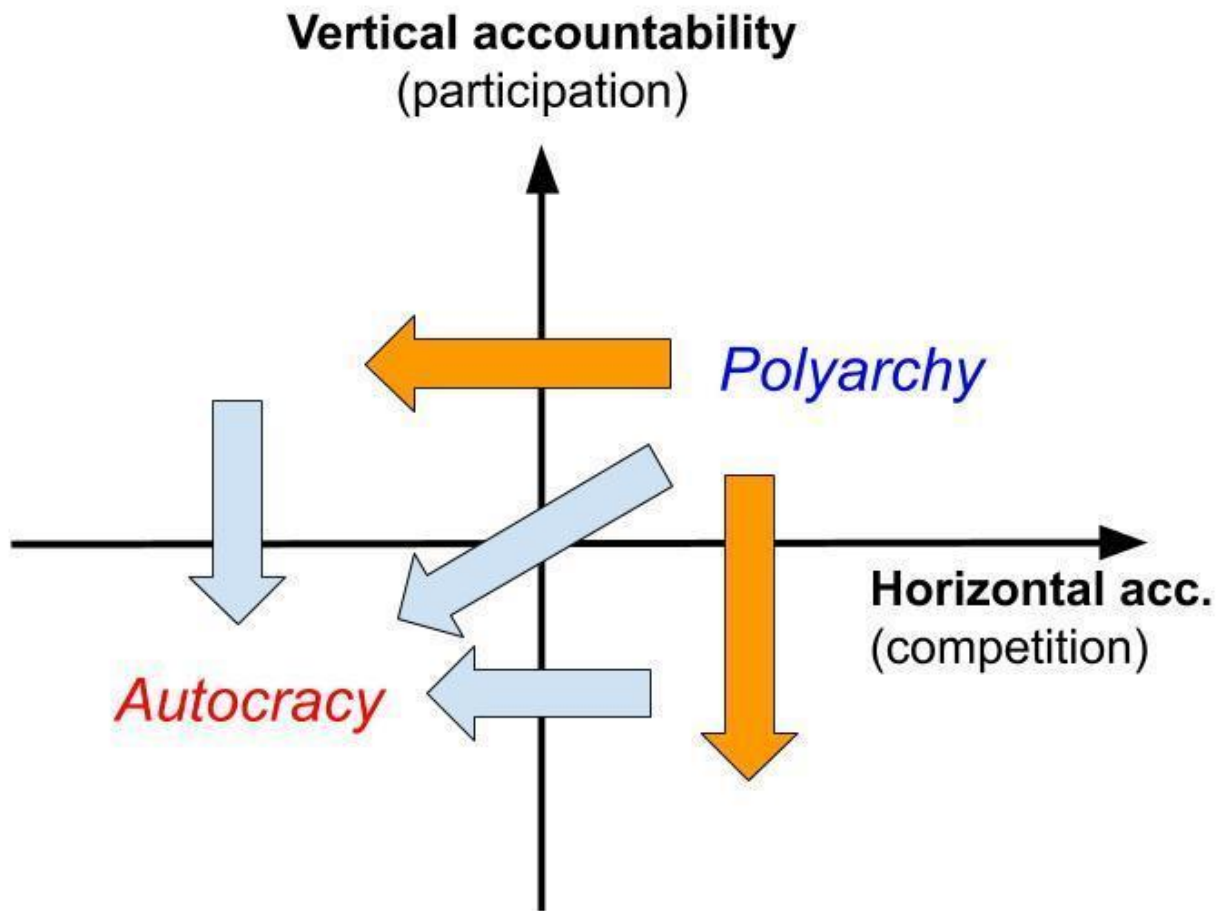
Appendix E. List of Autocratization Episodes

The episodes of autocratization identified in the sample used for the benchmark model are listed.

Table A6. List of Autocratization Episodes

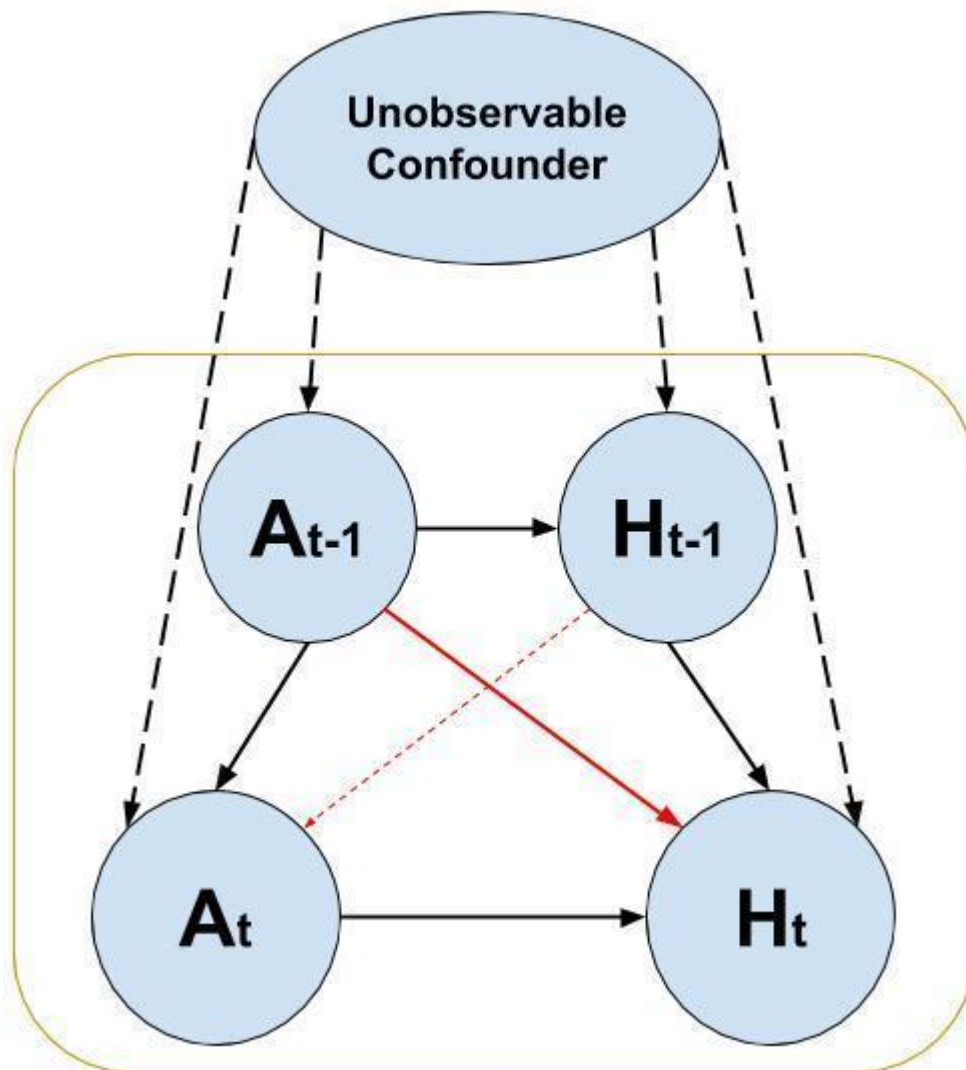
<i>country</i>	<i>year</i>	<i>country</i>	<i>year</i>
Haiti	2000	Burundi	2010
Moldova	2000	Zambia	2010
Fiji	2000	Cambodia	2010
Philippines	2001	Bahrain	2011
Armenia	2002	Brazil	2012
Bangladesh	2002	Moldova	2012
Nicaragua	2003	Mali	2012
Liberia	2003	Ghana	2012
Sri Lanka	2004	Maldives	2012
Macedonia	2005	Nepal	2012
Thailand	2005	Venezuela	2013
Bolivia	2006	Spain	2013
Fiji	2006	Poland	2013
Ecuador	2008	Croatia	2013
Turkey	2008	Niger	2013
South Korea	2008	Egypt	2013
Honduras	2009	Thailand	2013
Niger	2009	Burkina Faso	2014
Guinea	2009	Yemen	2014
Madagascar	2009	Bangladesh	2014
Hungary	2010	Dominican Republic	2015
Ukraine	2010	Lesotho	2015
Guinea-Bissau	2010	Comoros	2015

Figure A1. Backsliding and Autocratization



Note: The traditional literature on democratic backsliding tend to focus on the movement from polyarchy either vertically or horizontally (orange arrows). The concept of autocratization is more inclusive, in that it also identifies all movements towards autocracy (thus, further movement away from polyarchy) including a drastic collapse of polyarchy right into autocracy (the diagonal arrow).

Figure A2. Confoundedness in the panel design



A: autocratization; H: health outcomes. The dashed line from H_{t-1} to A_t implies that the past outcome (e.g., a public health crisis) may affect the chances of the current treatment (autocratization). Similarly, the ‘carry-over’ effect of the past autocratization on the current health outcomes (A_{t-1} to H_t) is likely present given the (often) long duration of autocratization. Under these conditions, estimates of a unit fixed effect model would be biased (Imai and Kim 2019).

Figure A3. Health Care Expenditure Distribution (% , GDP)

