

Autocratization and Health Outcomes

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Abstract (150 words)

If autocratization, like autocracy, helps political insiders at the expense of political outsiders, it should lead to lower primary health care spending as a share of GDP, less widespread access to quality health services, and higher infant mortality. This chapter explores these hypotheses statistically across up to 165 countries observed annually between 1990 and 2019. It finds that autocratization is associated, as predicted, with lower primary health care spending as a share of GDP and, less robustly, with narrower access to quality health care services. In some analyses, however, autocratization is also found to be associated, unexpectedly, with lower infant mortality. Possible explanations for this unexpected result include statistical artifacts, left- and right-wing ideologies, and government manipulation of infant mortality data. Importantly for future research, many of the study's findings proved to be highly sensitive to the autocratization indicator chosen, statistical method used, country cases studied, and time period observed.

Biographical Sketch

James W. McGuire, Professor in the Department of Government at Wesleyan University, specializes in democracy, welfare policies, and public health.

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1. Introduction

This chapter explores the impact of autocratization on primary health care spending, health service coverage, and infant mortality. Autocratization involves "a decline of democratic regime attributes," involving both democratic breakdowns and "gradual processes within and outside of democratic regimes where democratic traits decline" (Lührmann and Lindberg 2019: 1095, 1099). Time-series cross-sectional regression analyses reported below find that autocratization is associated with lower primary health care spending as a share of GDP and, less robustly, with a lower score on the World Health Organization's cumbersomely-named Universal Health Coverage Service Coverage Index. Autocratization's effect on the infant mortality rate, however, is found to vary according to the chosen statistical technique, autocratization measure, country cases, and time period. The results also show that anti-female gender bias is associated even more robustly than autocratization with weaker performances on the three health-related outcomes. To the extent that the purpose of the *Handbook of Autocratization* is to guide future research -- some of which is likely to be quantitative -- the chapter's most important finding is that the autocratization measures, statistical techniques, country cases, and time periods that the researcher chooses can lead to dramatically different conclusions about autocratization's causes and consequences.

The chapter begins by reviewing existing work on autocratization and health outcomes, outlining gaps in the literature. It then introduces the hypotheses to be explored, describes the variables used, explains the methodologies employed, summarizes the results of the analyses, and discusses the implications of the findings for research on autocratization and on health outcomes. The analyses confirm that choices among autocratization measures can yield different

sets of autocratization cases (Schedler, this volume), but also illustrate that large-scale time-series cross-country analyses can illuminate how autocratization affects important human development outcomes (Higashijima, this volume). Large-scale observational studies cannot alone confirm causal relations or do justice to the specificities of historical experience, but individual case studies and small-scale comparisons cannot alone provide a firm basis for generalization, which is a central goal of scientific research (Tomini, this volume).

2. Recent Cross-National Studies of Autocratization and Health Outcomes

As of mid-2023, the impact of autocratization on health-related outcomes had been addressed explicitly in only two readily-accessible English-language journal articles, those of Wigley et al. (2020) and Son and Bellinger (2022). Wigley et al. (2020) used the synthetic control method to estimate the impact of autocratization, as measured by Lührmann and Lindberg (2019), on health care spending, health service coverage, and health status. Comparing 17 countries that autocratized in 2000-2010 to 119 countries that didn't, they found that, 10 years after the onset of an autocratization episode, the WHO Universal Health Coverage Service Coverage Index rose only 11.9 percent in autocratizers, behind the 19.8 percent in non-autocratizers. HIV-free life expectancy at age 5 rose only 2.2 percent among autocratizers, short of 3.5 percent among non-autocratizers, and out-of-pocket health spending, reflecting inadequate risk-pooling, rose 10.0 percent in autocratizers but only 4.4 percent in non-autocratizers.

In the synthetic control method, a historical watershed (e.g., the onset of an autocratization episode) is stipulated to be a treatment, while a group of cases that are found to be similar to the focus case before the treatment are statistically combined into a control unit. Identification of the relevant determinants is then achieved by comparing the focus case to the

treatment unit over a subsequent span of time. The synthetic control method has been used to study the impact of democratization on premature mortality (Pieters et al. 2016, Bollyky et al. 2019). It has some drawbacks, however. It is usually confined to a one or a few treatment cases, raising the stakes of the researcher being able to identify a complete set of relevant treatment and non-treatment cases (Watson 2016). Also, the method requires the researcher to identify the point in time when the treatment was administered, about which consensus is often elusive. In India, autocratization began either in 2000 (Maerz et al. 2022, 2023), 2002 (Maerz et al. 2020), or 2014 (Pelke and Croissant 2020). In Türkiye, the first year of autocratization may have been either 2005 (Maerz et al. 2022, 2023), 2007 (Maerz et al. 2020), or 2013 (Pelke and Croissant 2020). In the United States, Pelke and Croissant (2020) and Maerz et al. (2020) detected autocratization from 2015 to 2019, but Maerz et al. (2023) identified the first year of US autocratization as 2016, and Maerz et al. (2022) found that no autocratization at all took place in the United States from 2015 to 2019 (Appendix Table A13).

It seems reasonable, then, when studying the statistical impact of autocratization on health care spending, health service coverage, and health status, to complement the synthetic control method with time-series cross-sectional analysis. Using that procedure, Son and Bellinger (2022a) explored the statistical impact of autocratization on particular measures of health care spending and health status across up to 183 countries observed annually from 2000 to 2015. With respect to health care spending, the study found that "when an autocratization episode takes place, the overall volume of a country's healthcare expenditure shrinks by about 2.6 per cent. Given [an] average annual change of about 0.56 per cent, this is a substantial effect." As to health status, the study concluded that "when an autocratization episode unfolds, infant mortality spikes up..." (Son and Bellinger 2022a: 880-881).

In all definitions of autocratization that have thus far been operationalized on a large scale, a country-year gets a "1" if it is part of an autocratization episode, and a "0" if not. Apart from this commonality, definitions differ substantially (Croissant and Pelke, this volume; Lindberg et al., this volume; Tomini, this volume). For example, Son and Bellinger's (2022a) operationalization of autocratization as initial-year disturbances differs from the operationalizations of other scholars, where autocratization is conceptualized as multi-year episodes. Son and Bellinger (2022a: 879) write that "we follow Lührmann and Lindberg's (2018) measure of 'autocratization' to construct our primary independent variable," but in fact their operationalization is quite different from that of the scholars they cite. Son and Bellinger's (2022c) health care spending data spanned 156 countries in the period from 2000 to 2015, 2,460 country-years. During this period they identified 46 episodes of autocratization, each exactly one year long, whereas Lührmann and Lindberg (2018) identified 14 autocratization episodes, of which 9 lasted longer than a year. Between 1990 and 2017 (the period over which they had annual data on the other dependent variable, infant mortality), Son and Bellinger (2022c) identified 75 autocratization episodes, each again exactly one year long. During the same period (1990-2017) Maerz et al. (2020), with whom Lührmann and Lindberg collaborated, recorded 87 episodes, each lasting an average of 4.8 years. Pelke and Croissant (2020) recorded 98 episodes, each lasting an average of 4.5 years (Appendix Table A12).

The different operationalizations of autocratization in the three coding projects yield different conclusions about the statistical impact of autocratization on total health care spending and on infant mortality. Son and Bellinger's (2022a) 46 year-long episodes of autocratization from 2000 to 2015 were associated significantly with lower total health care spending, and their 75 year-long episodes from 1990 to 2017 were associated significantly with higher infant

mortality. These results proved not to be robust, however, to alternative operationalizations of autocratization that allow for episodes lasting more than one year. In Table 1, Models 1 and 4 replicate Son and Bellinger's (2022a: 880) analyses, using their data, method, and program. Models 2, 3, 5, and 6 substitute alternative indicators of autocratization. The coefficient on each of the alternative indicators fails to achieve statistical significance, and in two of four models the sign of the Son and Bellinger autocratization coefficient reverses the sign of one of the other autocratization coefficients. It therefore seems useful to undertake a new time-series cross-country analysis of the impact of autocratization on health outcomes, substituting the Maerz et al. (2020, 2022, 2023) and Pelke and Croissant (2020) autocratization indicators for the Son and Bellinger (2022a) indicator, and utilizing a wider array of health outcomes, statistical techniques, country groups, and time periods than Son and Bellinger (2022a) employed.

[Table 1]

3. Variables and Hypotheses

To the extent that autocratization increases the political influence of the advantaged relative to the disadvantaged, one would expect it to be associated with lower primary health care spending, less accessible and lower-quality health services, and higher infant mortality, once other determinants of those health-related outcomes were taken into account.

Primary health care is the "level of a health service system that provides entry into the system,...person-focused (not disease-oriented) care over time,...care for all but very uncommon or unusual conditions, and [that] coordinates or integrates care provided elsewhere or by others" (Starfield 1998: 8-9). Typical primary health care activities include health education, family

planning, nutrition assistance, sanitation, disease control, simple curative care, immunization, and maternal and child health services. Developing country governments that have done well on population health have often effectively financed or provided primary health care (McGuire 2010a), but primary health care can be financed and provided by private-sector and transnational institutions as well as by various levels of government (Hanson et al. 2022).

Primary health care spending in developing countries often favors the rich more than the poor, but less so than secondary and tertiary health care spending (Gwatkin, Bhuyia, and Victora 2004). Also, "primary care is thought to be both less costly to individuals and more cost-effective to society -- thus freeing up resources to attend to the health needs of the most disadvantaged" (Macinko, Starfield, and Shi 2003: 832-833). The WHO (2021a) identified primary health care as a linchpin of progress toward universal health service coverage, which should also benefit the poor. Accordingly, it seems useful to explore the association of autocratization and other factors with *primary* health care spending as a share of GDP, complementing previous studies (e.g., Son and Bellinger 2022a) of such associations with *total* health care spending as a share of GDP.

Schneider et al. (2021) provide estimates of primary health care spending in 2017 US dollars for 134 low- and middle-income countries in each year from 2000 to 2017 (IHME 2021). In the present analysis, these dollar amounts are divided by GDP in constant 2015 US dollars (World Bank 2023) to obtain figures for primary health care spending as a share of GDP. These figures are skewed right, so they are (natural) log-transformed. If autocratization reduces the political influence of the poor, who stand to gain the most from primary health care spending, then autocratization should be associated with lower primary health care spending as a share of GDP, adjusting for other factors that could affect this outcome.

The World Health Organization's (WHO) Universal Health Coverage Service Coverage Index (Hogan et al. 2018) is "reported on a unitless scale of 0 to 100, which is computed as the geometric mean of 14 tracer indicators of health service coverage" related to reproductive, maternal, newborn and child health, infectious diseases, noncommunicable diseases, and service capacity and access. The Index is available for 192 countries for the years 2000, 2005, 2010, 2015, 2017, and 2019 (WHO 2021b). Annual data for missing years were linearly interpolated. If those with limited health care access have less political clout under autocratizing than under non-autocratizing regimes, then autocratization should be associated with a lower score on the WHO health service coverage index, adjusting for other factors likely to influence that score.

Studies that explore the association between political regime form and population health choose infant mortality more often than any other outcome (McGuire 2020: 25). Infant mortality data exist for 195 countries at all income levels in each year from 1990 to 2021 (World Bank 2023). National infant mortality rates reflect the influence of a wide variety of factors apart from social policies, but if autocratization is found to be associated with infant mortality after adjusting for other factors, social (including health) policies would be among the most likely mediators of the association. Autocratization is thus expected to be associated with higher infant mortality, controlling for other plausible determinants of this outcome. Like the other measures that are skewed right, infant mortality data are (natural) log-transformed.

The analyses reported below use six control variables: GDP per capita (natural log), GDP growth, left government, the presence and stringency of a legislative gender quota, a broader V-Dem index of gender bias in society (natural log), and, in analyses predicting primary health care spending and health service coverage, the old age dependency ratio.

Total health care spending as a share of GDP tends to rise with the level of GDP (WHO 2008: 82). The same is to be expected for primary health care spending as a share of GDP. Among low- and middle-income countries (the only countries for which data are available), per capita spending on primary health care is highest for upper middle-income countries, next-highest for lower middle-income countries, and lowest for low-income countries (Schneider et al. 2021: 9). When people have more resources, they tend to demand more health care (Hall and Jones 2007), including primary care. Higher GDP per capita also makes it easier for the government to serve the previously excluded, who benefit disproportionately from primary health care, while minimizing the need to finance the expansion by taking resources away from the previously included. Faster economic growth is expected to reinforce these effects. So, both higher GDP per capita and faster GDP growth are expected to be associated with greater primary health care spending as a share of GDP, the former in the long run and the latter in the short run.

Greater economic affluence and faster economic growth are also expected to be associated with a higher score on the WHO Universal Health Coverage Service Coverage Index. Higher GDP per capita and faster GDP growth facilitate the expansion of health services to the previously excluded, minimizing the need to reallocate them away from the previously included. Across 170 countries from 1990 to 2019, GDP per capita (as well as democratic quality as measured by the V-Dem v10 Electoral Democracy Index) had a positive association with the WHO Universal Health Coverage Service Coverage Index (Templin et al. 2021: 1237).

The "Wealthier is Healthier" conjecture (Pritchett and Summers 1996) holds that higher GDP per capita should be associated with lower infant mortality. Plenty of evidence supports this hypothesis (McGuire 2010a, 2013; Cole 2019). As for economic growth, Nishiyama (2011)

found that, although economic booms are neither uniformly nor substantially beneficial for infant survival, economic slumps are robustly inimical to it. GDP per capita is measured in 2017 international dollars at purchasing power parity, and GDP growth is measured in market prices based on constant local currency (World Bank 2022). GDP per capita is skewed right and so is (natural) log-transformed. The annual percentage growth of GDP is not transformed.

A third control variable is left government. All else equal, governments that claim to speak for the disadvantaged should devote a higher share of health spending to primary care, achieve more widespread access to quality health services, and encourage steeper declines and lower levels of infant mortality. To measure left government, Son and Bellinger (2022a) multiplied a V-Dem v10 variable measuring the extent to which a government pushes any ideology at all (v2exl_legitideol) by a V-Dem v10 variable measuring whether a government holds a "social or communist" ideology (v2exl_legitideol_1). That method is adopted here.

A fourth control variable is the V-Dem Exclusion by Gender Index, which combines expert ratings for each country-year of the degree of gender inequality in power distribution, respect for civil liberties, and access to public services, state jobs, and state business opportunities. The Index ranges from 0.000 to 1.000; a higher score means more exclusion of women. For reasons adduced by Clayton and Zetterberg (2018) as well as by Roggebrand and Kriszán (this volume), the Index is expected to be associated with lower primary health care spending as a share of GDP, lower coverage by quality health services, and higher infant mortality. The Index is skewed right, so it is (natural) log-transformed.

A fifth control variable is a V-Dem index of the presence and stringency of a legal gender quota for the national lower or unicameral legislative house (Coppedge et al. 2023, variable

v2lgqugen). Reviewing studies of gender differences in policy preferences, Clayton and Zetterberg (2018: 920) found "strong evidence that women citizens and women MPs support increased funding for public health, particularly maternal and child health care." Using pooled ordinary least squares regression models to analyze 139 countries observed annually from 1995 to 2012, they found that when a gender quota leads to a sharp rise in the female share of legislative seats, health spending rises as a share of total government spending.

Similar logic would predict that the presence and strength of a gender quota should be associated with more widespread health service coverage and with lower infant mortality. Across 24 Argentine provinces observed annually from 1991 to 2004, the presence of a gender quota for the lower legislative house was associated significantly with lower infant mortality (McGuire 2010b: 58). The V-Dem gender quota measure is scaled from 0 to 4. Zero means that no quota was in effect in the indicated country-year; 1-3 records the presence of a quota with no (1), weak (2), or strong (3) sanctions for non-compliance, and 4 corresponds to reserved seats for women, with or without a quota. To put the V-Dem gender quota on the same scale as the V-Dem Exclusion by Gender Index, it is rescaled from 0 to 1 by dividing the original scores by 4.

A sixth control variable is old age dependency, the ratio of persons aged 65 and over to persons aged 15 to 64 (World Bank 2022). Old age dependency is included only in the models predicting primary health care spending as a share of GDP and the WHO Universal Health Coverage Service Coverage Index. It is not expected to be associated with infant mortality. Primary health care services, as well as secondary and tertiary services, are in high demand among the elderly. The degree to which the elderly, as opposed to younger adults, influence health care policy differs according to country and time period, but the influence of the elderly is

always greater than the influence of infants. Accordingly, a higher share of elderly people in the population is expected to be associated with greater primary health care spending as a share of GDP and with greater coverage by quality health services, but not with lower infant mortality.

4. Methods

The statistical method used by Son and Bellinger (2022a) involved country and year fixed effects, a time trend variable, a panel-specific first-order autoregressive term, pairwise computation of the covariance matrix, and panel-corrected standard errors. The analyses reported below also include country and year fixed effects, and some of them also use a panel-corrected standard errors method involving pairwise computation of the covariance matrix. They differ from Son and Bellinger's (2022a) analyses, however, in that they complement the panel-corrected standard errors procedure with two other methods (one involving country-clustered standard errors and the other Driscoll-Kraay standard errors), lag the predictor variables a year behind the outcome variables, and include country and year fixed effects but no time trend. In using the panel-corrected standard errors method, moreover, the analyses use a common first-order autoregressive term, as Beck and Katz (1995) recommend, rather than a country-specific first-order autoregressive term, which Son and Bellinger (2022a) used. The analyses reported below also exclude two control variables that Son and Bellinger (2022a) included. Democratic stock was excluded because at issue here is whether autocratization affects health outcomes, not whether autocratization affects health outcomes contingent on accumulated democratic experience. The natural log of GDP was excluded because it seemed redundant with the natural log of GDP per capita, which remains a control variable.

As described by Beck and Katz (1995), the panel-corrected standard errors procedure (PCSE) uses an ordinary least squares (OLS) estimator unless and until a first-order autoregressive term is added, invoking a Prais-Winsten estimator. The standard errors produced by this composite procedure are robust to autocorrelation, groupwise heteroskedasticity, and cross-sectional correlation of the error term. Beck and Katz (1995: 640) discourage the use of a panel-specific first-order autoregressive term, which requires estimating as many parameters as units, allowing imprecision to cumulate. Monte Carlo simulations show that a panel-specific term can produce excessively small standard errors, especially when the data are highly trended and the number of time periods is less than 30. Beck and Katz (1995: 640) recommend instead using a common first-order autoregressive term, which requires estimating only one parameter.

A disadvantage of PCSE for the datasets analyzed here, which include 114-165 countries but only 18-30 annual observations in each country, is that "the finite sample properties of the PCSE estimator are rather poor when the panel's cross-sectional dimension N is large compared to the time dimension T " (Hoechle 2007: 284). Indeed, the Stata manual pages for the procedure note that the PCSE estimators "achieve their asymptotic behavior as the T 's approach infinity" (StataCorp 2023: 405). Beck (2001: 278), however, citing the Monte Carlo simulations he ran with Katz, reports that "PCSEs are very accurate (to within a few percent) for $T > 15$."

For "large N , small T " datasets analyzed with fixed-effect regressions producing "non-spherical" error terms, Hoechle (2007) recommends using ordinary least squares with Driscoll and Kraay (1998) standard errors. Like panel-corrected standard errors, Driscoll-Kraay standard errors are robust to groupwise heteroskedasticity, temporal autocorrelation, and cross-unit correlation, but become more precisely estimated as the number of observed time periods rises

(Hoechle 2007: 299). Hansen (2022: 467) regards Driscoll-Kraay standard errors as "better suited for large- n panels than are PCSE estimates," but Millo (2017: 9) finds them potentially misleading for data sets with fewer than 20-25 time periods. Also, when residuals in fixed effects analyses are correlated more closely over time than across units, Vogelsang (2011: 39-40) finds that ordinary least squares with country-clustered ("Rogers") standard errors, which are robust to heteroskedasticity and time-series autocorrelation but not to cross-unit correlation, are more conservative (wider, less likely to produce a false positive) than Driscoll-Kraay standard errors. In the analyses reported below, indeed, Driscoll-Kraay standard errors turn out to be almost invariably narrower (more generous) than country-clustered or panel-corrected standard errors.

New procedures for analyzing time-series cross-sectional data are constantly emerging, but over the past 15-25 years the three go-to procedures have been OLS estimation with country-clustered standard errors, OLS estimation with Driscoll-Kraay standard errors, and OLS and Prais-Winsten estimation with panel-corrected standard errors. Each procedure has strengths and weaknesses for analyzing datasets like the ones used here, which combine large numbers of units with a much smaller number of time periods. The panel-corrected standard errors and Driscoll-Kraay procedures are based on "large- T asymptotics," which means that their parameter estimates become more precise as the number of time periods rises. The country-clustered standard errors procedure, in contrast, yields precise estimates even when the universe of cases includes many more units than time periods, but unlike the other two procedures, it is not robust to cross-sectional correlation of the error term. Given these differing strengths and weaknesses, the present study re-estimates each model using each of the three procedures.

5. Results

Autocratization is expected to have harmful effects on health-related outcomes, fairly directly through health care spending, less directly through health service delivery, and still less directly through population health status. So, if autocratization affects the health-related outcomes of interest in this chapter, one would expect it to be associated most robustly with primary health care spending as a share of GDP, next-most robustly with the WHO Universal Health Coverage Service Coverage Index, and least robustly with infant mortality. An apples-to-apples comparison of the statistical impact of autocratization on the three outcomes requires restricting the data to country-years with data on all three outcomes, on both autocratization measures, and on all control variables. That leaves 110 developing countries observed over 18 years (2000-2017), as well as four additional countries observed over 14-17 years (the countries are listed in Appendix Table A9), for a total of 2040 country-years.

Tables 2-4 present the results of the models predicting these outcomes in this developing country data set. Each table includes six models, three using the Pelke and Croissant (2020) autocratization indicator and three using the Maerz et al. (2020) indicator. The statistical impact of each indicator on the health-related outcome is assessed first using an ordinary least squares (OLS) estimator with country-clustered standard errors, next using an OLS estimator with Driscoll-Kraay standard errors, and finally using OLS and Prais-Winsten estimators with panel-corrected standard errors. In the panel-corrected standard errors models the addition of a correction for first-order temporal autocorrelation invokes a Prais-Winsten estimator, which shrinks the value of both the coefficient and its standard error to such a degree that they cannot be meaningfully compared to those estimated with OLS. The ratio of coefficient to standard error changes much less, however, so t- and z-statistics allow a rough comparison of the precision of the estimates produced by each of the three methods.

[Tables 2, 3, 4]

In the 2040 country-year dataset autocratization was associated, as predicted, with lower primary health care spending as a share of GDP (Table 2). Each of the six autocratization coefficients had a negative sign, and five of the six were statistically significant at least at the .10 level. Because the dependent variable is expressed in natural log form, the -.062 OLS coefficient on the Pelke and Croissant (2020) autocratization indicator means that primary health care spending as a share of GDP in an autocratizing country-year (N=278) is estimated to be about 6 percent lower than such spending in a non-autocratizing country-year (N=1762). Using the Maerz et al. (2020) autocratization indicator, it is estimated to be about 4 percent lower.

Using the same dataset there was no sign that autocratization was associated, as predicted, with the WHO Universal Health Coverage Service Coverage Index (Table 3). In the models using the Driscoll-Kraay standard errors, however, autocratization was associated significantly -- and, unexpectedly, negatively -- with the infant mortality rate (Table 4, Models 2 and 5). As with primary health care spending as a share of GDP, the dependent variable, infant mortality, is expressed in natural log form, so the -.023 OLS coefficient on the Pelke and Croissant (2020) autocratization indicator (Table 4, Models 2 and 3) means that infant mortality is estimated to be about 2.3 percent lower in autocratizing country-years than in non-autocratizing country-years. Using the Maerz et al. (2020) autocratization indicator infant mortality is estimated to be about 1.6 percent lower.

Limiting the dataset to 114 low- and middle-income countries observed annually from 2000 to 2016 excludes much useful information. It is instructive to explore whether the findings for the 2040 country-year dataset hold up when the universe of cases is expanded to include both

high-income countries and a longer time series. Such data are available for the WHO Universal Health Coverage Service Coverage Index and for infant mortality.

The WHO calculated its Universal Health Coverage Service Coverage Index for 192 countries in 2000, 2005, 2010, 2015, 2017, and 2019 (WHO 2021b). Scaled 0 to 100, it ranged from 14 (Somalia 2000) to 89 (Canada 2017). Of the 192 countries 29 lacked complete data on at least one control variable, leaving a 3246 country-year dataset (163 countries observed over 17-20 years, listed in Appendix Table A10). In this dataset, unlike in the 2040 country-year dataset (Table 3), autocratization *did* have the expected significant negative statistical effect on the WHO Universal Health Coverage Service Coverage Index, but only when the autocratization measure came from Maerz et al. (2020) (Table 5, Models 5 and 6). The magnitude of the effect was small, however. The coefficient in Table 5, Model 5 implies that the index averaged 56.1 in autocratizing country-years (N=523), not much lower than the 56.7 in non-autocratizing country-years (N=2723). Also, the association between autocratization (as well as the control variables) and the WHO Universal Health Coverage Service Coverage Index may be exaggerated. In each country interpolation produced 14 of the 20 annual observations, so the dataset contains only about 30 percent of the information implied by the number of country-years analyzed.

[Table 5]

Complete data on infant mortality, as well as on autocratization and control variables, were available for 4731 country-years, 1990-2019, across the 165 countries listed in Appendix Table A11. In all six models predicting the infant mortality rate from 1990 to 2019 the sign on the autocratization coefficient was unexpectedly negative (Table 6), just as it was in the dataset with 114 developing countries observed annually from 2000 to 2017 (Table 4). In the 4731

country-year dataset, however, the negative coefficient was statistically significant only using the Pelke and Croissant (2020) measure of autocratization and the OLS estimator with Driscoll-Kraay standard errors (Table 6, Model 2). The $-.022$ coefficient on the Pelke and Croissant (2020) autocratization indicator (Table 6, Models 1 and 2) means that infant mortality in autocratizing country-years ($N=464$) is expected to be about 2.2 percent lower than in non-autocratizing country-years ($N=4143$).

[Table 6]

The association between autocratization and infant mortality was highly sensitive, however, to the particular time series analyzed. Using the Pelke and Croissant (2020) measure, the sign on the autocratization coefficient flipped from negative to positive as the number of years in the time series declined and as the end year of the time series receded from 2019 (Table 7). The $+0.047$ OLS coefficient yielded by the 1990-1997 analysis implied that infant mortality was 4.7 percent *higher* in autocratizing than in non-autocratizing country years, compared to the estimate of 2.2 percent *lower* over the annual observations from 1990 to 2019.

[Table 7]

The regressions reported in Table 7 vary according to time-series length as well as end year. If time-series length is held at 15 years, while the end year is allowed to vary from 2005 to 2019, the strongest (unexpected) negative association between autocratization and infant mortality is in the 2000-2014 series, when the Pelke and Croissant (2020) autocratization coefficient according to each of the three statistical methods is negative and significant at least at

the .10 level. The association is then attenuated as the period end-years go back in time; by 1991-2005 there is no significant association (Appendix robustness check 4).

To summarize, the unexpected negative statistical association between autocratization and lower infant mortality was neither strong nor robust to begin with (Tables 4 and 6). It fell as the number of years analyzed diminished and as the time series receded farther from the present. In the 15 years from 1990 to 2004, as well as over shorter periods also beginning in 1990, autocratization was associated, as expected, with *higher* infant mortality, although not always at conventional levels of statistical significance (Table 7). Similar attenuation is visible over time in the association between autocratization and, respectively, primary health care spending as a share of GDP and the WHO Universal Health Coverage Service Coverage Index. On these two indicators, however, the sign of the coefficient of the autocratization measure never switched from negative to positive (Appendix robustness checks 5 and 6), as it did in earlier years with the infant mortality rate (Table 7).

6. Discussion

Inferences about the relation between autocratization and health-related outcomes often change according to the autocratization measure employed, the statistical method chosen, the universe of cases analyzed, and the length and composition of the time series observed. Results even differ according to the successive *versions* of the Maerz et al. (2020, 2022, 2023) Episodes of Regime Transformation (ERT) database. Version 1 of the ERT was released in 2020; its autocratization measure is based on the V-Dem v10 Electoral Democracy Index (EDI). Versions 4 and 13 of the ERT were released in 2022 and 2023 respectively; their autocratization measures

are based on the EDI figures from V-Dem v12 and v13. Autocratization is defined identically in each version of the ERT database. What changes is the V-Dem Electoral Democracy Index.

V-Dem each year updates the Electoral Democracy Index point estimates and confidence intervals on the basis of which the ERT colleagues decide whether to code a country-year as autocratizing or non-autocratizing. As a result, in each version of the ERT database, different sets of country-years get coded "1" on *aut_ep* (being part of an autocratization episode). V-Dem coders may change their previous ratings when they receive new information, and every new release of the V-Dem dataset involves the recruitment of new coders as well as the attrition of previous coders (Coppedge et al. 2023: codebook 27-28). Also, the anchoring vignettes on which coders are trained change from version to version. Bayesian inference is used to reconcile ratings, and the simulations it requires produce slightly different estimates on each run. When a new year or a new country is added to the database, the ratings reconciliation algorithms usually change existing values by at least a small amount. Bug fixes can also alter country-year estimates even without changes in the input data (von Römer 2020). The V-Dem coding processes are thoughtfully constructed, but their limitations need to be recognized. "Subjective" indicators of democracy involving expert ratings have generic problems (Pelke and Croissant, this volume). The coding processes just outlined underscore some of them.

V-Dem's coding processes are inevitably data-changing, but they are also carefully designed to be as valid and reliable as possible. Were these coding processes not to take into account the latest information, the latest expert judgments, and the latest refinements of the algorithms for translating the information and judgments into country-year EDI values, the most recent version of the ERT dataset would be of lower quality. The shifting values of the V-Dem

EDI nevertheless mean that any statistical findings involving previous versions of the ERT dataset should be subjected to a sensitivity check using the latest version. Of 5169 country-years from 1990 to 2019 with EDI values in V-Dem v10, v12, and v13 alike, only 36 country-years had identical values in each version (Appendix Table A14). In the other 5133 country-years the values differed, in some cases substantially. Fiji in 2002 received a .649 on the Electoral Democracy Index in v10, a .545 in v12, and a .320 in v13. Malawi in 1994 received a .264 on the Electoral Democracy Index in v10, a .379 in v12, and a .460 in v13 (Appendix Table A15).

Different versions of the ERT database can sometimes change inferences about the association between autocratization and health-related outcomes. OLS with country-clustered standard errors was used to estimate the association between autocratization and primary health care spending as a share of GDP across 114 countries observed annually from 2000 to 2017 (Table 8). Using the Pelke and Croissant (2020) measure, the autocratization coefficient of $-.062$ was statistically significant at the .05 level. Using the Maerz et al. (ERT) measures, the coefficient shrank and fell short of statistical significance, especially in the 2023 version. Moreover, the magnitude of the coefficient was about twice as great when using the Maerz et al. (2020) autocratization indicator as when using the Maerz et al. (2023) indicator (Table 8). Similar differences in coefficient magnitude were found when the autocratization indicators from different versions of the ERT database were used to predict the WHO Universal Health Coverage Service Coverage Index and the infant mortality rate (Appendix robustness check 12).

[Table 8]

The most perplexing finding to emerge from this study is that autocratization was associated in some analyses with lower rather than higher infant mortality. At least three possible

explanations exist for this unexpected result. The first is statistical artifact. The significant negative coefficients on autocratization as a predictor of infant mortality emerged only in longer and more recent time series, and only when analyzed using OLS with Driscoll-Kraay standard errors. Using country-clustered or panel-corrected standard errors, all of the negative coefficients on autocratization fell short of statistical significance, even in the longer and more recent time series (Table 7). If Driscoll-Kraay standard errors are too small, especially in analyses using short ($T < 30$) and highly trended time series, that alone could explain the unexpected finding.

A second possible explanation for the unexpected association between autocratization and lower infant mortality is ideology. Autocrats have often instituted or at least presided over improved maternal and infant health care and nutrition policies in impoverished communities, motivated on the left by egalitarian ideologies (as in Cuba or Vietnam) and on the right by a belief that women and children are helpless and in need of a powerful father to protect them. Mussolini exhibited this type of paternalism in Italy in the 1930s (Ipsen 1996) and Pinochet did so in Chile in the 1970s (McGuire 2010a). Being remarkably cheap, such policies would be a cost-effective way to bolster public support for a government that lacks the procedural legitimacy associated with fair elections and the preservation of basic rights. To the extent that autocratizers behave like autocrats, egalitarian or paternalistic ideologies could thus explain why infant mortality is lower in autocratizing than in non-autocratizing country-years.

A third possible explanation for the association, in some of the regressions, between autocratization and lower infant mortality is data manipulation. Internationally, infant mortality is among the most conspicuous indicators of "how a country is doing," giving political leaders an incentive to understate it. If this incentive is stronger among political leaders who lack the

procedural legitimacy that comes with holding fair elections and preserving basic rights, the incentive to manipulate infant mortality data would be stronger in autocratizing than in non-autocratizing country-years. Complementing the greater incentive to manipulate the infant mortality rate is greater capacity. In autocratizing regimes compared to non-autocratizing regimes the media, opposition parties, and civil society have a lower capacity to review and criticize statistics released by the government (Wigley 2022: 1).

Data manipulation by autocratic governments has been demonstrated in other contexts. Comparing GDP figures reported by governments to GDP figures estimated by night lighting as recorded by satellites, Martínez (2022: 2747) found that "autocracies exaggerate GDP growth by about 35% relative to democracies." Comparing estimated excess deaths to reported Covid-19 deaths, Wigley (2022: 17) found that across 171 countries observed at the end of 2021, a 10 percent (.100) higher level of the V-Dem v12 EDI was associated with a 6 percent lower discrepancy between estimated excess deaths and reported Covid-19 deaths.

Even without directly falsifying infant mortality statistics, autocratic governments are well-suited to manipulate them indirectly. Strong evidence exists that the Cuban government, which reports remarkably low infant mortality rates (about two-thirds the US level), classifies some neonatal deaths as late fetal deaths. The government also encourages doctors to pressure expectant mothers to end risky pregnancies before they come to term (González and Gilleskie 2017; Mesa-Lago 2022).

Autocratization is not the only determinant of health-related outcomes. Low anti-female gender bias, represented by more stringent gender quotas and by a low score on the Gender Exclusion Index, was associated even more robustly than autocratization with the three health-

related outcomes, always in the expected direction. Much remains to be learned about the ways, degrees, and contexts in which autocratization contributes to health outcomes, about how and to what extent the impact of autocratization resembles or differs from the impact of autocracy, and about the relative impact of multiple factors on health spending, services, and status.

7. Conclusion

Using conservative statistical techniques including fixed country and year effects and alternative corrections for misbehaving errors, as well as five or six carefully-selected control variables, autocratization was associated robustly with a 4-6 percent lower GDP share devoted to primary health care spending, tentatively with about a 1 percent lower score on the WHO Universal Health Coverage Service Coverage Index, and unexpectedly with a 2-3 percent lower infant mortality rate, albeit only in longer and more recent time series, and only when using Driscoll-Kraay standard errors. In shorter and earlier time series using each of the three statistical methods, autocratization was associated with up to a 4-5 percent *higher* infant mortality rate. The findings withstood robustness checks involving modeling temporal autocorrelation, measuring infant mortality, extending the lag between predictors and outcomes, changing the length of and years included in the time series, and inserting additional control variables (Appendix).

The most important methodological finding to emerge from this study, and perhaps the most relevant finding for future research, is that quantitative studies using 0/1 autocratization indicators as either predictor or outcome variables would be well-advised to acknowledge that their findings may be specific to the autocratization measures, statistical methods, units of analysis, and/or time periods they employ. Autocratization was associated at the .05 level with lower primary health care spending as a share of GDP using the Pelke and Croissant (2020)

autocratization measure, but never using the Maerz et al. (2020, 2022, 2023) measures. Infant mortality was found to be lower during autocratization episodes only when using OLS with Driscoll-Kraay standard errors; never with any of the other methods. Even using OLS with Driscoll-Kraay standard errors, infant mortality was only lower during autocratization episodes when the regression was run on 20-30 year time spans from 1990 to 2009-2019. For 5-10 year time spans from 1990 to 1995-1999, autocratization was associated with significantly *higher* infant mortality using all three statistical methods (Table 7).

The study covered only the periods 1990-2019, 2000-2017, and 2000-2019, depending on the outcome observed. The statistical methods used are likely to be superseded in the next few years (Cook, Hays, and Franzese 2023), and the only outcomes considered in the study were health care spending, health service coverage, and infant mortality. Longer or shorter time periods, alternative statistical techniques, and alternative outcomes might fruitfully be explored. Some quantitative work has already been done on regime type and cash transfers (Barrientos 2022), regime type and fuel subsidies (Fails 2022), and regime type and equity in access to public services (Annaka and Higashijima 2021). This research could be extended from regime type (democracy and autocracy) to regime evolution (democratization and autocratization) and thus advance the understanding of how, how much, and in what contexts autocratization is similar to or different from autocracy in its effects on social policies and health outcomes.

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Table 1: Replication of Son and Bellinger 2022a: 880, Table 2

	(1)	(2)	(3)	(4)	(5)	(6)
	Current health care spending as % GDP (ln)	Current health care spending as % GDP (ln)	Current health care spending as % GDP (ln)	Infant mortality (ln)	Infant mortality (ln)	Infant mortality (ln)
Autoc Son Bellinger	-0.026*			-0.004*		
Autoc Pelke Croissant		-0.010			-0.001	
Autoc Maerz 2020			0.002			0.000
Leftist government	0.004	0.002	0.001	-0.003	-0.002	-0.002
Gender quota	0.011**	0.011**	0.011**	-0.002*	-0.003*	-0.003*
Democratic legacy (ln)	0.087	0.080	0.081	-0.042**	-0.041**	-0.042**
GDP annual growth	-0.000	0.000	0.000	0.000***	0.000***	0.000***
GDP (ln)	-0.246*	-0.250*	-0.250*	0.103***	0.103***	0.103***
GDP per capita	-0.141	-0.136	-0.138	-0.204***	-0.207***	-0.205***
N (country-years)	2424	2424	.2424	4155	4155	4155
R ²	.949	.948	.947	.993	.994	.994

⁺ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Pooled time-series cross-sectional data using ordinary least squares and Prais-Winsten estimators, panel-corrected standard errors, country and year fixed effects, a time trend, a panel-specific autoregressive term, and pairwise computation of the elements of the covariance matrix. Constant, year dummies, country dummies, and a time trend are included in each model but not shown.

The data on the control variables and the Stata do-file (the statistical program) were copied from Son and Bellinger (2023c).

The high R² includes the impact of fixed effects (manually introduced dummy (0/1) variables for each country and each year).

Autoc Son Bellinger: Son and Bellinger (2022c) autocratization indicator. Original variable: *auto*

Autoc Pelke Croissant: Pelke and Croissant (2020) autocratization indicator. Original variable: *auto_period01ci*

Autoc Maerz 2020: Maerz et al. (2020) autocratization indicator. Original variable: *aut_ep*

Table 2: Autocratization and Primary Health Care Spending, Developing Countries

Dependent var. -->	(1)	(2)	(3)	(4)	(5)	(6)
Method -->	phc % GDP xtreg	phc % GDP xtscc	phc % GDP xtpcse	phc % GDP xtreg	phc % GDP xtscc	phc % GDP xtpcse
Autoc Pelke Croissant	-0.062*	-0.062***	-0.021*			
Autoc Maerz 2020				-0.041+	-0.041**	-0.013
GDP per capita (ln)	-0.141+	-0.141**	-0.070	-0.141+	-0.141**	-0.069
GDP annual growth	-0.001	-0.001	0.000	-0.001	-0.001	0.000
Gender exclusion (ln)	-0.329**	-0.329***	-0.157**	-0.317*	-0.317***	-0.153**
Gender quota	0.069+	0.069***	0.019	0.067	0.067***	0.019
Left government	0.098*	0.098*	0.047*	0.088+	0.088*	0.044*
Old age dependency	0.017+	0.017***	0.015*	0.017+	0.017***	0.015*
N° country-years	2040	2040	2040	2040	2040	2040
Overall R ²			.756			.751
Within R ²	.201	.201		.195	.195	

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The numbers in the table are unstandardized regression coefficients.

The t and z scores on which the significance levels are based are provided in Appendix Tables 2-8.

Predictor variables are lagged one year behind the outcome variable.

Constant and two-way fixed effects (0/1 variables representing each country and each year) are included in each model but not shown.

Each model was run on 114 developing countries. In 109 countries 18 years were observed: 2000-2016 (outcome variable) and 1999-2015 (predictor variables). In 5 countries only 14-17 years were observed: Afghanistan: 2003-2016, Liberia 2001-2016, Libya 2000-2016, São Tome and Príncipe 2002-2016, Timor Leste 2001-2016 (Appendix Table A9).

phc % GDP: primary health care spending as a share of GDP, natural log (see text for source).

Autoc Pelke Croissant: Pelke and Croissant (2020) autocratization indicator. Original variable: *auto_period01ci*

Autoc Maerz 2020: Maerz et al. (2020) autocratization indicator. Original variable: *aut_ep*

xtreg, xtscc, and xtpcse are Stata 17 command names.

xtreg: two-way fixed-effects time-series cross-sectional regression with standard errors clustered by country (estimator: OLS)

xtscc: two-way fixed-effects time-series cross-sectional regression with Driscoll-Kraay standard errors (estimator: OLS)

xtpcse: two-way fixed-effects time-series cross-sectional regression with panel corrected standard errors, a correction for AR1 serial correlation common to all panels, and an error covariance matrix calculated pairwise rather than casewise (estimators OLS and, after adjustment for autocorrelation, Prais-Winsten).

Table 3: Autocratization and Health Service Coverage, Developing Countries

Dependent var. -->	(1) health service coverage	(2) health service coverage	(3) health service coverage	(4) health service coverage	(5) health service coverage	(6) health service coverage
Method -->	xtreg	xtscc	xtpcse	xtreg	xtscc	xtpcse
Autoc Pelke Croissant Autoc Maerz 2020	-0.075	-0.075	-0.127	-0.100	-0.100	-0.137
GDP per capita (ln)	4.689***	4.689**	2.926***	4.678***	4.678**	2.915***
GDP annual growth	-0.007	-0.007	-0.011*	-0.007	-0.007	-0.011*
Gender exclusion (ln)	-2.205	-2.205**	-0.815*	-2.227	-2.227***	-0.798*
Gender quota	-0.384	-0.384*	-0.134	-0.380	-0.380*	-0.134
Left government	1.789*	1.789*	0.513+	1.812*	1.812*	0.507+
Old age dependency	-0.565+	-0.565**	-0.229	-0.560+	-0.560**	-0.226
N° country-years	2040	2040	2040	2040	2040	2040
Overall R ²			.937			.936
Within R ²	.871	.871		.871	.871	

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Health service coverage: World Health Organization Universal Health Coverage Service Coverage Index, missing values interpolated. All else identical to Table 2.

Table 4: Autocratization and Infant Mortality, Developing Countries

Dependent var. -->	(1) infant mortality (ln)	(2) infant mortality (ln)	(3) infant mortality (ln)	(4) infant mortality (ln)	(5) infant mortality (ln)	(6) infant mortality (ln)
Method -->	xtreg	xtscc	xtpcse	xtreg	xtscc	xtpcse
Autoc Pelke Croissant Autoc Maerz 2020	-0.023	-0.023***	-0.006	-0.016	-0.016**	-0.002
GDP per capita (ln)	-0.310***	-0.310***	-0.156***	-0.310***	-0.310***	-0.156***
GDP annual growth	0.002*	0.002*	0.001***	0.002*	0.002*	0.001***
Gender exclusion (ln)	0.071	0.071+	0.018	0.076	0.076+	0.018
Gender quota	-0.060+	-0.060**	-0.008	-0.060+	-0.060***	-0.008
Left government	-0.004	-0.004	0.004	-0.008	-0.008	0.003
N° country-years	2040	2040	2040	2040	2040	2040
Overall R ²			.990			.990
Within R ²	.812	.812		.812	.812	

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Infant mortality (ln): Infant deaths per 1000 live births, natural log, World Bank World Development Indicators accessed 11 March 2023. All else identical to Table 2.

Table 5: Autocratization and Health Service Coverage, All Countries

Dependent var. -->	(1) health service coverage	(2) health service coverage	(3) health service coverage	(4) health service coverage	(5) health service coverage	(6) health service coverage
Method -->	xtreg	xtscc	xtpcse	xtreg	xtscc	xtpcse
Autoc Pelke Croissant Autoc Maerz 2020	-0.311	-0.311	-0.130	-0.603	-0.603**	-0.188*
GDP per capita (ln)	7.697***	7.697***	4.761***	7.681***	7.681***	4.796***
GDP annual growth	-0.016	-0.016	-0.019***	-0.015	-0.015	-0.019***
Gender exclusion (ln)	-0.999	-0.999**	-0.056	-0.942	-0.942**	-0.053
Gender quota	-0.289	-0.289	-0.074	-0.280	-0.280	-0.076
Left government	0.490	0.490*	0.063	0.481	0.481*	0.064
Old age dependency	-0.716***	-0.716***	-0.527***	-0.712***	-0.712***	-0.529***
N° country-years	3246	3246	3246	3246	3246	3246
Overall R ²			.953			.954
Within R ²	.832	.832		.833	.833	

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Health service coverage: World Health Organization Universal Health Coverage Service Coverage Index, missing values interpolated. Regressions are run on 163 countries observed annually from 2000 to 2019 (Appendix Table A10). All else identical to Table 2.

Table 6: Autocratization and Infant Mortality, All Countries

Dependent var. -->	(1) infant mortality (ln)	(2) infant mortality (ln)	(3) infant mortality (ln)	(4) infant mortality (ln)	(5) infant mortality (ln)	(6) infant mortality (ln)
Method -->	xtreg	xtscc	xtpcse	xtreg	xtscc	xtpcse
Autoc Pelke Croissant Autoc Maerz 2020	-0.022	-0.022**	-0.002	-0.015	-0.015	-0.000
GDP per capita (ln)	-0.231**	-0.231***	-0.098***	-0.232**	-0.232***	-0.098***
GDP annual growth	0.001	0.001	0.001***	0.001	0.001	0.001***
Gender exclusion (ln)	0.067	0.067**	0.024*	0.073	0.073**	0.024*
Gender quota	-0.085*	-0.085***	-0.009	-0.087*	-0.087***	-0.008+
Left government	-0.015	-0.015	-0.002	-0.016	-0.016	-0.002
N° country-years	4731	4731	4731	4731	4731	4731
Overall R ²			.981			.981
Within R ²	.823	.823		.823	.823	

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Infant mortality (ln): Infant deaths per 1000 live births, from World Bank World Development Indicators accessed 11 March 2023. Regressions are run on 165 countries (Appendix Table A11) observed annually from 1990 to 2019 (N=4731 country-years). All else identical to Table 2.

Table 7
Association Between Autocratization and Infant Mortality By Time Period Analyzed

Range	Years	Countries	Country-years	OLS coefficient	Country-clustered t-statistic	Driscoll-Kraay t-statistic	Panel-corrected z-statistic
1990-2019	30	165	4,731	-.022	- 1.00	- 2.57*	- 0.69
1990-2018	29	165	4,566	-.024	- 1.06	- 2.64*	- 0.52
1990-2017	28	165	4,401	-.027	- 1.25	- 3.66***	- 0.63
1990-2016	27	165	4,236	-.030	- 1.47	- 4.21***	- 0.73
1990-2015	26	165	4,071	-.032	- 1.61	- 4.02***	- 0.80
1990-2014	25	165	3,906	-.033	- 1.72+	- 3.49***	- 1.34
1990-2013	24	165	3,741	-.028	- 1.47	- 3.67***	-1 .26
1990-2012	23	163	3,578	-.022	- 1.16	- 3.78***	- 0.82
1990-2011	22	163	3,415	-.019	- 1.03	- 2.93**	- 0.70
1990-2010	21	163	3,252	-.017	- 0.92	- 2.29*	- 0.62
1990-2009	20	163	3,089	-.015	- 0.82	- 1.86+	- 0.60
1990-2008	19	163	2,926	-.011	- 0.63	- 1.41	- 0.43
1990-2007	18	163	2,763	-.006	- 0.34	- 0.74	+0.75
1990-2006	17	163	2,600	-.004	- 0.24	- 0.42	+0.73
1990-2005	16	163	2,437	-.000	- 0.02	- 0.04	+0.97
1990-2004	15	163	2,274	+.003	+0.16	+0.24	+1.06
1990-2003	14	163	2,111	+.007	+0.38	+0.51	+1.02
1990-2002	13	162	1,948	+.013	+0.79	+0.99	+1.06
1990-2001	12	161	1,786	+.021	+1.29	+1.57	+1.44
1990-2000	11	158	1,625	+.025	+1.51	+1.72	+1.37
1990-1999	10	157	1,467	+.036	+1.96+	+ 2.77*	-
1990-1998	9	157	1,310	+.043	+1.97+	+ 3.63**	-
1990-1997	8	155	1,153	+.047	+ 2.01*	+ 4.78**	+ 2.46*
1990-1996	7	155	998	+.046	+1.81+	+ 4.85**	+ 2.23*
1990-1995	6	145	843	+.053	+1.59+	+ 7.69***	+ 2.87**

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

- means that xtpcse could not estimate the model using the pairwise procedure.

Autocratization measure: Pelke and Croissant (2020). Original variable: *auto_period01ci*.

The 30-year models are identical to Table 6, Models 1, 2, and 3. The other models differ only in length of time series.

The information in the note to Table 6 pertains to Table 7 as well.

Table 8: Alternative Measures of Autocratization and Primary Health Care Spending

	(1)	(2)	(3)	(4)
	phc % GDP	phc % GDP	phc % GDP	phc % GDP
Autoc Pelke Croissant	-0.062*			
Autoc Maerz 2020		-0.041+		
Autoc Maerz 2022			-0.051+	
Autoc Maerz 2023				-0.019
GDP per capita	-0.141+	-0.141+	-0.140+	-0.137+
GDP annual growth	-0.001	-0.001	-0.001	-0.001
Gender exclusion	-0.329**	-0.317*	-0.322**	-0.317*
Gender quota	0.069+	0.067	0.068	0.069
Left government	0.099*	0.088+	0.096*	0.090*
Old age dependency	0.017+	0.017+	0.015	0.015
N ^o country-years	2040	2040	2040	2040
Within R ²	.202	.196	.197	.190

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

phc % GDP: primary health care spending as a share of GDP, natural log.
Estimator: OLS, country-clustered standard errors.

Autoc Pelke Croissant: Pelke and Croissant (2020) autocratization indicator. Original variable: *auto_period01ci*.
Autoc Maerz 2020: Maerz et al. (2020) autocratization indicator. Original variable: *aut_ep*.
Autoc Maerz 2022: Maerz et al. (2022) autocratization indicator. Original variable: *aut_ep*.
Autoc Maerz 2023: Maerz et al. (2023) autocratization indicator. Original variable: *aut_ep*.

All else identical to Table 2.

Autocratization and Health Outcomes

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Chapter prepared for Aurel Croissant and Luca Tomini, eds., *Routledge Handbook of Autocratization*

Online Appendix Document

The online appendix consists of this document, the data used in the analyses (.xlsx), the annotated Stata statistical program used to carry out the diagnostic tests, main analyses, and robustness checks (.do), and the output produced by pasting the .xlsx data into Stata 17 and running the .do statistical program (.smcl).

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Table A1: Replication of Son and Bellinger (2022a: 880) Table 2

	(1)	(2)	(3)	(4)	(5)	(6)
	Current health care spending as % GDP (ln)	Current health care spending as % GDP (ln)	Current health care spending as % GDP (ln)	Infant mortality (ln)	Infant mortality (ln)	Infant mortality (ln)
Autocratization (Son and Bellinger 2022c)	-0.026* (0.013)			0.004* (0.002)		
Autocratization (Pelke and Croissant 2022)		-0.010 (0.010)			-0.001 (0.003)	
Autocratization (Maerz et al. 2020)			0.002 (0.011)			0.000 (0.002)
Leftist government	0.004 (0.013)	0.002 (0.013)	0.001 (0.013)	-0.003 (0.004)	-0.002 (0.004)	-0.002 (0.004)
Gender quota	0.011** (0.004)	0.011** (0.004)	0.011** (0.004)	-0.002* (0.001)	-0.003* (0.001)	-0.003* (0.001)
Democratic legacy (ln)	0.087 (0.068)	0.080 (0.072)	0.081 (0.071)	-0.042** (0.014)	-0.041** (0.014)	-0.042** (0.014)
GDP annual growth	-0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
GDP (ln)	-0.246* (0.098)	-0.250* (0.099)	-0.250* (0.099)	0.103*** (0.021)	0.103*** (0.021)	0.103*** (0.021)
GDP per capita (ln)	-0.141 (0.088)	-0.136 (0.090)	-0.138 (0.090)	-0.204*** (0.022)	-0.207*** (0.022)	-0.205*** (0.022)
<i>N</i>	2424	2424	2424	4155	4155	4155
<i>R</i> ²	0.949	0.948	0.947	0.993	0.994	0.994

Standard errors in parentheses

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Pooled time-series cross-sectional data using ordinary least squares and Prais-Winsten estimators, panel-corrected standard errors, country and year fixed effects, a time trend, a panel-specific autoregressive term, and pairwise computation of the elements of the covariance matrix. Constant, year dummies, country dummies, and a time trend are included in each model but not shown.

The data on the control variables and the Stata do-file (the statistical program) are copied from Son and Bellinger (2023c).

The high R^2 includes the impact of fixed effects (manually introduced dummy (0/1) variables for each country and each year).

Autoc Son Bellinger: Son and Bellinger (2022c) autocratization indicator. Original variable: *auto*

Autoc Pelke Croissant: Pelke and Croissant (2020) autocratization indicator. Original variable: *auto_period01ci*

Autoc Maerz 2020: Maerz et al. (2020) autocratization indicator. Original variable: *aut_ep*

Table A2: Autocratization and Primary Health Care Spending, Developing Countries, N = 2040

Dependent var. --> Method --> Indep. vars. below:	(1) phc % GDP xtreg	(2) phc % GDP xtscc	(3) phc % GDP xtpcse	(4) phc % GDP xtreg	(5) phc % GDP xtscc	(6) phc % GDP xtpcse
Autocratization (Pelke/Croissant)	-0.062* (-2.544)	-0.062*** (-4.677)	-0.021* (-2.350)			
Autocratization (Maerz et al. 2020)				-0.041+ (-1.749)	-0.041** (-3.172)	-0.013 (-1.423)
GDP per capita (ln)	-0.141+ (-1.760)	-0.141** (-3.123)	-0.070 (-1.622)	-0.141+ (-1.748)	-0.141** (-3.141)	-0.069 (-1.582)
GDP annual growth	-0.001 (-1.612)	-0.001 (-1.514)	-0.000 (-0.078)	-0.001 (-1.532)	-0.001 (-1.479)	-0.000 (-0.048)
Gender exclusion (ln)	-0.329** (-2.687)	-0.329*** (-7.327)	-0.157** (-3.132)	-0.317* (-2.580)	-0.317*** (-7.541)	-0.153** (-3.044)
Gender quota 0-1	0.069+ (1.678)	0.069*** (5.448)	0.019 (1.222)	0.067 (1.639)	0.067*** (5.231)	0.019 (1.196)
Ideology, left	0.098* (2.421)	0.098** (2.908)	0.047* (2.388)	0.088+ (1.971)	0.088* (2.702)	0.044* (2.273)
Old age dependency	0.017+ (1.741)	0.017*** (4.192)	0.015* (2.275)	0.017+ (1.744)	0.017*** (4.082)	0.015* (2.258)
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N° countries	114	114	114	114	114	114
Years	2000-2017	2000-2017	2000-2017	2000-2017	2000-2017	2000-2017
N° country-years	2040	2040	2040	2040	2040	2040
Overall R ²			.756			.751
Within R ²	.201	.201		.195	.195	

t or z statistics in parentheses.

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

PHC spend % GDP: primary health care spending as a share of GDP, natural log.

All independent variables lagged one year behind dependent variable

xtreg: two-way fixed-effects time-series cross-sectional regression with standard errors clustered by country (estimator: OLS)

xtscc: two-way fixed-effects time-series cross-sectional regression with Driscoll-Kraay standard errors (estimator: OLS)

xtpcse: two-way fixed-effects time-series cross-sectional regression with panel corrected standard errors, a correction for ar1 serial correlation common to all panels, and an error covariance matrix calculated pairwise rather than casewise.

Pelke/Croissant: Pelke and Croissant (2020) coding of autocratization country-years.

Maerz 2020: Maerz et al. (2020) coding of autocratization country-years.

Gender exclusion: V-Dem v13 Exclusion by gender index (v2xpe_exlgender). Range 0.000 to 1.000. A higher value means greater exclusion. Combined index of gender bias in power distribution, equality in respect for civil liberties, and access to public services, state jobs, and state business opportunities. The values are skewed right so the natural log was taken.

Table A3: Autocratization and Health Service Coverage, Developing Countries, N = 2040

Dependent var. -->	(1)	(2)	(3)	(4)	(5)	(6)
Method -->	health service coverage	health service coverage	health service coverage	health service coverage	health service coverage	health service coverage
Indep. vars. below:	xtreg	xtscc	xtpcse	xtreg	xtscc	xtpcse
Autocratization (Pelke/Croissant)	0.075 (0.17)	0.075 (0.43)	-0.127 (-1.29)			
Autocratization (Maerz et al. 2020)				-0.100 (-0.23)	-0.100 (-0.62)	-0.137 (-1.34)
GDP per capita (ln)	4.689*** (3.57)	4.689** (3.84)	2.926*** (4.15)	4.678*** (3.55)	4.678** (3.83)	2.915*** (4.15)
GDP annual growth	-0.007 (-0.39)	-0.007 (-0.96)	-0.011* (-2.41)	-0.007 (-0.40)	-0.007 (-0.97)	-0.011* (-2.39)
Gender exclusion (ln)	-2.205 (-0.95)	-2.205** (-3.88)	-0.815* (-2.07)	-2.227 (-0.96)	-2.227*** (-4.09)	-0.798* (-2.02)
Gender quota 0-1	-0.384 (-0.42)	-0.384* (-2.77)	-0.134 (-0.89)	-0.380 (-0.42)	-0.380* (-2.73)	-0.134 (-0.89)
Ideology, left	1.789* (2.38)	1.789* (2.81)	0.513+ (1.76)	1.812* (2.42)	1.812* (2.80)	0.507+ (1.74)
Old age dependency	-0.565+ (-1.71)	-0.565** (-2.98)	-0.229 (-1.30)	-0.560+ (-1.70)	-0.560** (-2.90)	-0.226 (-1.27)
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N° countries	114	114	114	114	114	114
Years	2000-2017	2000-2017	2000-2017	2000-2017	2000-2017	2000-2017
N° country-years	2040	2040	2040	2040	2040	2040
R2			.937			.936
Within R2	.871	.871		.871	.871	

t or z statistics in parentheses.

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Health service coverage: World Health Organization Universal Health Coverage Service Coverage Index, missing values interpolated. All independent variables lagged one year behind dependent variable

xtreg: two-way fixed-effects time-series cross-sectional regression with standard errors clustered by country

xtscc: two-way fixed-effects time-series cross-sectional regression with Driscoll-Kraay standard errors

xtpcse: two-way fixed-effects time-series cross-sectional regression with panel corrected standard errors, a correction for ar1 serial correlation common to all panels, and an error covariance matrix calculated pairwise rather than casewise.

Pelke/Croissant: Pelke and Croissant (2020) coding of autocratization country-years.

Maerz 2020: Maerz et al. (2020) coding of autocratization country-years.

Gender exclusion: V-Dem v13 Exclusion by gender index (v2xpe_exlgender). Range 0.000 to 1.000. A higher value means greater exclusion. Combined index of gender bias in power distribution, equality in respect for civil liberties, and access to public services, state jobs, and state business opportunities. The values are skewed right so the natural log was taken.

Table A4: Autocratization and Infant Mortality, Developing Countries, N = 2040

Dependent var. -->	(1)	(2)	(3)	(4)	(5)	(6)
Method -->	infant	infant	infant	infant	infant	infant
Indep. vars. below:	mortality (ln)	mortality (ln)	mortality (ln)	mortality (ln)	mortality (ln)	mortality (ln)
	xtreg	xtscc	xtpcse	xtreg	xtscc	xtpcse
Autocratization (Pelke/Croissant)	-0.023 (-1.22)	-0.023*** (-4.66)	-0.006 (-1.57)			
Autocratization (Maerz et al. 2020)				-0.016 (-0.87)	-0.016** (-3.79)	-0.002 (-0.65)
GDP per capita (ln)	-0.310*** (-4.64)	-0.310*** (-12.48)	-0.156*** (-5.12)	-0.310*** (-4.65)	-0.310*** (-12.50)	-0.156*** (-5.12)
GDP annual growth	0.002* (2.49)	0.002* (2.47)	0.001*** (4.17)	0.002* (2.52)	0.002* (2.50)	0.001*** (4.20)
Gender exclusion (ln)	0.071 (0.72)	0.071+ (1.77)	0.018 (1.07)	0.076 (0.76)	0.076+ (1.87)	0.018 (1.07)
Gender quota 0-1	-0.060+ (-1.80)	-0.060*** (-5.69)	-0.008 (-1.45)	-0.060+ (-1.82)	-0.060*** (-5.64)	-0.008 (-1.44)
Ideology, left	-0.004 (-0.10)	-0.004 (-0.54)	0.004 (0.29)	-0.008 (-0.19)	-0.008 (-1.02)	0.003 (0.25)
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N° countries	114	114	114	114	114	114
Years	2000-2017	2000-2017	2000-2017	2000-2017	2000-2017	2000-2017
N° country-years	2040	2040	2040	2040	2040	2040
Overall R ²			.990			.990
Within R ²	.812	.812		.812	.812	

t or z statistics in parentheses.

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Infant mortality (ln): Infant deaths per 1000 live births, World Bank World Development Indicators accessed 11 March 2023.
All independent variables lagged one year behind dependent variable

xtreg: two-way fixed-effects time-series cross-sectional regression with standard errors clustered by country

xtscc: two-way fixed-effects time-series cross-sectional regression with Driscoll-Kraay standard errors

xtpcse: two-way fixed-effects time-series cross-sectional regression with panel corrected standard errors, a correction for ar1 serial correlation common to all panels, and an error covariance matrix calculated pairwise rather than casewise.

Pelke/Croissant: Pelke and Croissant (2020) coding of autocratization country-years.

Maerz 2020: Maerz et al. (2020) coding of autocratization country-years.

Gender exclusion: V-Dem v13 Exclusion by gender index (v2xpe_exlgender). Range 0.000 to 1.000. A higher value means greater exclusion. Combined index of gender bias in power distribution, equality in respect for civil liberties, and access to public services, state jobs, and state business opportunities. The values are skewed right so the natural log was taken.

Table A5: Autocratization and Health Service Coverage, N = 3246

Dependent var. -->	(1)	(2)	(3)	(4)	(5)	(6)
Method -->	health service coverage	health service coverage	health service coverage	health service coverage	health service coverage	health service coverage
Indep. vars. below:	xtreg	xtscc	xtpcse	xtreg	xtscc	xtpcse
Autocratization (Pelke/Croissant)	-0.311 (-0.70)	-0.311 (-1.68)	-0.130 (-1.46)			
Autocratization (Maerz et al. 2020)				-0.603 (-1.29)	-0.603** (-3.40)	-0.188* (-2.10)
GDP per capita (ln)	7.697*** (5.95)	7.697*** (8.08)	4.761*** (6.35)	7.681*** (5.94)	7.681*** (8.22)	4.796*** (6.41)
GDP annual growth	-0.0159 (-0.84)	-0.0159 (-1.43)	-0.0188*** (-3.86)	-0.0154 (-0.81)	-0.0154 (-1.42)	-0.0188*** (-3.86)
Gender exclusion (ln)	-0.999 (-0.54)	-0.999** (-3.63)	-0.056 (-0.19)	-0.942 (-0.52)	-0.942** (-3.53)	-0.053 (-0.18)
Gender quota 0-1	-0.289 (-0.33)	-0.289 (-1.27)	-0.074 (-0.55)	-0.280 (-0.32)	-0.280 (-1.24)	-0.076 (-0.56)
Ideology, left	0.490 (1.07)	0.490* (2.26)	0.063 (0.59)	0.481 (1.06)	0.481* (2.29)	0.064 (0.61)
Old age dependency	-0.716*** (-4.91)	-0.716*** (-13.20)	-0.527*** (-5.84)	-0.712*** (-4.92)	-0.712*** (-13.51)	-0.529*** (-5.90)
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N° countries	163	163	163	163	163	163
Years	2000-2019	2000-2019	2000-2019	2000-2019	2000-2019	2000-2019
N° country-years	3246	3246	3246	3246	3246	3246
R2			.953			.954
Within R2	.832	.832		.833	.833	

t or z statistics in parentheses.

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Health service coverage: World Health Organization Universal Health Coverage Service Coverage Index, missing values interpolated. All independent variables lagged one year behind dependent variable

xtreg: two-way fixed-effects time-series cross-sectional regression with standard errors clustered by country

xtscc: two-way fixed-effects time-series cross-sectional regression with Driscoll-Kraay standard errors

xtpcse: two-way fixed-effects time-series cross-sectional regression with panel corrected standard errors, a correction for ar1 serial correlation common to all panels, and an error covariance matrix calculated pairwise rather than casewise.

Pelke/Croissant: Pelke and Croissant (2020) coding of autocratization country-years.

Maerz 2020: Maerz et al. (2020) coding of autocratization country-years.

Gender exclusion: V-Dem v13 Exclusion by gender index (v2xpe_exlgender). Range 0.000 to 1.000. A higher value means greater exclusion. Combined index of gender bias in power distribution, equality in respect for civil liberties, and access to public services, state jobs, and state business opportunities. The values are skewed right so the natural log was taken after 1 was added to each raw value to avoid the negative values that would have resulted from taking the natural log of numbers between 0.000 and 0.999.

Table A6: Autocratization and Infant Mortality, N = 4731

Dependent var. -->	(1)	(2)	(3)	(4)	(5)	(6)
Method -->	infant	infant	infant	infant	infant	infant
Indep. vars. below:	mortality (ln)	mortality (ln)	mortality (ln)	mortality (ln)	mortality (ln)	mortality (ln)
	xtreg	xtscc	xtpcse	xtreg	xtscc	xtpcse
Autocratization (Pelke/Croissant)	-0.0225 (-1.00)	-0.0225* (-2.57)	-0.00217 (-0.69)			
Autocratization (Maerz et al. 2020)				-0.0150 (-0.72)	-0.0150+ (-1.72)	-0.000280 (-0.10)
GDP per capita (ln)	-0.231** (-3.25)	-0.231*** (-5.41)	-0.0984*** (-6.11)	-0.232** (-3.25)	-0.232*** (-5.42)	-0.0983*** (-6.11)
GDP annual growth	-0.000602 (-0.96)	-0.000602 (-0.79)	0.000548*** (4.34)	-0.000584 (-0.93)	-0.000584 (-0.77)	0.000549*** (4.36)
Left government	-0.0149 (-0.59)	-0.0149 (-1.53)	-0.00172 (-0.41)	-0.0164 (-0.64)	-0.0164+ (-1.70)	-0.00179 (-0.42)
Gender quota	-0.0868* (-2.37)	-0.0868*** (-6.45)	-0.00865+ (-1.79)	-0.0872* (-2.39)	-0.0872*** (-6.40)	-0.00862+ (-1.78)
Gender exclusion (ln)	0.0673 (0.95)	0.0673** (3.15)	0.0214* (2.18)	0.0677 (0.96)	0.0677** (3.13)	0.0213* (2.17)
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N° countries	165	165	165	165	165	165
Years	1990-2019	1990-2019	1990-2019	1990-2019	1990-2019	1990-2019
N° country-years	4731	4731	4731	4731	4731	4731
Overall R ²			0.981			0.981
Within R2	0.823	0.823		0.823	0.823	

t or z statistics in parentheses.

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Infant mortality (ln): Infant deaths per 1000 live births, from World Bank World Development Indicators accessed 11 March 2023.

All independent variables lagged one year behind dependent variable

xtreg: two-way fixed-effects time-series cross-sectional regression with standard errors clustered by country

xtscc: two-way fixed-effects time-series cross-sectional regression with Driscoll-Kraay standard errors

xtpcse: two-way fixed-effects time-series cross-sectional regression with panel corrected standard errors, a correction for ar1 serial correlation common to all panels, and an error covariance matrix calculated pairwise rather than casewise.

Pelke/Croissant: Pelke and Croissant (2020) coding of autocratization country-years.

Maerz 2020: Maerz et al. (2020) coding of autocratization country-years.

Gender exclusion: V-Dem v13 Exclusion by gender index (v2xpe_exlgender). Range 0.000 to 1.000. A higher value means greater exclusion. Combined index of gender bias in power distribution, equality in respect for civil liberties, and access to public services, state jobs, and state business opportunities. The values are skewed right so the natural log was taken.

Table A7: Association Between Autocratization and Infant Mortality By Time Period Analyzed

Range	Years	Countries	Country-years	OLS coefficient	Country-clustered t-statistic	Driscoll-Kraay t-statistic	Panel-corrected z-statistic
1990-2019	30	165	4,731	- .022	- 1.00	- 2.57*	- 0.69
1990-2018	29	165	4,566	- .024	- 1.06	- 2.64*	- 0.52
1990-2017	28	165	4,401	- .027	- 1.25	- 3.66***	- 0.63
1990-2016	27	165	4,236	- .030	- 1.47	- 4.21***	- 0.73
1990-2015	26	165	4,071	- .032	- 1.61	- 4.02***	- 0.80
1990-2014	25	165	3,906	- .033	- 1.72+	- 3.49***	- 1.34
1990-2013	24	165	3,741	- .028	- 1.47	- 3.67***	-1 .26
1990-2012	23	163	3,578	- .022	- 1.16	- 3.78***	- 0.82
1990-2011	22	163	3,415	- .019	- 1.03	- 2.93**	- 0.70
1990-2010	21	163	3,252	- .017	- 0.92	- 2.29*	- 0.62
1990-2009	20	163	3,089	- .015	- 0.82	- 1.86+	- 0.60
1990-2008	19	163	2,926	- .011	- 0.63	- 1.41	- 0.43
1990-2007	18	163	2,763	- .006	- 0.34	- 0.74	+0.75
1990-2006	17	163	2,600	- .004	- 0.24	- 0.42	+0.73
1990-2005	16	163	2,437	- .000	- 0.02	- 0.04	+0.97
1990-2004	15	163	2,274	+ .003	+0.16	+0.24	+1.06
1990-2003	14	163	2,111	+ .007	+0.38	+0.51	+1.02
1990-2002	13	162	1,948	+ .013	+0.79	+0.99	+1.06
1990-2001	12	161	1,786	+ .021	+1.29	+1.57	+1.44
1990-2000	11	158	1,625	+ .025	+1.51	+1.72	+1.37
1990-1999	10	157	1,467	+ .036	+1.96+	+ 2.77*	-
1990-1998	9	157	1,310	+ .043	+1.97+	+ 3.63**	-
1990-1997	8	155	1,153	+ .047	+ 2.01*	+ 4.78**	+ 2.46*
1990-1996	7	155	998	+ .046	+1.81+	+ 4.85**	+ 2.23*
1990-1995	6	145	843	+ .053	+1.59+	+ 7.69***	+ 2.87**

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

- means that xtpcse could not estimate the model using the pairwise procedure.

Infant mortality (ln): Infant deaths per 1000 live births, from World Bank World Development Indicators accessed 11 March 2023.

All independent variables lagged one year behind dependent variable

Autocratization measure: Pelke and Croissant (2020). Original variable: *auto_period01ci*.

The 30-year models are identical to Table 6, Models 1, 2, and 3. The other models differ only in the length of the time series and in the specific years it includes.

Table A8: Alternative Measures of Autocratization and Primary Health Care Spending

	(1)	(2)	(3)	(4)
Dependent var. -->	phc % GDP	phc % GDP	phc % GDP	phc % GDP
Stata command -->	xtreg, vce (cluster by country)	xtreg, vce (cluster by country)	xtreg, vce (cluster by country)	xtreg, vce (cluster by country)
Autocratization (Pelke/Croissant)	-0.0617* (-2.54)			
Autocratization (Maerz et al. 2020)		-0.0414+ (-1.75)		
Autocratization (Maerz et al. 2022)			-0.0510+ (-1.96)	
Autocratization (Maerz et al. 2023)				-0.0192 (-0.81)
GDP per capita (ln)	-0.141+ (-1.76)	-0.141+ (-1.75)	-0.140+ (-1.77)	-0.137+ (-1.71)
GDP annual growth	-0.00136 (-1.61)	-0.00130 (-1.53)	-0.00134 (-1.59)	-0.00133 (-1.54)
Gender exclusion (ln)	-0.329** (-2.69)	-0.317* (-2.58)	-0.322** (-2.63)	-0.317* (-2.57)
Gender quota 0-1	0.0687+ (1.68)	0.0674 (1.64)	0.0680 (1.65)	0.0686 (1.65)
Ideology, left	0.0985* (2.42)	0.0880+ (1.97)	0.0955* (2.31)	0.0896* (2.15)
Old age dependency	0.0168+ (1.74)	0.0170+ (1.74)	0.0154 (1.58)	0.0154 (1.56)
N° country-years	2040	2040	2040	2040
Within R2	0.202	0.196	0.197	0.190

t or z statistics in parentheses.

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Method: xtreg: two-way fixed-effects time-series cross-sectional regression with standard errors clustered by country.

phc % GDP: primary health care spending as a share of GDP, natural log

Predictor variables lagged one year behind outcome variable

Pelke/Croissant: Pelke and Croissant (2020) coding of autocratization country-years

Maerz et al. 2020: Maerz et al. (2020) coding of autocratization country-years based on V-Dem v10.

Maerz et al. 2022: Maerz et al. (2022) coding of autocratization country-years based on V-Dem v12.

Maerz et al. 2023: Maerz et al. (2023) coding of autocratization country-years based on V-Dem v13.

Table A9: Countries and Years Included in Tables 2, 3, 4, and 8

A one-year forward lag was applied to the outcome variables, as a result of which, for predictor variables, the earliest start year is 1999 and the latest end year is 2015, and for outcome variables the earliest start year is 2000 and the latest end year is 2016.

Country	Data start	Data end	Years	Country	Data start	Data end	Years
Afghanistan	2003	2016	14	Lao PDR	1999	2016	18
Albania	1999	2016	18	Lebanon	1999	2016	18
Algeria	1999	2016	18	Lesotho	1999	2016	18
Angola	1999	2016	18	Liberia	2001	2016	16
Argentina	1999	2016	18	Libya	2000	2016	17
Armenia	1999	2016	18	Madagascar	1999	2016	18
Azerbaijan	1999	2016	18	Malawi	1999	2016	18
Bangladesh	1999	2016	18	Malaysia	1999	2016	18
Belarus	1999	2016	18	Maldives	1999	2016	18
Benin	1999	2016	18	Mali	1999	2016	18
Bhutan	1999	2016	18	Mauritania	1999	2016	18
Bolivia	1999	2016	18	Mauritius	1999	2016	18
Bosnia and Herzegovina	1999	2016	18	Mexico	1999	2016	18
Botswana	1999	2016	18	Moldova	1999	2016	18
Brazil	1999	2016	18	Mongolia	1999	2016	18
Bulgaria	1999	2016	18	Montenegro	1999	2016	18
Burkina Faso	1999	2016	18	Morocco	1999	2016	18
Burundi	1999	2016	18	Mozambique	1999	2016	18
Cabo Verde	1999	2016	18	Myanmar	1999	2016	18
Cambodia	1999	2016	18	Namibia	1999	2016	18
Cameroon	1999	2016	18	Nepal	1999	2016	18
Central African Republic	1999	2016	18	Nicaragua	1999	2016	18
Chad	1999	2016	18	Niger	1999	2016	18
China	1999	2016	18	Nigeria	1999	2016	18
Colombia	1999	2016	18	North Macedonia	1999	2016	18
Comoros	1999	2016	18	Pakistan	1999	2016	18
Congo, Dem. Rep.	1999	2016	18	Papua New Guinea	1999	2016	18
Congo, Rep.	1999	2016	18	Paraguay	1999	2016	18
Costa Rica	1999	2016	18	Peru	1999	2016	18
Cote d'Ivoire	1999	2016	18	Philippines	1999	2016	18
Dominican Republic	1999	2016	18	Romania	1999	2016	18
Ecuador	1999	2016	18	Russian Federation	1999	2016	18
Egypt, Arab Rep.	1999	2016	18	Rwanda	1999	2016	18
El Salvador	1999	2016	18	Sao Tome and Principe	2002	2016	15
Equatorial Guinea	1999	2016	18	Senegal	1999	2016	18
Eswatini	1999	2016	18	Serbia	1999	2016	18
Ethiopia	1999	2016	18	Sierra Leone	1999	2016	18
Fiji	1999	2016	18	Solomon Islands	1999	2016	18
Gabon	1999	2016	18	South Africa	1999	2016	18
Gambia, The	1999	2016	18	Sri Lanka	1999	2016	18
Georgia	1999	2016	18	Sudan	1999	2016	18
Ghana	1999	2016	18	Suriname	1999	2016	18
Guatemala	1999	2016	18	Tajikistan	1999	2016	18
Guinea	1999	2016	18	Tanzania	1999	2016	18
Guinea Bissau	1999	2016	18	Thailand	1999	2016	18
Guyana	1999	2016	18	Timor Leste	2001	2016	16
Haiti	1999	2016	18	Togo	1999	2016	18
Honduras	1999	2016	18	Tunisia	1999	2016	18
India	1999	2016	18	Turkiye	1999	2016	18
Indonesia	1999	2016	18	Turkmenistan	1999	2016	18
Iran, Islamic Rep.	1999	2016	18	Uganda	1999	2016	18
Iraq	1999	2016	18	Ukraine	1999	2016	18
Jamaica	1999	2016	18	Uzbekistan	1999	2016	18
Jordan	1999	2016	18	Vanuatu	1999	2016	18
Kazakhstan	1999	2016	18	Vietnam	1999	2016	18
Kenya	1999	2016	18	Zambia	1999	2016	18
Kyrgyz Republic	1999	2016	18	Zimbabwe	1999	2016	18
Total country-years (both columns)							2040

Table A10. Countries and Years Included in Table 5

A one-year forward lag was applied to the outcome variables, as a result of which, for predictor variables, the earliest start year is 1999 and the latest end year is 2017, and for outcome variables the earliest start year is 2000 and the latest end year is 2018.

Country	Data Start	Data End	Years	Country	Data Start	Data End	Years	Country	Data Start	Data End	Years
Afghanistan	2003	2018	16	Germany	1999	2018	20	Nigeria	1999	2018	20
Albania	1999	2018	20	Ghana	1999	2018	20	North Macedonia	1999	2018	20
Algeria	1999	2018	20	Greece	1999	2018	20	Norway	1999	2018	20
Angola	1999	2018	20	Guatemala	1999	2018	20	Oman	1999	2018	20
Argentina	1999	2018	20	Guinea	1999	2018	20	Pakistan	1999	2018	20
Armenia	1999	2018	20	Guinea Bissau	1999	2018	20	Panama	1999	2018	20
Australia	1999	2018	20	Guyana	1999	2018	20	Papua New Guinea	1999	2018	20
Austria	1999	2018	20	Haiti	1999	2018	20	Paraguay	1999	2018	20
Azerbaijan	1999	2018	20	Honduras	1999	2018	20	Peru	1999	2018	20
Bahrain	1999	2018	20	Hungary	1999	2018	20	Philippines	1999	2018	20
Bangladesh	1999	2018	20	Iceland	1999	2018	20	Poland	1999	2018	20
Barbados	1999	2018	20	India	1999	2018	20	Portugal	1999	2018	20
Belarus	1999	2018	20	Indonesia	1999	2018	20	Qatar	2001	2018	18
Belgium	1999	2018	20	Iran	1999	2018	20	Romania	1999	2018	20
Benin	1999	2018	20	Iraq	1999	2018	20	Russian Federation	1999	2018	20
Bhutan	1999	2018	20	Ireland	1999	2018	20	Rwanda	1999	2018	20
Bolivia	1999	2018	20	Israel	1999	2018	20	Sao Tome and Principe	2002	2018	17
Bosnia & Herzegovina	1999	2018	20	Italy	1999	2018	20	Saudi Arabia	1999	2018	20
Botswana	1999	2018	20	Jamaica	1999	2018	20	Senegal	1999	2018	20
Brazil	1999	2018	20	Japan	1999	2018	20	Serbia	1999	2018	20
Bulgaria	1999	2018	20	Jordan	1999	2018	20	Seychelles	1999	2018	20
Burkina Faso	1999	2018	20	Kazakhstan	1999	2018	20	Sierra Leone	1999	2018	20
Burundi	1999	2018	20	Kenya	1999	2018	20	Singapore	1999	2018	20
Cabo Verde	1999	2018	20	Korea, Rep.	1999	2018	20	Slovak Republic	1999	2018	20
Cambodia	1999	2018	20	Kuwait	1999	2018	20	Slovenia	1999	2018	20
Cameroon	1999	2018	20	Kyrgyz Rep.	1999	2018	20	Solomon Islands	1999	2018	20
Canada	1999	2018	20	Lao PDR	1999	2018	20	South Africa	1999	2018	20
Central African Rep.	1999	2018	20	Latvia	1999	2018	20	Spain	1999	2018	20
Chad	1999	2018	20	Lebanon	1999	2018	20	Sri Lanka	1999	2018	20
Chile	1999	2018	20	Lesotho	1999	2018	20	Sudan	1999	2018	20
China	1999	2018	20	Liberia	2001	2018	18	Suriname	1999	2018	20
Colombia	1999	2018	20	Libya	2000	2018	19	Sweden	1999	2018	20
Comoros	1999	2018	20	Lithuania	1999	2018	20	Switzerland	1999	2018	20
Congo, Dem. Rep.	1999	2018	20	Luxembourg	1999	2018	20	Tajikistan	1999	2018	20
Congo, Rep.	1999	2018	20	Madagascar	1999	2018	20	Tanzania	1999	2018	20
Costa Rica	1999	2018	20	Malawi	1999	2018	20	Thailand	1999	2018	20
Cote d'Ivoire	1999	2018	20	Malaysia	1999	2018	20	Timor Leste	2001	2018	18
Croatia	1999	2018	20	Maldives	1999	2018	20	Togo	1999	2018	20
Cyprus	1999	2018	20	Mali	1999	2018	20	Trinidad and Tobago	1999	2018	20
Czechia	1999	2018	20	Malta	1999	2018	20	Tunisia	1999	2018	20
Denmark	1999	2018	20	Mauritania	1999	2018	20	Turkiye	1999	2018	20
Dominican Republic	1999	2018	20	Mauritius	1999	2018	20	Turkmenistan	1999	2018	20
Ecuador	1999	2018	20	Mexico	1999	2018	20	Uganda	1999	2018	20
Egypt, Arab Rep.	1999	2018	20	Moldova	1999	2018	20	Ukraine	1999	2018	20
El Salvador	1999	2018	20	Mongolia	1999	2018	20	United Arab Emirates	1999	2018	20
Equatorial Guinea	1999	2018	20	Montenegro	1999	2018	20	United Kingdom	1999	2018	20
Estonia	1999	2018	20	Morocco	1999	2018	20	United States	1999	2018	20
Eswatini	1999	2018	20	Mozambique	1999	2018	20	Uruguay	1999	2018	20
Ethiopia	1999	2018	20	Myanmar	1999	2018	20	Uzbekistan	1999	2018	20
Fiji	1999	2018	20	Namibia	1999	2018	20	Vanuatu	1999	2018	20
Finland	1999	2018	20	Nepal	1999	2018	20	Vietnam	1999	2018	20
France	1999	2018	20	Netherlands	1999	2018	20	Zambia	1999	2018	20
Gabon	1999	2018	20	New Zealand	1999	2018	20	Zimbabwe	1999	2018	20
Gambia, The	1999	2018	20	Nicaragua	1999	2018	20				
Georgia	1999	2018	20	Niger	1999	2018	20	Total country-years (all columns)			3246

Table A11. Countries and Years Included in Tables 6 and 7

A one-year forward lag was applied to the outcome variables, as a result of which, for predictor variables, the earliest start year is 1990 and the latest end year is 2018, and for outcome variables the earliest start year is 1991 and the latest end year is 2019.

Country	Data start	Data End	Years	Country	Data start	Data End	Years	Country	Data start	Data End	Years
Afghanistan	2003	2019	17	Georgia	1990	2019	30	Niger	1990	2019	30
Albania	1990	2019	30	Germany	1990	2019	30	Nigeria	1990	2019	30
Algeria	1990	2019	30	Ghana	1990	2019	30	North Macedonia	1991	2019	29
Angola	1990	2019	30	Greece	1990	2019	30	Norway	1990	2019	30
Argentina	1990	2019	30	Guatemala	1990	2019	30	Oman	1990	2019	30
Armenia	1991	2019	29	Guinea	1990	2019	30	Pakistan	1990	2019	30
Australia	1990	2019	30	Guinea Bissau	1990	2019	30	Panama	1990	2019	30
Austria	1990	2019	30	Guyana	1990	2019	30	Papua New Guinea	1990	2019	30
Azerbaijan	1991	2019	29	Haiti	1990	2019	30	Paraguay	1990	2019	30
Bahrain	1990	2019	30	Honduras	1990	2019	30	Peru	1990	2019	30
Bangladesh	1990	2019	30	Hungary	1992	2019	28	Philippines	1990	2019	30
Barbados	1990	2019	30	Iceland	1996	2019	24	Poland	1991	2019	29
Belarus	1991	2019	29	India	1990	2019	30	Portugal	1990	2019	30
Belgium	1990	2019	30	Indonesia	1990	2019	30	Qatar	2001	2019	19
Benin	1990	2019	30	Iran	1990	2019	30	Romania	1991	2019	29
Bhutan	1990	2019	30	Iraq	1990	2019	30	Russian Federation	1990	2019	30
Bolivia	1990	2019	30	Ireland	1990	2019	30	Rwanda	1990	2019	30
Bosnia & Herzegovina	1995	2019	25	Israel	1996	2019	24	Sao Tome & Principe	2002	2019	18
Botswana	1990	2019	30	Italy	1990	2019	30	Saudi Arabia	1990	2019	30
Brazil	1990	2019	30	Jamaica	1990	2019	30	Senegal	1990	2019	30
Bulgaria	1990	2019	30	Japan	1990	2019	30	Serbia	1996	2019	24
Burkina Faso	1990	2019	30	Jordan	1990	2019	30	Seychelles	1990	2019	30
Burundi	1990	2019	30	Kazakhstan	1991	2019	29	Sierra Leone	1990	2019	30
Cabo Verde	1990	2019	30	Kenya	1990	2019	30	Singapore	1990	2019	30
Cambodia	1994	2019	26	Korea,Rep	1990	2019	30	Slovakia	1993	2019	27
Cameroon	1990	2019	30	Kuwait	1995	2019	25	Slovenia	1996	2019	24
Canada	1998	2019	22	Kyrgyz Rep.	1990	2019	30	Solomon Islands	1990	2019	30
Central African Rep.	1990	2019	30	Lao PDR	1990	2019	30	Somalia	2014	2019	6
Chad	1990	2019	30	Latvia	1996	2019	24	South Africa	1990	2019	30
Chile	1990	2019	30	Lebanon	1990	2019	30	Spain	1990	2019	30
China	1990	2019	30	Lesotho	1990	2019	30	Sri Lanka	1990	2019	30
Colombia	1990	2019	30	Liberia	2001	2019	19	Sudan	1990	2019	30
Comoros	1990	2019	30	Libya	2000	2019	20	Suriname	1990	2019	30
Congo, Dem. Rep.	1990	2019	30	Lithuania	1996	2019	24	Sweden	1990	2019	30
Congo, Rep.	1990	2019	30	Luxembourg	1990	2019	30	Switzerland	1990	2019	30
Costa Rica	1990	2019	30	Madagascar	1990	2019	30	Tajikistan	1990	2019	30
Cote d'Ivoire	1990	2019	30	Malawi	1990	2019	30	Tanzania	1990	2019	30
Croatia	1996	2019	24	Malaysia	1990	2019	30	Thailand	1990	2019	30
Cyprus	1990	2019	30	Maldives	1996	2019	24	Timor-Leste	2001	2019	19
Czechia	1991	2019	29	Mali	1990	2019	30	Togo	1990	2019	30
Denmark	1990	2019	30	Malta	1990	2019	30	Trinidad and Tobago	1990	2019	30
Djibouti	2014	2019	6	Mauritania	1990	2019	30	Tunisia	1990	2019	30
Dominican Republic	1990	2019	30	Mauritius	1990	2019	30	Turkiye	1990	2019	30
Ecuador	1990	2019	30	Mexico	1990	2019	30	Turkmenistan	1990	2019	30
Egypt, Arab Rep.	1990	2019	30	Moldova	1996	2019	24	Uganda	1990	2019	30
El Salvador	1990	2019	30	Mongolia	1990	2019	30	Ukraine	1990	2019	30
Equatorial Guinea	1990	2019	30	Montenegro	1998	2019	22	United Arab Emirates	1990	2019	30
Estonia	1996	2019	24	Morocco	1990	2019	30	United Kingdom	1990	2019	30
Eswatini	1990	2019	30	Mozambique	1990	2019	30	United States	1990	2019	30
Ethiopia	1990	2019	30	Myanmar	1990	2019	30	Uruguay	1990	2019	30
Fiji	1990	2019	30	Namibia	1990	2019	30	Uzbekistan	1990	2019	30
Finland	1990	2019	30	Nepal	1990	2019	30	Vanuatu	1990	2019	30
France	1990	2019	30	Netherlands	1990	2019	30	Vietnam	1990	2019	30
Gabon	1990	2019	30	New Zealand	1990	2019	30	Zambia	1990	2019	30
Gambia	1990	2019	30	Nicaragua	1990	2019	30	Zimbabwe	1990	2019	30
Total country-years (all columns)											4731

Table A12. Summary of Autocratization Episodes 1990-2017 According to Three Sources

	Maerz et al. 2020	Pelke and Croissant 2020	Son and Bellinger 2022c
Number of countries coded 1990	167	167	141
Number of countries coded in 2000	173	173	157
Number of countries coded in 2017	174	174	159
Total country-years coded 1990-2017	4827	4827	4447
Autocratization country-years 1990-2017	413	443	75
Autocratization country-years % total	8.6%	9.2%	1.7%
Autocratization episodes 1990-2017	87	98	75
Longest autocratization episode	21 years	15 years	1 year
Shortest autocratization episode	1 year	1 year	1 year
Years per episode, mean	4.8	4.5	1.0
Years per episode, median	3	4	1

Table A13: Autocratization Episode Discrepancies Across Five Databases, 1990-2019

Country	Database	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Brazil	Son/Bellinger	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	n.d.	n.d.
Brazil	Pelke/Croissant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
Brazil	ERT v01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
Brazil	ERT v04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
Brazil	ERT v13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
Hungary	Son/Bellinger	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	n.d.	n.d.
Hungary	Pelke/Croissant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Hungary	ERT v01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Hungary	ERT v04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1
Hungary	ERT v13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
India	Son/Bellinger	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	n.d.	n.d.	
India	Pelke/Croissant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1
India	ERT v01	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
India	ERT v04	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
India	ERT v13	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Nicaragua	Son/Bellinger	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	n.d.	n.d.
Nicaragua	Pelke/Croissant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Nicaragua	ERT v01	0	0	1	1	1	1	1	1	1	1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Nicaragua	ERT v04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1
Nicaragua	ERT v13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Philippines	Son/Bellinger	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	n.d.	n.d.
Philippines	Pelke/Croissant	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Philippines	ERT v01	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1
Philippines	ERT v04	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1
Philippines	ERT v13	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1
Poland	Son/Bellinger	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	n.d.	n.d.
Poland	Pelke/Croissant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
Poland	ERT v01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
Poland	ERT v04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Poland	ERT v13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
Russia	Son/Bellinger	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	n.d.	n.d.
Russia	Pelke/Croissant	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Russia	ERT v01	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Russia	ERT v04	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
Russia	ERT v13	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
Turkey	Son/Bellinger	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	n.d.	n.d.
Turkey	Pelke/Croissant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
Turkey	ERT v01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1
Turkey	ERT v04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1
Turkey	ERT v13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0
USA	Son/Bellinger	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	n.d.	n.d.
USA	Pelke/Croissant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
USA	ERT v01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
USA	ERT v04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
USA	ERT v13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
Venezuela	Son/Bellinger	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	n.d.	n.d.
Venezuela	Pelke/Croissant	0	0	0	0	0	0	0	0	0	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Venezuela	ERT v01	0	0	1	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Venezuela	ERT v04	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1	1	1	1	1	1
Venezuela	ERT v13	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

1 = Country-year part of autocratization episode; 0 = country-year not part of autocratization episode; n.d. = no data. Sources: Son and Bellinger 2022b: 6 (covered 1990-2017 only; identified no autocratization episodes in India or the United States), Pelke and Croissant 2020. ERT v01: Maerz et al. 2020. ERT v04: Maerz et al. 2022. ERT v13: Maerz et al. 2023.

Table A14: Complete Set of Country-Years with Identical Electoral Democracy Index Values in the V-Dem v10, v12, and v13 Databases

Country	Year	EDI VDem v10	EDI VDem v12	EDI VDem v13
Angola	1990	0.076	0.076	0.076
Azerbaijan	2000	0.248	0.248	0.248
Bahrain	2001	0.113	0.113	0.113
Bhutan	2002	0.092	0.092	0.092
Burundi	1991	0.09	0.09	0.09
El Salvador	2010	0.613	0.613	0.613
El Salvador	2011	0.613	0.613	0.613
Eritrea	2016	0.069	0.069	0.069
Ghana	1990	0.105	0.105	0.105
Ghana	2003	0.733	0.733	0.733
Iraq	1990	0.081	0.081	0.081
Iraq	1991	0.081	0.081	0.081
Kazakhstan	2017	0.239	0.239	0.239
Laos	1991	0.085	0.085	0.085
Libya	1990	0.072	0.072	0.072
Libya	1991	0.072	0.072	0.072
Libya	1992	0.072	0.072	0.072
Libya	1993	0.072	0.072	0.072
Libya	1994	0.072	0.072	0.072
Libya	1995	0.072	0.072	0.072
Libya	1996	0.072	0.072	0.072
Libya	1997	0.072	0.072	0.072
Libya	1998	0.072	0.072	0.072
Libya	1999	0.072	0.072	0.072
Libya	2000	0.072	0.072	0.072
Libya	2001	0.072	0.072	0.072
Libya	2002	0.072	0.072	0.072
Libya	2003	0.072	0.072	0.072
New Zealand	2005	0.887	0.887	0.887
Oman	2008	0.157	0.157	0.157
Qatar	1990	0.017	0.017	0.017
Qatar	1991	0.017	0.017	0.017
Qatar	1992	0.017	0.017	0.017
Qatar	1993	0.017	0.017	0.017
Tajikistan	1997	0.181	0.181	0.181
Togo	1990	0.154	0.154	0.154
County-years rated 1990-2019		5,169	5,173	5,173

Sources

EDI VDem v10: Coppedge, Michael, et al. (2020). "Vdem Country-Year Dataset v10" Varieties of Democracy (V-Dem) Project. Variable v2x_polyarchy. Accessed March 18, 2020, at <https://doi.org/10.23696/vdemds20>.

EDI VDem v12: Coppedge, Michael, et al. (2022). "Vdem Country-Year Dataset v12" Varieties of Democracy (V-Dem) Project. Variable v2x_polyarchy. Accessed March 1, 2022, at <https://www.v-dem.net/vdemds.html>

EDI VDem v13: Coppedge, Michael, et al. (2023). "Vdem Country-Year Dataset v13" Varieties of Democracy (V-Dem) Project. Variable v2x_polyarchy. Accessed March 9, 2023, at <https://www.v-dem.net/vdemds.html>

**Table A15: Greatest Discrepancies in Electoral Democracy Index Values
Across Country-Years in the V-Dem v10, v12, and v13 Databases**

Country	Year	EDI V-Dem v10	EDI V-Dem v12	EDI V-Dem v13	Standard Deviation
Slovakia	1993	.327	.763	.760	0.205
Czech Republic	1990	.403	.651	.804	0.165
Burkina Faso	2019	.358	.708	.667	0.156
Slovakia	1994	.428	.734	.715	0.140
Fiji	2002	.649	.545	.320	0.137
Bulgaria	1990	.311	.481	.577	0.110
Poland	1990	.521	.527	.747	0.105
Namibia	1994	.364	.368	.589	0.105
Romania	1990	.300	.437	.517	0.090
Slovenia	1990	.443	.614	.631	0.085
Hungary	1990	.616	.764	.807	0.082
Mozambique	1994	.432	.280	.247	0.081
Malawi	1994	.264	.379	.460	0.080
Sao Tome and Principe	1991	.402	.563	.558	0.075
Cape Verde	1991	.503	.645	.664	0.072
The Gambia	2017	.346	.474	.503	0.068
Fiji	2006	.567	.459	.405	0.067
Sierra Leone	2002	.451	.435	.302	0.067
Republic of the Congo	1997	.378	.389	.249	0.064
Comoros	2012	.604	.470	.470	0.063
Country-years rated 1990-2019		5,169	5,173	5,173	

Shown are the 20 country-years whose Electoral Democracy Index point estimates had the highest standard deviations across three releases of the Varieties of Democracy database.

Sources

EDI VDem v10: Coppedge, Michael, et al. (2020). "Vdem Country–Year Dataset v10" Varieties of Democracy (V-Dem) Project. Variable v2x_polyarchy. Accessed March 18, 2020, at <https://doi.org/10.23696/vdemds20>.

EDI VDem v12: Coppedge, Michael, et al. (2022). "Vdem Country–Year Dataset v12" Varieties of Democracy (V-Dem) Project. Variable v2x_polyarchy. Accessed March 1, 2022, at <https://www.v-dem.net/vdemds.html>

EDI VDem v13: Coppedge, Michael, et al. (2023). "Vdem Country–Year Dataset v13" Varieties of Democracy (V-Dem) Project. Variable v2x_polyarchy. Accessed March 9, 2023, at <https://www.v-dem.net/vdemds.html>

Robustness Check 1

Alternative Ways of Modeling Autocorrelation Using Panel-Corrected Standard Errors

Do alternative ways of modeling temporal autocorrelation using xtpcse make a difference to findings?

The panel-corrected standard errors analyses reported in this chapter (McGuire 2023) model temporal autocorrelation with a general (ar1) rather than a panel (country)-specific (psar1) first-order autocorrelation adjustment, following the recommendation of Beck and Katz (1995). Son and Bellinger (2022a) use the alternative panel-specific first-order autocorrelation adjustment, so it is well worth checking whether this difference matters for findings.

Both Son and Bellinger (2022a) and McGuire (2023) use a pairwise rather than casewise procedure to calculate the covariance matrix. Using the pairwise procedure, the covariance matrix uses all years common to two countries to run its calculations, maximizing the use of the available data. Using the casewise procedure, the calculation is done using only years for which all countries have data, so that missing data on "2003" in any country will result in the covariance matrix not using the 2003 observations for all countries.

This robustness check is designed to see whether results differ significantly when the panel-corrected standard errors procedure uses a common rather than panel-specific adjustment for temporal autocorrelation, or when the covariance matrix is calculated using the pairwise rather than the casewise procedure.

Using the panel-corrected standard errors procedure, the two significant findings in McGuire (2023) were that:

(1) across 114 developing countries observed annually from 2000 to 2017, the Pelke and Croissant (2020) measure of autocratization had a significant negative association with primary health care spending as a share of GDP.

(2) across 163 countries observed annually from 2000 to 2019, the Maerz et al. (2020) measure of autocratization had a significant negative association with the WHO Universal Health Service Coverage Index.

None of the modifications to either result rendered the autocratization coefficient insignificant. For the primary health care spending as a share of GDP outcome, however, using a panel-specific correction for autocorrelation reduced the magnitude of the coefficient from -.021 to -.017.

Health outcome	Autocratization measure	Auto-correlation adjustment	Covariance matrix computed	Countries	Yrs	Country-yrs	Autocratization coefficient	Autocratization Z-statistic	Autocratization P-value
fl.ln_hsp_phcgdp	raznpeledi	ar1	pairwise	114	2000-2016	2040	-0.021	-2.35	.02
fl.ln_hsp_phcgdp	raznpeledi	ar1	casewise	114	2000-2016	2040	-0.021	-2.36	.02
fl.ln_hsp_phcgdp	raznpeledi	psar1	pairwise	114	2000-2016	2040	-0.017	-2.08	.04
fl.ln_hsp_phcgdp	raznpeledi	psar1	casewise	114	2000-2016	2040	-0.017	-2.06	.04
fl.uhc_i_covtot	raznert01edi	ar1	pairwise	163	2000-2019	3246	-0.188	-2.10	.04
fl.uhc_i_covtot	raznert01edi	ar1	casewise	163	2000-2019	3246	-0.190	-2.14	.03
fl.uhc_i_covtot	raznert01edi	psar1	pairwise	163	2000-2019	3246	-0.188	-2.37	.02
fl.uhc_i_covtot	raznert01edi	psar1	casewise	163	2000-2019	3246	-0.190	-2.41	.02

Robustness Check 2
Replace World Bank Infant Mortality Figures Released in 2023 for those Released in 2022

Does using infant mortality figures from the World Bank 2022 instead of the World Bank 2023 make a difference to findings? Apparently not.

Method	Autocratization measure	Health outcome	Autocratization coefficient	Autocratization t- or z- statistic	Autocratization P-value
xtreg	raznpeledi	f1.ln_hstat_imr_wb23	-0.022	-1.00	0.32
xtreg	raznpeledi	f1.ln_hstat_imr_wb22	-0.026	-1.13	0.26
xtsc	raznpeledi	f1.ln_hstat_imr_wb23	-0.022	-2.57	0.02
xtsc	raznpeledi	f1.ln_hstat_imr_wb22	-0.026	-2.61	0.01
xtpcse	raznpeledi	f1.ln_hstat_imr_wb23	-0.002	-0.69	0.49
xtpcse	raznpeledi	f1.ln_hstat_imr_wb22	-0.003	-0.74	0.46
xtreg	raznert01edi	f1.ln_hstat_imr_wb23	-0.015	-0.72	0.47
xtreg	raznert01edi	f1.ln_hstat_imr_wb22	-0.017	-0.81	0.42
xtsc	raznert01edi	f1.ln_hstat_imr_wb23	-0.015	-1.72	0.10
xtsc	raznert01edi	f1.ln_hstat_imr_wb22	-0.017	-1.73	0.09
xtpcse	raznert01edi	f1.ln_hstat_imr_wb23	0.000	-0.10	0.92
xtpcse	raznert01edi	f1.ln_hstat_imr_wb22	0.000	-0.15	0.88

Robustness Check 3

Substitute a Five-Year Forward Moving Average for a One-Year Forward Lag

Does using a five-year forward moving average instead of a one-year forward lag make a difference to findings? To simplify the syntax of Stata commands, a one-year forward lag on the outcome variable was used instead of a one-year lag on each of the predictor variables. A five-year forward moving average is a summary way of testing whether a longer lag length between predictor and outcome variables would make a difference to findings. The answer is: only rarely, and differences may be due not to the number of years in the forward lag, but rather to large changes in the number of cases. The five-year forward moving average on the outcome variable costs five annual observations per country, the one-year forward moving average costs only one.

ANSWER: not a big difference. Substituted for the one-year forward lag, the five-year forward moving average usually, but not always, slightly attenuated the negative coefficient and t- or z-statistic when the outcome of interest was primary health care spending as a share of GDP or the WHO Universal Health Coverage Coverage Index, and usually, but not always, slightly strengthened the negative coefficient and t- or z-statistic when the outcome of interest was infant mortality. No signs switched (the sign was negative in all 36 regressions). Among 18 comparison pairs, when the five-year forward moving average was substituted for the one-year forward lag, only one pair member lost statistical significance and only one pair member gained statistical significance (see the figures in red in the table on the next page). Also, the number of cases rather than the different forward lags might well account for the difference: the number of cases in the one-year forward lag, compared to the five-year forward moving average, was 28.4% higher when the outcome variable was primary health care spending as a share of GDP, 24.8% higher when the outcome variable was the WHO Universal Health Coverage Coverage Index, and 7.5% higher when the outcome variable was infant mortality.

A table depicting the findings of this robustness check is on the next page

Robustness Check 3 (continued)
Substitute a Five-Year Forward Moving Average for a One-Year Forward Lag

Method	Health outcome	One-yr forward lag or five-yr forward moving average	Autocratization measure	Country-yrs	Autocratization coeff.	Autocratization t- or z- statistic	Autocratization P-value
xtreg	PHC spending % GDP	1-yr frwrd lag	raznpeledi	2040	-0.062	-2.54	0.01
xtreg	PHC spending % GDP	5-yr frwrd moving avg	raznpeledi	1589	-0.049	-1.98	0.05
xtsc	PHC spending % GDP	1-yr frwrd lag	raznpeledi	2040	-0.062	-4.68	0.00
xtsc	PHC spending % GDP	5-yr frwrd moving avg	raznpeledi	1589	-0.049	-4.38	0.00
xtpcse	PHC spending % GDP	1-yr frwrd lag	raznpeledi	2040	-0.021	-2.35	0.02
xtpcse	PHC spending % GDP	5-yr frwrd moving avg	raznpeledi	1589	-0.009	-1.45	0.15
xtreg	PHC spending % GDP	1-yr frwrd lag	raznert01edi	2040	-0.041	-1.75	0.08
xtreg	PHC spending % GDP	5-yr frwrd moving avg	raznert01edi	1589	-0.036	-1.56	0.12
xtsc	PHC spending % GDP	1-yr frwrd lag	raznert01edi	2040	-0.041	-3.17	0.01
xtsc	PHC spending % GDP	5-yr frwrd moving avg	raznert01edi	1589	-0.036	-4.27	0.00
xtpcse	PHC spending % GDP	1-yr frwrd lag	raznert01edi	2040	-0.013	-1.42	0.16
xtpcse	PHC spending % GDP	5-yr frwrd moving avg	raznert01edi	1589	-0.006	-1.16	0.25
xtreg	Univ Health Svc Covg Ix	1-yr frwrd lag	raznpeledi	3246	-0.311	-0.70	0.49
xtreg	Univ Health Svc Covg Ix	5-yr frwrd moving avg	raznpeledi	2600	-0.236	-0.57	0.57
xtsc	Univ Health Svc Covg Ix	1-yr frwrd lag	raznpeledi	3246	-0.311	-1.68	0.11
xtsc	Univ Health Svc Covg Ix	5-yr frwrd moving avg	raznpeledi	2600	-0.236	-1.55	0.14
xtpcse	Univ Health Svc Covg Ix	1-yr frwrd lag	raznpeledi	3246	-0.130	-1.46	0.15
xtpcse	Univ Health Svc Covg Ix	5-yr frwrd moving avg	raznpeledi	2600	-0.065	-0.90	0.37
xtreg	Univ Health Svc Covg Ix	1-yr frwrd lag	raznert01edi	3246	-0.603	-1.29	0.20
xtreg	Univ Health Svc Covg Ix	5-yr frwrd moving avg	raznert01edi	2600	-0.532	-1.33	0.19
xtsc	Univ Health Svc Covg Ix	1-yr frwrd lag	raznert01edi	3246	-0.603	-3.40	0.00
xtsc	Univ Health Svc Covg Ix	5-yr frwrd moving avg	raznert01edi	2600	-0.532	-3.22	0.01
xtpcse	Univ Health Svc Covg Ix	1-yr frwrd lag	raznert01edi	3246	-0.188	-2.10	0.04
xtpcse	Univ Health Svc Covg Ix	5-yr frwrd moving avg	raznert01edi	2600	-0.157	-1.99	0.05
xtreg	Infant mortality rate	1-yr frwrd lag	raznpeledi	4731	-0.022	-1.00	0.32
xtreg	Infant mortality rate	5-yr frwrd moving avg	raznpeledi	4401	-0.024	-1.16	0.25
xtsc	Infant mortality rate	1-yr frwrd lag	raznpeledi	4731	-0.022	-2.57	0.02
xtsc	Infant mortality rate	5-yr frwrd moving avg	raznpeledi	4401	-0.024	-3.20	0.00
xtpcse	Infant mortality rate	1-yr frwrd lag	raznpeledi	4731	-0.004	-0.99	0.32
xtpcse	Infant mortality rate	5-yr frwrd moving avg	raznpeledi	4401	-0.003	-0.78	0.44
xtreg	Infant mortality rate	1-yr frwrd lag	raznert01edi	4731	-0.015	-0.72	0.47
xtreg	Infant mortality rate	5-yr frwrd moving avg	raznert01edi	4401	-0.018	-0.94	0.35
xtsc	Infant mortality rate	1-yr frwrd lag	raznert01edi	4731	-0.015	-1.72	0.10
xtsc	Infant mortality rate	5-yr frwrd moving avg	raznert01edi	4401	-0.018	-2.44	0.02
xtpcse	Infant mortality rate	1-yr frwrd lag	raznert01edi	4731	0.000	-0.10	0.92
xtpcse	Infant mortality rate	5-yr frwrd moving avg	raznert01edi	4401	0.000	-0.18	0.86

Robustness Check 4

Autocratization and Infant Mortality Over Successive 15-Year Time Periods

Does the significant negative association between autocratization and infant mortality become attenuated, or switch to a positive association, when the time-series length is held at 15 years, but the time-series end year is allowed to vary from 2005 to 2019?

The regressions reported in Table 7 vary according to time-series length, as well as according to time-series end year. If time-series length is held at 15 years, while the time-series end year is allowed to vary from 2005 to 2019, the strongest (unexpected) negative association between autocratization and infant mortality is in the 2000-2014 series, when the Pelke and Croissant (2020) autocratization coefficient is negative and significant at least at the .10 level according to each of the three statistical methods. The association is then attenuated as the period end-years go back in time. By 1991-2005 there is no significant association, and the coefficient on the

If time-series length is held at 15 years, while the time-series end year is allowed to vary from 2005 to 2019, the strongest (unexpected) negative association between autocratization and infant mortality is in the **2000-2014 series**, when the Pelke and Croissant (2022) autocratization coefficient is negative and significant at least at the .10 level according to each of the three statistical methods. The association is then attenuated as the period end-years go back in time. By **1991-2005** there is no significant association, and the autocratization coefficient has switched signs from negative to positive, indicating that autocratization episodes from 1991 to 2005 were associated, as expected, with higher infant mortality.

Range	Years	Countries	Country-years	Coefficient and t- and z-statistics pertain to the <i>raznpeledi</i> indicator (Pelke and Croissant 2020)			
				OLS coefficient	Country-clustered t-statistic	Driscoll-Kraay t-statistic	Panel-corrected z-statistic
2005-2019	15	165	2,457	-.0040	-0.27	-0.51	-1.85+
2004-2018	15	165	2,455	-.0085	-0.54	-0.96	-1.50
2003-2017	15	165	2,453	-.0149	-0.91	-2.06+	-
2002-2016	15	165	2,450	-.0194	-1.23	-3.78**	-
2001-2015	15	165	2,446	-.0239	-1.55	-5.62***	-1.87+
2000-2014	15	165	2,439	-.0278	-1.84+	-5.01***	-2.60**
1999-2013	15	163	2,431	-.0245	-1.65	-4.70***	-2.20*
1998-2012	15	163	2,425	-.0193	-1.26	-3.56**	-1.70+
1997-2011	15	163	2,417	-.0201	-1.25	-3.71**	-
1996-2010	15	163	2,409	-.0192	-1.08	-3.61**	-
1995-2009	15	163	2,391	-.0165	-0.94	-3.82**	-
1994-2008	15	163	2,371	-.0154	-0.96	-3.99***	-
1993-2007	15	163	2,350	-.0091	-0.55	-2.06+	-0.85
1992-2006	15	163	2,328	-.0089	-0.54	-1.38	+0.63
1991-2005	15	163	2,305	-.0027	-0.16	-0.28	+1.11

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

- means that xtprse could not estimate the model using the pairwise method.

Autocratization measure: Pelke and Croissant (2020). Original variable: *auto_period01ci*.

Robustness Check 5

Autocratization and Primary Health Care Spending Over Successive Time Periods

Does the significant negative association between autocratization and primary health care spending as a share of GDP (in 114 developing countries) become attenuated, or switch to a positive association, as the number of years in the time series declines, and as the end year of the time series recedes from 2016?

That is exactly what happened with the significant negative association between autocratization and infant mortality (Table 7). And, as the table below shows, similar attenuation is visible over time in the association between autocratization and primary health care spending as a share of GDP. On this indicator, however, the sign of the coefficient of the autocratization measure never switches from negative to positive, as it did with the infant mortality rate in 1990-2004 and in earlier and shorter time series (Table 7)

Range	Years	Countries	Country-years	Coefficient and t- and z-statistics pertain to the <i>raznpeledi</i> indicator (Pelke and Croissant 2020)			
				OLS coefficient	Country-clustered t-statistic	Driscoll-Kraay t-statistic	Panel-corrected z-statistic
2000-2016	17	114	2,040	-.0617	-2.54*	-4.68***	-2.35*
2000-2015	16	114	1,926	-.0612	-2.46*	-4.35***	-2.26*
2000-2014	15	114	1,812	-.0595	-2.32*	-4.05***	-2.54*
2000-2013	14	114	1,698	-.0564	-2.29*	-3.89***	-
2000-2012	13	114	1,584	-.0516	-2.18*	-3.66**	-
2000-2011	12	114	1,470	-.0496	-2.05*	-3.35**	-
2000-2010	11	114	1,356	-.0432	-1.78+	-2.84*	-
2000-2009	10	114	1,242	-.0396	-1.66+	-2.42*	-
2000-2008	9	114	1,128	-.0379	-1.70+	-2.17+	-
2000-2007	8	114	1,014	-.0385	-1.95+	-1.94+	-
2000-2006	7	114	900	-.0218	-1.06	-1.31	-
2000-2005	6	114	786	-.0068	-0.31	-0.48	-

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

- means that *xtpcse* could not estimate the model using the pairwise method.

Autocratization measure: Pelke and Croissant (2020). Original variable: *auto_period01ci*.

The 17-year models are identical to Table 2, Models 1, 2, and 3. The other models differ only in length and end year of time series.

The information in the note to Table 2 pertains to this table as well.

Robustness Check 6

Autocratization and the Health Coverage Index Over Successive Time Periods

Does the significant negative association between autocratization and the WHO Universal Health Service Coverage Index become attenuated, or switch to a positive association, as the number of years in the time series declines, and as the end year of the time series recedes from 2016?

That is exactly what happened with the significant negative association between autocratization and infant mortality (Table 7). And, as the table below shows, similar attenuation is visible over time in the association between autocratization and the WHO Universal Health Service Coverage Index. On this indicator, however, the sign of the coefficient of the autocratization measure never switches from negative to positive, as it did with the infant mortality rate in 1990-2004 and in earlier and shorter time series (Table 7).

Coefficient and t- and z-statistics pertain to the
raznert01edi indicator (Maerz et al. 2020)

Range	Years	Countries	Country- years	OLS coefficient	Country- clustered t-statistic	Driscoll- Kraay t-statistic	Panel- corrected z-statistic
2000-2018	19	163	3,246	-.6029	-1.29	-3.40**	-2.10*
2000-2017	18	163	3,083	-.5684	-1.23	-3.50**	-2.14*
2000-2016	17	163	2,920	-.5717	-1.24	-3.67**	-2.11*
2000-2015	16	163	2,757	-.5636	-1.24	-3.81**	-2.05*
2000-2014	15	163	2,594	-.5568	-1.22	-3.73**	-1.80+
2000-2013	14	163	2,431	-.5538	-1.21	-3.48**	-1.55
2000-2012	13	163	2,268	-.6143	-1.34	-3.75**	-1.82+
2000-2011	12	163	2,105	-.6317	-1.36	-3.48**	-1.84+
2000-2010	11	163	1,942	-.6621	-1.30	-2.81*	-1.85+
2000-2009	10	163	1,779	-.5226	-1.09	-2.28*	-1.71+
2000-2008	9	163	1,616	-.3963	-0.85	-1.89+	-1.38
2000-2007	8	163	1,453	-.3214	-0.66	-1.47	-1.51
2000-2006	7	163	1,290	-.2558	-0.51	-0.82	-1.41
2000-2005	6	163	1,127	-.3860	-0.74	-0.96	-0.91

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Autocratization measure: Maerz et al. (2020). Original variable: *aut_ep*.

This replication used the Maerz et al. (2020) autocratization indicator rather than the Pelke and Croissant (2020) indicator because the Maerz et al. (2020) autocratization indicator produced the only significant findings in Table 5.

The 19-year models are identical to Table 5, Models 4, 5, and 6. The other models differ only in length of time series.

The information in the note to Table 5 pertains to this table as well.

Robustness Check 7

Add Additional Control Variables to the Regressions Depicted in Table 2

Does the association between autocratization and primary health care spending as a share of gdp across developing countries from 2000 to 2016 (Table 2) change significantly if additional control variables are included? The models tested are xtreg with country-clustered standard errors, autocratization measure from Pelke and Croissant 2020 (raznpeledi) (Table 2, Model 1); and xtpcse, autocratization measure from Maerz et al. 2020 (raznert01edi) (Table 2, Model 6). None of the additional variables made the Pelke and Croissant (2020) variable insignificant, not even the population size (ln) variable, which itself had a significant coefficient signed in the expected direction using both xtreg and xtpcse. Population size and urbanization each had a significant negative association with primary health care spending as a share of GDP, but their addition never eliminated the significance of the Pelke and Croissant 2020 autocratization measure, or the Maerz et al. 2020 autocratization measure significant.

Top (baseline) regression results are identical to those in [Table 2, Model 1](#), PHC spending as % GDP, developing countries only. [Table 2, Model 1](#) uses `xtreg, fe cluster(id_num_wb)`, with two-way fixed effects (`id_year` included as a regressor). The six lines below the baseline variable results show how findings change when the indicated control variables are added, one by one, to the baseline model, which has six other control variables.

Additional control variable	N	Statistical effect of the additional control variable on the Pelke and Croissant 2020 autocratization coefficient (raznpeledi)			Prediction	Statistical effect of the additional control variable on primary health care spending as a share of GDP		
		autoczn Pelke coeff.	autoczn Pelke t-score	autoczn Pelke P-value		Add'l var coeff.	Add'l var t-score	Add'l var P-value
None (baseline)	2040	-0.062	-2.54	.01	..	..	..	..
Public goods orient	2004	-0.061	-2.44	.02	positive	0.009	0.44	0.66
Corruption	2004	-0.060	-2.42	.02	negative	-0.069	-0.64	0.52
Democratic stock	1875	-0.064	-2.23	.03	positive	0.005	0.17	0.87
Fertility	2039	-0.062	-2.51	.01	uncertain	0.029	0.76	0.45
Population size ln	2040	-0.055	-2.19	.03	uncertain	-0.437	-2.39	0.02
Urbanization	2040	-0.062	-2.54	.01	uncertain	-0.007	-1.41	0.16

Top (baseline) regression results are identical to those in [Table 2, Model 6](#), PHC spending as % GDP, developing countries only. [Table 2, Model 6](#) uses `xtpcse, corr(ar1) pairwise`, with two-way fixed effects (`id_year` and `id_num_wb` are included as regressors). The six lines below the baseline variable results show how findings change when the indicated control variables are added, one by one, to the baseline model, which has six other control variables.

Additional control variable	N	Statistical effect of the additional control variable on the Maerz et al. 2020 autocratization coefficient (raznert01edi)			Prediction	Statistical effect of the additional control variable on primary health care spending as a share of GDP		
		autoczn Maerz coeff.	autoczn Maerz t-score	autoczn Maerz P-value		Add'l var coeff.	Add'l var t-score	Add'l var P-value
None (baseline)	2040	-0.013	-1.42	.16	..	..	..	..
Public goods orient	2004	-0.016	-1.66	.10	positive	-0.009	-1.02	.31
Corruption	2004	-0.015	-1.58	.12	negative	-0.051	-1.14	.25
Democratic stock	1875	-0.014	-1.36	.17	positive	-0.013	0.00	1.00
Fertility	2039	-0.013	-1.42	.15	uncertain	0.022	1.21	.23
Population size	2040	-0.012	-1.25	.21	uncertain	-0.379	-3.97	.000
Urbanization	2040	-0.013	-1.40	.16	uncertain	-0.008	-3.24	.001

Robustness Check 8

Add Additional Control Variables to the Regressions Depicted in Table 3

Does the association between autocratization and the WHO Universal Health Service Coverage Index across developing countries from 2000 to 2016 (Table 3) change significantly if additional control variables are included? The models tested are xtreg with country-clustered standard errors, autocratization measure from Pelke and Croissant 2020 (raznpeledi) (Table 3, Model 1); and xtpcse, autocratization measure from Maerz et al. 2020 (raznert01edi) (Table 3, Model 6). Answer: No. None of the additional variables rendered autocratization significant, even though, using the xtpcse procedure, four of the six additional control variables had significant coefficients signed in the expected direction, and the addition of democratic stock made the Maerz et al. (2020) autocratization coefficient nearly significant.

Top (baseline) regression results are identical to those in [Table 3, Model 1](#), WHO Universal Health Service Coverage Index, developing countries only. [Table 3, Model 1](#) uses `xtreg, fe cluster(id_num_wb), with two-way fixed effects (id_year included as a regressor)`. The six lines below the baseline variable results show how findings change when the indicated control variables are added, one by one, to the baseline model, which has six other control variables.

Additional control variable	N	Statistical effect of the additional control variable on the Pelke and Croissant 2020 autocratization coefficient (raznpeledi)			Statistical effect of the additional control variable on the WHO Universal Health Service Coverage Index			
		autoczn Pelke coeff.	autoczn Pelke t-score	autoczn Pelke P-value	Prediction	Add'l var coeff.	Add'l var t-score	Add'l var P-value
None (baseline)	2040	0.075	0.17	.87	..	..	..	..
Public goods orientation	2004	0.186	0.41	.69	positive	0.041	0.12	.91
Corruption	2004	0.196	0.43	.67	negative	-1.022	-0.38	.71
Democratic stock	1875	-0.011	-0.02	.98	positive	0.755	1.33	.19
Fertility	2039	0.059	0.13	.89	negative	-0.604	-0.71	.48
Population size ln	2040	0.089	0.20	.84	negative	-0.976	-0.24	.81
Urbanization	2040	0.073	0.16	.87	positive	0.063	0.57	.57

Top (baseline) regression results are identical to those in [Table 3, Model 6](#), WHO Universal Health Service Coverage Index, developing countries only. [Table 3, Model 6](#) uses `xtpcse, corr(ar1) pairwise, with two-way fixed effects (id_year and id_num_wb are included as regressors)`. The six lines below the baseline variable results show how findings change when the indicated control variables are added, one by one, to the baseline model, which has six other control variables.

Additional control variable	N	Statistical effect of the additional control variable on the Maerz et al. 2020 autocratization coefficient (raznert01edi)			Statistical effect of the additional control variable on the WHO Universal Health Service Coverage Index			
		autoczn Maerz coeff.	autoczn Maerz t-score	autoczn Maerz P-value	Prediction	Add'l var coeff.	Add'l var t-score	Add'l var P-value
None (baseline)	2040	-0.137	-1.34	.18	..	..	..	..
Public goods orientation	2004	-0.161	-1.56	.12	positive	0.073	0.82	.41
Corruption	2004	-0.162	-1.58	.11	negative	-1.422	-1.98	.05
Democratic stock	1875	-0.201	-1.85	.06	positive	0.671	3.38	.00
Fertility	2039	-0.138	-1.33	.18	negative	-0.521	-2.28	.02
Population size (ln)	2040	-0.135	-1.31	.19	negative	-1.694	-1.48	.14
Urbanization	2040	-0.137	-1.35	.18	positive	0.100	3.61	.00

Robustness Check 9

Add Additional Control Variables to the Regressions Depicted in Table 4

Does the association between autocratization and infant mortality across developing countries from 2000 to 2016 (Table 4) change significantly if additional control variables are included? The models tested are xtreg with country-clustered standard errors, autocratization measure from Pelke and Croissant 2020 (raznpeledi) (Table 4, Model 1); and xtpcse, autocratization measure from Maerz et al. 2020 (raznert01edi) (Table 4, Model 6). Answer: No. None of the additional variables rendered autocratization significant, even though, using the xtpcse procedure, two of the six additional control variables had significant coefficients signed in the expected direction.

Top (baseline) regression results are identical to those in [Table 4, Model 1](#), infant mortality rate, developing countries only. [Table 4, Model 1](#) uses xtreg, fe cluster(id_num_wb), with two-way fixed effects (id_year included as a regressor). The six lines below the baseline variable results show how findings change when the indicated control variables are added, one by one, to the baseline model, which has six other control variables.

Additional control variable	Statistical effect of the additional control variable on the Pelke and Croissant 2020 autocratization coefficient (raznpeledi)				Statistical effect of the additional control variable on the infant mortality rate			
	N	autoczn Pelke coeff.	autoczn Pelke t-score	autoczn Pelke P-value	Prediction	Add'l var coeff.	Add'l var t-score	Add'l var P-value
None (baseline)	2040	-0.023	-1.22	.23	..	..	..	..
Public goods orientation	2004	-0.024	-1.19	.24	negative	-0.029	-1.35	.18
Corruption	2004	-0.024	-1.19	.24	positive	0.086	0.61	.55
Democratic stock	1875	-0.025	-1.45	.15	negative	0.005	0.24	.81
Fertility	2039	-0.023	-1.27	.21	negative	-0.070	-2.19	.03
Population size ln	2040	-0.025	-1.32	.19	positive	0.171	1.15	.25
Urbanization	2040	-0.023	-1.22	.33	negative	0.000	0.00	1.00

Top (baseline) regression results are identical to those in [Table 4, Model 6](#), WHO Universal Health Service Coverage Index, developing countries only. [Table 4, Model 6](#) uses xtpcse, corr(ar1) pairwise, with two-way fixed effects (id_year and id_num_wb are included as regressors). The six lines below the baseline variable results show how findings change when the indicated control variables are added, one by one, to the baseline model, which has six other control variables.

Additional control variable	Statistical effect of the additional control variable on the Maerz et al. 2020 autocratization coefficient (raznert01edi)				Statistical effect of the additional control variable on the infant mortality rate			
	N	autoczn Maerz coeff.	autoczn Maerz t-score	autoczn Maerz P-value	Prediction	Add'l var coeff.	Add'l var t-score	Add'l var P-value
None (baseline)	2040	-0.002	-0.65	.52	..	..	..	..
Public goods orient	2004	-0.001	-0.26	.80	negative	-0.003	-0.72	.47
Corruption	2004	-0.001	-0.22	.82	positive	0.033	1.21	.23
Democratic stock	1875	-0.002	-0.66	.51	negative	0.008	1.55	.12
Fertility	2039	-0.002	-0.59	.56	negative	-0.047	-4.83	.00
Population size (ln)	2040	-0.002	-0.66	.51	positive	0.233	7.68	.00
Urbanization	2040	-0.002	-0.65	.52	negative	-0.001	-0.73	.46

Robustness Check 10

Add Additional Control Variables to the Regressions Depicted in Table 5

Does the association between autocratization and the WHO Universal Health Service Coverage Index across all countries from 2000 to 2019 (Table 5) change significantly if additional control variables are included? The models tested are xtreg with country-clustered standard errors, autocratization measure from Pelke and Croissant 2020 (raznpeledi) (Table 5, Model 1); and xtpcse, autocratization measure from Maerz et al. 2020 (raznert01edi) (Table 5, Model 6). Answer: No. None of the additional variables rendered the autocratization coefficient significant using the Pelke and Croissant (2020) autocratization indicator and the OLS country-clustered standard errors method, or made the autocratization coefficient insignificant using the Maerz et al. (2020) autocratization indicator and the panel-corrected standard errors method, even though, using xtpcse, four of the six additional control variables had significant coefficients signed in the expected direction.

Top (baseline) regression results are identical to those in [Table 5, Model 1](#), WHO Universal Health Service Coverage Index, all countries. [Table 5, Model 1](#) uses `xtreg, fe cluster(id_num_wb)`, with two-way fixed effects (`id_year` included as a regressor). The six lines below the baseline variable results show how findings change when the indicated control variables are added, one by one, to the baseline model, which has six other control variables.

Additional control variable	N	Statistical effect of the additional control variable on the Pelke and Croissant 2020 autocratization coefficient (raznpeledi)			Statistical effect of the additional control variable on the WHO Universal Health Service Coverage Index			
		autoczn Pelke coeff.	autoczn Pelke t-score	autoczn Pelke P-value	Prediction	Add'l var coeff.	Add'l var t-score	Add'l var P-value
None (baseline)	3246	-0.311	-0.70	.49	..	..	..	..
Public goods orient	3206	-0.255	-0.55	.58	positive	0.194	0.52	.61
Corruption	3200	-0.198	-0.43	.67	negative	-2.076	-0.76	.45
Democratic stock	2689	-0.280	-0.56	.57	positive	0.665	1.19	.24
Fertility	3245	-0.361	-0.82	.42	negative	-1.434	-1.78	.08
Population size ln	3246	-0.319	-0.71	.48	negative	0.634	0.23	.82
Urbanization	3246	-0.299	-0.67	.50	positive	0.158	1.62	.11

Top (baseline) regression results are identical to those in [Table 5, Model 6](#), WHO Universal Health Service Coverage Index, all countries. [Table 5, Model 6](#) uses `xtpcse, corr(ar1) pairwise`, with two-way fixed effects (`id_year` and `id_num_wb` are included as regressors). The six lines below the baseline variable results show how findings change when the indicated control variables are added, one by one, to the baseline model, which has six other control variables.

Additional control variable	N	Statistical effect of the additional control variable on the Maerz et al. 2020 autocratization coefficient (raznert01edi)			Statistical effect of the additional control variable on the WHO Universal Health Service Coverage Index			
		autoczn Maerz coeff.	autoczn Maerz t-score	autoczn Maerz P-value	Prediction	Add'l var coeff.	Add'l var t-score	Add'l var P-value
None (baseline)	3246	-0.188	-2.10	.04	..	..	..	..
Public goods orient	3206	-0.212	-2.33	.02	positive	0.090	1.28	.20
Corruption	3200	-0.210	-2.31	.02	negative	-1.388	-2.30	.02
Democratic stock	2689	-0.252	-2.58	.01	positive	0.620	3.87	.00
Fertility	3245	-0.189	-2.11	.04	negative	-1.181	-4.87	.00
Population size (ln)	3246	-0.187	-2.09	.04	negative	-0.563	-0.50	.62
Urbanization	3246	-0.186	-2.09	.04	positive	0.196	12.72	.00

Robustness Check 11

Add Additional Control Variables to the Regressions Depicted in Table 6

Does the association between autocratization and the infant mortality rate across all countries from 1990 to 2019 (Table 6) change significantly if additional control variables are included? The models tested are xtreg with country-clustered standard errors, autocratization measure from Pelke and Croissant 2020 (raznpeledi) (Table 6, Model 1); and xtpcse, autocratization measure from Maerz et al. 2020 (raznert01edi) (Table 6, Model 6). Answer: No. None of the additional variables made the autocratization coefficient significant using either (1) the Pelke and Croissant (2020) autocratization indicator and the OLS country-clustered standard errors method, or (2) the Maerz et al. (2020) autocratization indicator and the panel-corrected standard errors method, even though, using xtpcse, two of the six additional control variables had significant coefficients signed in the expected direction.

Top (baseline) regression results are identical to those in [Table 6, Model 1](#), infant mortality rate, all countries. [Table 6, Model 1](#) uses `xtreg, fe cluster(id_num_wb)`, with two-way fixed effects (`id_year` included as a regressor). The six lines below the baseline variable results show how findings change when the indicated control variables are added, one by one, to the baseline model, which has six other control variables.

Additional control variable	Statistical effect of the additional control variable on the Pelke and Croissant 2020 autocratization coefficient (raznpeledi)				Statistical effect of the additional control variable on the infant mortality rate			
	N	autoczn Pelke coeff.	autoczn Pelke t-score	autoczn Pelke P-value	Prediction	Add'l var coeff.	Add'l var t-score	Add'l var P-value
None (baseline)	4731	-0.022	-1.00	0.318	..	..	..	..
Public goods orient	4675	-0.023	-0.99	0.324	negative	-0.021	-1.02	.31
Corruption	4660	-0.020	-0.87	0.386	positive	0.021	0.14	.89
Democratic stock	3977	-0.024	-1.15	0.251	negative	-0.013	-0.96	.34
Fertility	4722	-0.022	-0.99	0.325	negative	0.003	0.11	.91
Population size ln	4731	-0.022	-1.00	0.321	positive	0.135	1.50	.14
Urbanization	4731	-0.022	-0.98	0.330	negative	0.002	0.47	.64

Top (baseline) regression results are identical to those in [Table 6, Model 6](#), infant mortality rate, all countries. [Table 6, Model 6](#) uses `xtpcse, corr(ar1) pairwise`, with two-way fixed effects (`id_year` and `id_num_wb` are included as regressors). The six lines below the baseline variable results show how findings change when the indicated control variables are added, one by one, to the baseline model, which has six other control variables.

Additional control variable	Statistical effect of the additional control variable on the Maerz et al. 2020 autocratization coefficient (raznert01edi)				Statistical effect of the additional control variable on the infant mortality rate			
	N	autoczn Maerz coeff.	autoczn Maerz t-score	autoczn Maerz P-value	Prediction	Add'l var coeff.	Add'l var t-score	Add'l var P-value
None (baseline)	4731	0.000	-0.10	0.922	..	..	..	..
Public goods orient	4675	0.001	0.20	0.845	negative	-0.003	-0.95	.34
Corruption	4660	0.001	0.28	0.780	positive	0.017	0.95	.34
Democratic stock	3977	0.001	0.29	0.769	negative	-0.018	-5.40	.00
Fertility	4722	0.000	-0.11	0.914	negative	0.000	0.02	.98
Population size (ln)	4731	0.000	-0.04	0.970	positive	0.182	7.30	.00
Urbanization	4731	0.000	-0.08	0.934	negative	0.001	0.87	.38

Robustness Check 12

Add Additional Control Variables to the Regressions Depicted in Table 8

The association between autocratization and primary health care spending as a share of GDP differed greatly depending on which measure of autocratization was used (Table 8). Was that also true for the association between autocratization and the WHO Universal Health Service Coverage Index, and for the association between autocratization and infant mortality? Answer: Yes. See the results below.

Results from Table 8, outcome PHC spending % GDP, all countries, using four autocratization measures
Method: `xtreg, fe cluster(id_num_wb)`, two-way fixed effects (`id_year` included as a regressor).

The four regression results immediately below are identical to those in Table 8. The magnitude of the autocratization coefficient proved to be more than three times as great when using the `raznpeledi` autocratization indicator (-0.062) as when using the `raznert13edi` indicator (-0.019), and **more than two times as great using the `raznert01edi` indicator (-0.041) as the `raznert13edi` indicator (-0.019).**

Autocratization variable:	Table/Model	Ctry-years	Coefficient	t-statistic	P>|t|
<code>raznpeledi</code> (Pelke/Croissant 2020)	T 8, M 1	2040	-0.062	-2.54	.012
<code>raznert01edi</code> (Maerz et al. 2020)	T 8, M 2	2040	-0.041	-1.75	.083
<code>raznert04edi</code> (Maerz et al. 2022)	T 8, M 3	2040	-0.051	-1.96	.052
<code>raznert13edi</code> (Maerz et al. 2023)	T 8, M 4	2040	-0.019	-0.81	.421

Replication of Table 5, outcome WHO UHC Index, all countries, using four autocratization measures

Method: `xtpcse, corr(ar1) pairwise`, 2-way fixed effects (`id_year` & `id_num_wb` incl. regressors)

When replicated using `xtreg` neither result was significant (Table 5, Models 1 and 4). Accordingly, the `xtpcse` results, one of which was significant (Table 5, Model 6), were replicated. The magnitude of the autocratization coefficient proved to be **more than two times as great when using the `raznert01edi` autocratization indicator (-0.188) as when using the `raznert04edi` indicator (-0.085).**

Autocratization variable:	Table/Model	Ctry-years	Coefficient	z-statistic	P>|z|
<code>raznpeledi</code> (Pelke/Croissant 2020)	T 5, M 3	3246	-0.130	-1.46	.15
<code>raznert01edi</code> (Maerz et al. 2020)	T 5, M 6	3246	-0.188	-2.10	.04
<code>raznert04edi</code> (Maerz et al. 2022)	New	3246	-0.085	-0.81	.42
<code>raznert13edi</code> (Maerz et al. 2023)	New	3246	-0.114	-1.15	.25

Replication of Table 6, outcome infant mortality rate, all countries, using four autocratization measures

Method: `xtreg, fe cluster(id_num_wb)`, two-way fixed effects (`id_year` included as a regressor)

When replicated using `xtreg`, neither result was significant, but the magnitude of the autocratization coefficient proved to be **nearly two times as great when using the `raznert04edi` autocratization indicator (-0.019) as when using the `raznert13edi` indicator (-0.010).**

Autocratization variable:	Table/Model	Ctry-years	Coefficient	t-statistic	P>|t|
<code>raznpeledi</code> (Pelke/Croissant 2020)	T 6, M 1	4731	-0.022	-1.00	.32
<code>raznert01edi</code> (Maerz et al. 2020)	T 6, M 4	4731	-0.015	-0.72	.47
<code>raznert04edi</code> (Maerz et al. 2022)	New	4895	-0.019	-0.83	.41
<code>raznert13edi</code> (Maerz et al. 2023)	New	4895	-0.010	-0.49	.63