Democracy and the Poor Reassessed

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Abstract

By using life expectancy as our core indicator of a country's health status, this paper empirically re-assesses the political foundations of human biological development. Our overarching question is: does democracy drive the health of nations? To investigate this, we use both the level and change measures of democracy in our regressions. Our overriding discovery can be summarised as follows: accounting for the various country and time features, a one standard deviation increase in the level of democracy is associated with a 0.11 standard deviation increase in life expectancy. This is an increase in life expectancy of around 5 years for a country initially with a mean life expectancy of 54 years. These results are robust to employing alternative model specifications, to using different subsamples of the data, and to alternative estimation techniques. We, therefore, conclude that the material role of democratic institutions in promoting human welfare is of first-order relevance.

Key words: Democracy, Health

JEL: D72, I14

1. Introduction

Sir Angus Deaton opens *The Great Escape: Health, Wealth, and the Origins of Inequality* by stating that: "Life is better now than at almost any time in history. More people are richer and fewer people live in dire poverty. Lives are longer and parents no longer routinely watch a quarter of their children die. Yet millions still experience the horrors of destruction and of premature death. The world is hugely unequal" (2013, p. 1). According to him: "The great escape in human history is the escape from poverty and death... You need a life to have a *good* life, and poor health and disability among the living can severely limit the

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capability to enjoy an other-wise good life" (pp. 23-24).[2]

In the above, Deaton provides an apt summary of how poverty determines mortality, and why some societies continue to suffer calamitous mortality rates, that keep the life expectancy faced at birth by their citizens agonisingly low, which remains a topic of great debate. The United Nations (UN 2015), in its 2030 Agenda for Sustainable Development (henceforth, 2030 Agenda), identified ensuring good health and promoting well-being at all ages as Goal 3 of 17 Sustainable Development Goals (SDGs). The destination is thus set, and the journey has begun. Undoubtedly, great strides forward have been made in recent times. For example, between the years 2000 and 2015, child mortality rate declined by 44%, and neonatal mortality rate fell by over 38%. Relative to the year 2000, the corresponding numbers in 2017 were reductions by 49% and 41%, respectively, for child and neonatal mortality rates (UN 2019). This shows a considerable improvement in recent years, which appears to have been gaining speed.

Despite the monumental strides that have been made over the years in reducing the plights of the poorest citizens of the world, the 2019 progress towards the SDGs report claims that "progress has stalled or is not happening fast enough..." (p. 9). The good news though is that the existing literature has offered various explanations for why some countries live better, healthier, and longer than others. For instance, Cutler et al. (2006) have outlined a variety of socioeconomic factors as the fundamental causes of the differences in mortality rates between and within countries. Some of the factors they discussed are (i) improvements in nutrition and water supply; (ii) availability of medications and vaccines for the treatment of sicknesses and prevention of others; and (iii) changes in income and education.[3]

Implicit in their discourse is the need for a political man or machine to organise the resources of a nation to the desired end of attaining prosperous health. Hence, the existing literature has shown that access to more of the above-listed conditions alone is insufficient for explaining the cross-country differences in health

[2] A similar view was noted by Cutler et al. (2006, p. 97): "The pleasures of life are worth nothing if one is not alive to experience them." This was also quoted in Oyekola (2019), who provided a piece of historical evidence on the powerful effect of European colonial migration strategies on the current health status of non-European countries. Although Deaton noted that escape from "poverty and death" are the great escapes in human history, we have centred on death-related indicators in this paper. In a related paper, Oyekola (2019) focusses on the link between political democracy and economic outcomes.

[3] Among other factors, they also covered improvement in public health, increasingly eradicating disease vectors (such as anopheles mosquitoes and rats that carry malaria and lice, respectively), and deliberate public action.

and health policies, claiming that politics matter (Boone 1996; Sen 1981, 1999; Zweifel and Navia 2000; Navarro et al. 2003; Franco et al. 2004; Ruger 2005). We, therefore, reassess in this paper whether political arrangements under democracy are superior to the ones under autocracy in providing better health outcomes for its population. Thus, we ask: does health follows, where democracy leads? Moreover, understanding this is important because the health of nations has been established as one of the key drivers of the wealth of nations.[4]

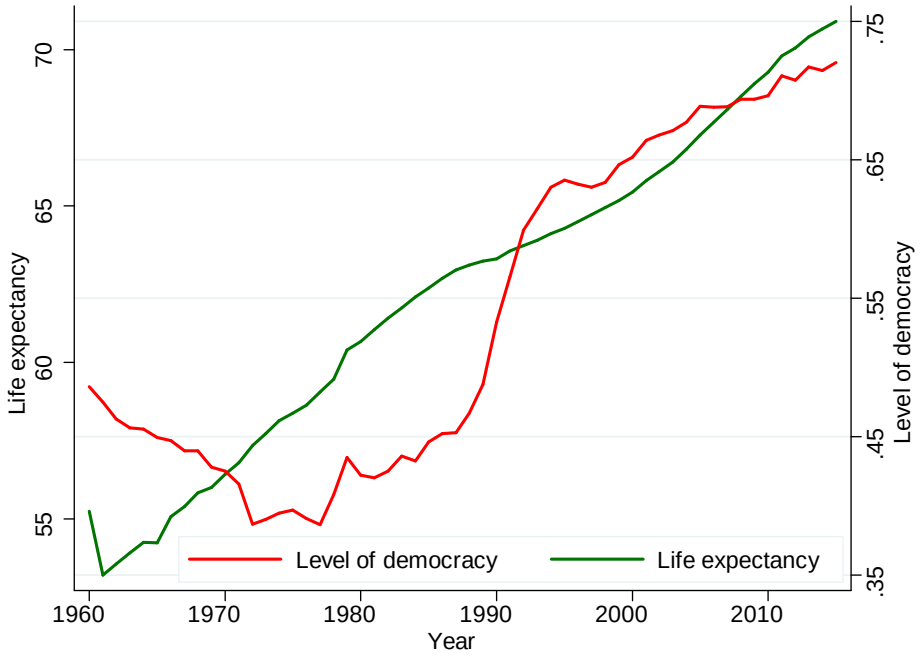
As there have been debates about the potential gains from having democratic capital, some insightful research outputs have, in addition to a proxy for the level, or the contemporaneous measure, of democracy, also included measures of a country's democratic experience as part of their controls in evaluating the influence of democracy on human development (see, for example, Besley and Kudamatsu 2006; Ross 2006; Gerring et al. 2012). Another way to think about a country's constitutional history is to consider its political regime durability, or lack thereof, as in Minier (1998). The innovation she brought to bear was examined the extent to which it was the level of, or the change in, democracy that was crucial for economic growth. We adopt such a strategy here, and utilise both the level and change measures of democracy in our attempt to identify whether (or not) there is a causal effect of democracy on health.

Our level measure of democracy is the revised combined polity score from the Polity IV database (Marshall et al. 2018), which is constructed based on the conceptual framework of Gurr and Eckstein's (1975) patterns of authority. This measure is based on openness and competitiveness of executive recruitment, constraints on the executive, and the competitiveness of political participation. The change measures of democracy are constructed to capture substantial shifts in the level of democracy based on data from Cheibub et al. (2010) and Bormann and Golder (2013). The two derived indicators reflect increases and decreases in the level of democracy in a country. In the baseline, we mainly capture the health of a nation using life expectancy.[5] Figure 1, which displays the unweighted averages of life expectancy (unlogged on the

[4] For supporting and dissenting views, see, for example, Pritchett and Summers (1996), World Health Organisation (WHO 2001), Bloom et al. (2004), Acemoglu and Robinson (2007), Lorentzen et al. (2008), Bhattacharyya (2009), Barro (2013), Weil (2013), and Kunze (2014).

[5] Detailed definitions and data sources of all variables used for analysis are provided in Section 2.

Figure 1: Democracy and life expectancy: the evolution



left y-axis) and the level of democracy (rescaled to lie between 0 and 1 on the right y-axis), underlines why one may want to study more the association between democracy and health systematically. For instance, the overall picture from the diagram suggests that there is some strong correlation between a country's democratic level and its citizen's life expectancy, especially since the 1980s. So, is this just a coincidence?

The main result of our paper is to document a strong and robust statistical and economic relationship between levels of democracy and life expectancy: countries with more consolidated democratic values are much more likely to enjoy higher life expectancy. More specifically, we find that, after controlling for the various country and time features, a one standard deviation increase in the level of democracy of 0.35 is associated with a 0.11 standard deviation increase in life expectancy in the baseline analysis that uses fixed effect estimator. This is equivalent to an increase in life expectancy of around 5 years for a country, which initially held a mean level of life expectancy of 54 years. However, we find that changes in democracy, whether it is an increase or a decrease, exert no consistently significant effect on health outcomes. We confirm that the results are robust to (i) employing alternative model specifications, such as controlling for the dynamics of the dependent variable and possible nonlinear effect of income; and (ii) using different

subsamples of the data, such as regressing the model on observations for the least democratic countries, the most democratic countries, and excluding countries from each continent (Africa, Americas, Asia, Europe, and Oceania) at a time.

Although we have also reported findings from the random effect (RE) estimator throughout this paper, our emphasis is on the fixed effect (FE) results. As argued by Acemoglu et al. (2008, pp. 809-810), "fixed effect regressions... are well suited to the investigation of the relationship between income and democracy, especially in the postwar era. The major source of potential bias in a regression is country-specific, historical factors influencing both political and economic development." Following this strand of literature, Ross (2006), Gerring et al. (2012), and Wang et al. (2018), among others, have estimated the within-country effect of democracy on the health of a country's population. Essentially, this approach stresses the importance of probing the association between democracy and health within a nation over time, rather than just across nations. For example, instead of comparing how a country, say Nigeria, is health-wise relative to the rest of the world now that it has returned to democratic rule for the last 20 years, with regular elections and peaceful transfers of political powers. The emphasis, however, should be on scrutinising whether Nigeria's chances of becoming relatively healthier is improved as it is becoming relatively more democratic.[6]

This is our motivation for mostly providing evidence using the FE estimator. However, while the FE estimation technique allows us to control for potential confounding factors that may otherwise exacerbate the problem of omitted variable bias, it is essential to remember that it is not the magic bullet. We have, therefore, also pursued estimation by two alternative methods. First, we employ two-stage least squares (2SLS) regressions that use plausibly exogenous variations in a country's regional democratisation wave (an external instrument made available by Acemoglu et al. 2019) to instrument for within-country variations in a country's level of democracy. Second, we utilise both the difference and system generalised method of moments (GMM) estimators that use relevant lags of appropriate moment conditions (internal instruments) to instrument for all variables of interest.

[6] This is a similar approach undertaken by Kudamatsu (2012) in studying the relationship between a democratic institution and infant mortality in sub-Saharan Africa.

The estimates from using both the external and internal instruments indicate that the effect of the level of democracy on life expectancy is not only robust but are also causal. First, in a result resembling that reported by Acemoglu et al. (2019), the first-stage regression reveals that regional democratisation wave is a powerful instrument for the level of democracy. Second, our 2SLS (second-stage) regression result shows that the level of democracy raises life expectancy: a one standard deviation increase in the instrumented level of democracy will yield an increase in life expectancy of 0.04 (approximately one-fifth of a standard deviation). Given these values, a country initially with a mean level of life expectancy of 54 years can now live on average to more than 63 years.

The estimates from both the difference and system GMM methodologies bolster our confidence in the results from the FE and 2SLS techniques. In terms of the difference GMM, we obtain slightly less than one-tenth of one standard deviation of life expectancy in response to a one standard deviation increase in the level of democracy, implying that a country initially with a mean level of life expectancy of 54 years may now experience an additional 4.5 years. With regards to the system GMM, we find that a one standard deviation increase in the level of democracy (0.35) corresponds to 0.08 standard deviation increase in life expectancy, suggesting that a country initially with a mean level of life expectancy of 54 years will increase life expectancy to more than 57 years.

Finally, we utilise alternative health measures, such as infant mortality, child mortality, and crude death, which are all negatively and statistically significantly associated with democracy. More specifically, a one standard deviation increase in the level of democracy of 0.35 will, in these instances, reduce the standard deviation of infant mortality, child mortality, and crude death by 0.05, 0.06, and 0.11, respectively. These values lead to a decline in (i) infant mortality to around 67 per thousand live births for a country initially with a mean level of around 86 per thousand live births; (ii) child mortality to approximately 95 per thousand from approximately 132 per thousand; and (iii) crude death to about 12 per thousand from 13 per thousand. While democracy reduces the probability of all types of mortality more than nondemocracies, we observe that it is more effective in combating infant mortality and child mortality, whereas it is less potent in dealing with crude death.

Our paper fits into the empirical literature on the political determinants of human development. These works are, however, far from reaching consensus on the link between democracy and health. While a large cluster of papers holding the traditional view passed down from Aristotle have documented a positive connection between democracy and health (see, for example, Lake and Baum 2001; Navarro et al. 2003; Franco et al. 2004; Ghobarah et al. 2004; Ruger 2005; Besley and Kudamatsu 2006; Safaei 2006; Klomp and Haan 2009; Wigley and Akkoyunlu-Wigley 2011; Gerring et al. 2012; Kudamatsu 2012; Garcia 2014; Wang et al. 2018), others have reported little, nonexistent, or negative impact of democracy on population health (see, for example, Gauri and Khaleghian 2002; Shandra et al. 2004; Ross 2006; Rothstein 2011; Norris 2012).

This paper is likewise related to the political economy literature examining the nexus between democracy and inequality. These are important and related issues as, on average, poor health outcomes do unfortunately concentrate more among members of a society with poor socioeconomic outcomes (see, for example, Wilkinson 1996; Kawachi and Kennedy 2002; Hofrichter 2003; Gwatkin 2004; Navarro 2004; Blaydes and Kayser 2011). Using a large panel of countries and instrumental variable estimation methodology, Oyekola (2020) presents evidence of a causal effect running from democracy to several measures of inequality (including the Gini coefficient and income quintiles) and finds that democracy significantly decreased inequality.

There is also an established large body of work that centres on socioeconomic-health nexus (see, for example, Hadley and Osei 1982; Duleep 1986; Marmot et al. 1987; Kunst and Mackenbach 1994; Ettner 1996; Pritchett and Summers 1996; Wildman 2001, 2003; Meer et al. 2003). Whatever measure is used to proxy socioeconomic status (whether wealth, education, occupation, social class, or self-help), this literature has found evidence of a positive link between socioeconomic position and the health outcomes of a population (Safaei 2006).

The research endeavours mentioned so far have been mainly concerned with establishing a nonneutral (positive or negative) relationship between democracy and health. Our paper can be viewed as extending this literature by showing not only a robust and strong effect of political democracy on the health of a nation but, more importantly, submitting evidence of a causal effect that runs from democracy to health. The rest of the paper is organised as follows. Section 2 provides the definitions of variables, data sources,

and econometric model specification. Section 3 provides our main results and contains a series of robustness exercises. Section 4 provides the conclusion.

2. Data and Methods

To study the effects of democracy on health outcomes, we collect the relevant outcome measures, independent variables, and additional controls for the two halves of each decade from 1960 to 2015. All data used are extracted from the Quality of Government Institute's (QOG) database at the University of Gothenburg, but the primary sources are acknowledged in the text below.

Our core indicator of a country's health status is life expectancy from the World Bank's World Development Indicators (WDI 2016). Life expectancy measures the number of years a newborn infant is expected to live if the prevailing mortality patterns at the time of its birth persisted throughout its life. Meanwhile, we have also considered three alternative health indicators (also from WDI) as dependent variables: infant mortality, child mortality, and crude death. Infant mortality is the number of infants per thousand live births dying before reaching the age of one; child mortality is the number of infants per thousand that will die before reaching the age of five; crude death is the number of deaths per thousand population.

As noted earlier, an objective of this paper, beyond re-assessing the effect on human development of the level measure of democracy, is to examine whether there is a health effect of a change measure of democracy. To accomplish this, we include, in our model specification, the average level of democracy and two additional variables that identify if/when there is a transition in a country's political regime by becoming more: (i) democratic; or (ii) dictatorial. This approach has enabled us to empirically implement both the substantive and minimalist conceptualisations of democracy (Cheibub et al. 2010).

We represent the average level of democracy using the revised combined polity score from the Polity IV database of the Center for Systemic Peace. This dataset is compiled based on the conceptual framework of Eckstein and Gurr's (1975) patterns of authority, and the Polity2 scores are formulated around three assessed sub-scores. The first is how institutionalised, competitive and open the process of executive recruitment is. The second is the degree of institutional constraints on the decision-making powers of the executive arm

of the government. The third is the degree of institutionalisation (or regulation) of, and the extent of, government restriction on political competition (Marshall et al. 2018).

The Polity2 scores are computed by subtracting Polity IV's institutionalised autocracy measure from its institutionalised democracy measure. Given this, the Polity2 scores range from -10 to +10 because both autocracy and democracy indicators are characterised on an additive eleven-point (0-10) scale. The lower values (closer to -10) suggest more coherent autocratic regimes, while the higher values (closer to +10) indicate more enduring democratic polities.[7] This 21-point measure is then normalised and rescaled to range from 0 (full dictatorship) to 1 (full democracy).

In a recent study, meanwhile, Cheibub et al. (2010) have criticised the use of continuous measures of political regimes.[8] Thus, to borrow the approach of Minier (1998), we supplement our polychotomous measure of democracy by constructing two additional measures, which are dichotomous, to capture increases and decreases in the levels of democracies around the world (our change measures of democracy). While Minier (1998) used these change measures of democracy to re-visit the link between economic growth and democracy, to our best knowledge, this is the first paper to adopt it when (re-)examining the connection between health and democracy.[9]

We have coded our two 0-1 binary indicators for monitoring the extent of democratic engagements and practices based on the Democracy-Dictatorship database of Cheibub et al. (2010), appended by updates from Bormann and Golder (2013). The qualifications for codifying countries as becoming more democratic/dictatorial over a five-year window are: (i) a change in classification by types of democracies (parliamentary, mixed or presidential) towards or away from types of dictatorships (monarchic, military or civilian dictatorships); (ii) the fraction of years the change is observed must be greater than or equal to 0.5; and

[7] To arrive at these Polity2 scores that range from -10 to +10, the Polity IV project codes: (i) periods of foreign interruption (with standardised authority scores of -66) as system missing; (ii) periods of interregnum or anarchy (with standardised authority scores of -77) as neutral with polity scores of 0; and (iii) periods of transition (with standardised authority scores of -88) are converted by interpolating values between the two years at the start and end of an interregnum.

[8] One of the issues raised is the difficulty in interpreting values in the middle of such measures.

[9] We note that, as Ross (2006) and Gerring et al. (2012) argue, the level measure of democracy is the Polity2 variable from Marshall et al. database. A point of departure of our study compared to these two bodies of literature is that we use a change measure of democracy to further represent political development in a country, whereas, Ross and Gerring et al. examined two variations of a stock measure of democracy, which stress the number of years of democratic experience of a country. This manner of capturing contemporaneous and historical democracy is also used by Besley and Kudamatsu (2006).

(iii) turn off the binary indicator from 1 to 0 after ten periods.

Our objective in creating binary variables for democracy increases and decreases is to capture changes, such that the third condition, just stated, is needed and justifiable under the assumption that countries that fall into this category have settled down into the new democracy/dictatorship status.[10] To clarify the construction of our change measures of democracy, we consider Argentina for illustration, which is represented in Figure 2. We begin in the early sixties, when Argentina changed from presidential democracy, in 1961, under Arturo Frondizi, to military dictatorship in 1962, when Jose Maria Guido was acting president. The country, however, immediately reverted to presidential democracy the following year with the election of Arturo Umberto Illia. This new transition only lasted from 1963 to 1965, when, once again, the country succumbed to Juan Carlos Ongania, a military dictator. These reversals between democratic and dictatorial rules continued for another few years, and it was not until the election and installation of Raul Alfonsin in 1983 that this pattern ceased.

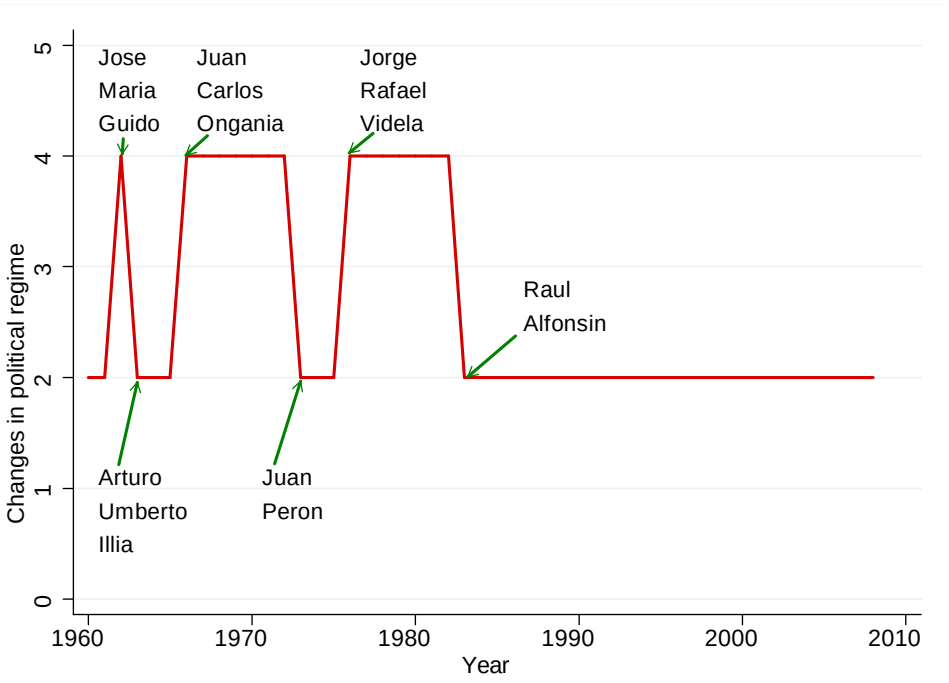
At this point (1983), we turn on the binary indicator for increases in democracy for the next ten years, after which it is turned off. As it happens, Argentina has remained under democratic governance since then. The implementation in practice, though is that an increase in a democracy is equal to unity in 1985 and zero in all subsequent years. Our conceptualisation invokes a form of jostling for supremacy between democracy and dictatorship per given period (generally over a five-year window). Continuing with Argentina's illustration, we proceed as follows. Using information from 1960 to 1964, we code 1965 as an increase in democracy because it lasted longer than the dictatorial disruption (4/5 years which is higher than our lower bound in condition (ii)).

Next, 1970 is coded as a decrease in democracy because the military administered the country during this period, which was interrupted in 1973 by a stint of democratic rule. We nonetheless still coded 1975 as a decrease in democracy because $2/5 = 0.4 < 0.5$.[11] Conditions (i)-(iii) imply that 1980 is zero for both an

[10] That is, we add the third rule to accommodate instances when a country is more volatile democratically, repeatedly jumping between increases and decreases in democracy within a specified window. Note also that our binary indicators for democracy increases and decreases will collapse to the variables labelled ttd and tta in Cheibub et al.'s (2010) database, without condition (ii).

[11] Note that we did not treat this as a continuation of the previous dictatorship, in which case 1975 would have a zero value.

Figure 2: Time series plot of political regime changes in Argentina



increase and a decrease in democracy. The next and last change for Argentina happened in 1985 when an increase in democracy took a unit value because of the country's return to presidential democracy in 1983. It is this approach that we utilise to code the binary indicators for increases and decreases in democracy for each country in the sample.

Our analysis has considered two sets of potential determinants of human development. In the first set of controls are time-varying factors, such as GDP pc (gross domestic product divided by total population, measured in constant 2010 $US from WDI), population density (people per square km of land area from WDI), years of schooling (average total number of years of education in the population above 25 years of age from Barro and Lee 2013), and growth of GDP pc (percentage change on previous year's GDP pc as defined above). These controls were decided upon based on existing literature (see, for example, Pritchett and Summers 1996, Franco et al. 2004, Besley and Kudamatsu 2006, Ross 2006, Gerring et al. 2012, and Wang et al. 2018).

The reason for this is the competition element in our coding operationalisation. Given this rule, no change was observed in 1980.

Then, building on insights provided by the Gerring et al. (2012), we entered as the second set of controls largely time-invariant covariates. These consist of ethnic diversity (the probability that two randomly selected persons belong to different ethnic groups from Alesina et al. 2003), colonial roots (dummy variables taking the value of 1 for former British, French, Portuguese, Spanish, and other European—Belgian, Dutch, and Italian—colonies, respectively, and 0 otherwise from Teorell and Hadenius 2007), legal origins (dummy variables taking the value of 1 when a country is recognised as having British common law, French civil law, German civil law, Scandinavian law, and Socialist law, respectively, and 0 otherwise from La Porta et al. 1999), religious affiliations (fraction of each country's population that is Roman Catholic, Muslim, and Protestant in 1980, with the residual organised into "other religions" from La Porta et al. 1999), and latitude (the absolute value of the latitude of a country's capital city divided by 90, to lie between 0 and 1 from La Porta et al. 1999).

Table 1 documents the descriptive statistics for our variables, reporting on the mean, standard deviation, minimum, and maximum values. The table presents these statistics for all countries, and also separately for high- and low-democracy countries. We designate countries into high-democracy if their mean level of democracy over the sample period is greater than the median value for all countries; otherwise, they are classified as low-democracy countries. The general pattern, it appears, is that high-democracy countries have better health status than nondemocracy countries. In particular, high-democracy countries live longer, their babies' survival rates are higher, and they suffer lower maximum crude death.[12]

Further, we observe that high-democracy countries tend to have more socioeconomic and culture-historic requisites for better health performance. More specifically, relative to the low-democracy countries, high-democracy countries, on average, have higher income per capita, are more educated, have lower population heterogeneity, are likely to be the coloniser rather than the colonised, and have higher fractions of their population professing to be Protestants rather than Muslims.

Then, as the basis for characterising the association between political regimes and human development,

[12] Interestingly, the data shows that the minimum value of crude death is experienced in a low-democracy country: 0.41 (in logs) compared to 1.38 (in logs) for high-democracy countries.

we run regressions of the following baseline linear model:

$$H_{ct} = \alpha D_{c,t-1} + \beta D^{R}_{c,t-1} + \gamma D^{F}_{c,t-1} + \Theta \mathbf{Y}_{c,t-1} + \Gamma \mathbf{X}_{c} + \delta_{c} + \eta_{t} + \epsilon_{ct} \quad (1)$$

where c = country, t = time, H = life expectancy, infant mortality, child mortality, or crude death, D = level of democracy, D^R = increase in democracy, D^F = decrease in democracy, $\mathbf{Y}$ = GDP pc, years of schooling, population density, and growth of GDP pc, $\mathbf{X}$ = ethnic diversity, colonial roots, legal origins, religious affiliations, and latitude, δ = country dummies, η = time dummies, and ϵ = error term. We estimate Equation (1) using mainly RE and FE estimation techniques following existing literature (e.g., Besley and Kudamatsu 2006; Ross 2006; Gerring et al. 2012; Wang et al. 2018). As part of the robustness tests, however, we confirm our results and make a causal statement by employing 2SLS and difference and system GMM estimators.

3. Results and Robustness

We begin by documenting results using the RE estimator, which helps to obtain the unique effects of the included observed country-specific time-invariant controls. We then report estimates from the FE estimator in which case consideration is given to unobserved heterogeneity, although we are no longer able to produce the unique effects of our preferred time-invariant factors. After that, we carry out several robustness exercises.

Table 2 documents our baseline estimates for the relationship between the level and change measures of democracy and life expectancy, which is arranged into two panels. Panel (a) displays the results using the RE estimator and Panel (b) shows the results using the FE estimator. Whilst we have included the estimated coefficients of the core independent variables, we have not reported estimates for the four time-varying controls and the time-invariant covariates to save space. Additionally, we have only documented estimates from our most structured model specification and indeed focussed on discussions around the effects of the level and change measures of democracy on our measures of health performance.[13]

[13] Estimated coefficients of all independent variables generally have standard patterns established in the existing literature and can be obtained from the author by interested readers.

Beginning with the results in Panel (a), columns (1)-(3) utilise our world sample. Column (1) reports that the level of democracy is positively related to life expectancy, and this coefficient of 0.064 (standard error = 0.001) is significantly different from zero at the 99% confidence level. Surprisingly, both of our change measures of democracy yield estimates (a coefficient of -0.007 for the increase in democracy, with a standard error of 0.227 and a coefficient of 0.004 for the decrease in democracy, with a standard error of 0.739) that are not significantly different from zero at conventional confidence levels. These findings indicate that changes in a democracy have no influence, once we control for the level of democracy and other variables.

Column (2) adds the lag of life expectancy. We find evidence of persistence in life expectancy (as one would expect), with a coefficient of 0.885 (standard error = 0.000), which is both sizeable and statistically different from zero at the 99% confidence level. This indicates that the coefficient of 0.017 (standard error = 0.000) on the level of democracy now measures its short-term effect, which is still statistically different from zero at the 99% confidence level. This yields a corresponding long-term effect of 0.145.

Based on the influential contribution of Preston (1975), we have included GDP pc squared in column (3) to control for the possible nonlinear relationship that may exist between life expectancy and income. We did not find any evidence of a nonlinear effect of income on life expectancy (the coefficient (standard error) of GDP pc is 0.0232 (0.648), and the coefficient (standard error) of GDP pc squared is 0.001 (0.862)). Moreover, these estimates are not statistically different from zero at conventional significance levels. Importantly, our level of democracy effect has gone up again to the magnitude and significance levels reported in column (1).

We then look at a series of restrictions on the base sample in columns (4) through (10), using our baseline specification of column (1). Columns (4) and (5) exclude countries that were, on average, the least (falling in the first quartile) and the most (falling in the fourth quartile) democratic in the sample, while columns (6) through (10) exclude countries from various continents (Africa, Americas, Asia, Europe, and Oceania, in that order). The results in the restricted samples for the level of democracy corroborate our finding from the base sample. In the same vein, we again find no evidence that changes in democracy exert any meaningful effect on life expectancy. With a few exceptions, this is a pattern that will become synonymous with all the results that we present, that the average level of democracy is positively and statistically correlated with

life expectancy; whereas, both the increase and decrease in a democracy have mostly insignificant influence on life expectancy.[14]

The estimated size of the association between the level of democracy and life expectancy in Panel (a) of Table 2 is not only statistically significant but are also economically considerable. As displayed, a one standard deviation increase in the level of democracy (0.35) is related to between 0.06 and 0.17 standard deviation increase in life expectancy. Using the estimated coefficient in column (1) for the world sample, this demonstrates that, for a country initially with a mean level of life expectancy of 54 years, a one standard deviation increase in the level of democracy will improve life expectancy by approximately 4.6 years. This finding is consistent with Besley and Kudamatsu (2006), who found that life expectancy is higher in democracies than autocracies by between 3.5 and 5 years.

Whilst we controlled for certain observed country-specific characteristics in Panel (a), a possible concern about the RE estimator is the potential endogeneity problem that may arise from omitted variables. We have ameliorated the impact of this in Panel (b) by including country dummies, which account for all unobserved country time-invariant features. In all the columns of Panel (b), whether we use the base sample in columns (1)-(3), or any of the sub-samples relating to the least democratic in column (4), most democratic in column (5), non-African countries in column (6), non-Americas' countries in column (7), non-Asian countries in column (8), non-European countries in column (9), and non-Oceania countries in column (10), we find that the level, and not either of the change measures,[15] of democracy remains the important measure of a political institution for explaining life expectancy.

Specifically, we see that the level of democracy is positively and statistically significant at least at the 90% confidence level (1/2 and 2/5 of the FE regressions are statistically significant at the 99% and 95% confidence levels, respectively). Moreover, the estimated coefficients (ranging from 0.023, with a standard error of 0.001, to 0.072, with a standard error of 0.017) remain economically considerable. Using the estimated coefficient in

[14] The exception is when African countries are removed and increase in democracy negatively (coefficient = -0.008, standard error = 0.052) affects life expectancy and is statistically different from zero at the 90% confidence level.

[15] The exception is when African countries are removed and increase in democracy negatively (coefficient = -0.007, standard error = 0.041) affects life expectancy and is statistically different from zero at the 95% confidence level.

column (1), Panel (b), of Table 2, an increase in the level of democracy by 0.35 (one standard deviation) will raise life expectancy by 0.02 (over one-tenth of a standard deviation). Given these values, a country with an initial mean level of life expectancy of 54 years will now enjoy an additional 4.5 years. These FE estimates are encouraging because the inclusion of country and time dummies in the FE estimator massively reduce the numbers of potential confounders of democracy compared to when we employ the RE estimator.[16]

In the analysis presented so far, we have assumed that democracy is driving life expectancy. However, it is possible to imagine a scenario where the quality of health in a country may influence its democratic outcome. The idea is that life expectancy may affect the democratic outcome; for example, a short life expectancy may diminish incentives for political participation that entails short-run outlays and long-run returns. To address this point, we first utilise regional democratisation wave as an instrument for democracy (Acemoglu et al. 2019).[17] We briefly describe this variable next. Based on a number of political developments around the world in the last forty years,[18] Acemoglu et al. (2019) argue that democratisation and social unrest that lead to a change of regime often happens in waves across regions, as already identified in the existing literature.[19]

They then conjectured that the observed regional patterns were likely reflecting the spread of the demand for democracy among countries within a region, and postulated that democracy in the cth country is shaped by democracy in the set of countries in the same region with similar histories, political cultures, practical problems, and close informational ties. This can be summarised as follows: $I_c = \{c' : c' \neq c, R_{c'} = R_c, D_{c',t_o} = D_{ct_o}\}$, where D_{ct_o} captures whether the cth country in the same region is a democracy or nondemocracy when the sample began and R_c represents the geographic region of cth country. Using these sets, the authors define regional democratisation wave for each country as $Z_{ct} = \frac{1}{|I_c|}\sum_{c' \epsilon I_c} D_{c't}$, which defines

[16] In the rest of the paper, we focus on the baseline specification in column (1) of Table 2. Given the existing literature, there tends to be little, if any, support to continue to include the lag of our health variables (Beck and Katz 2004) or GDP pc squared as dependent variables.

[17] See Table 1 for descriptive statistics.

[18] The events include episodes of reversion of democracies to non-democracies in the 1970s, transitions back to democracies in the 1980s and early 1990s of countries in Latin America and the Caribbean, and the experience of the Soviet Union in the 1990s that triggered democratisations of many countries in Eastern Europe, Central Asia, and Africa, with the watershed moment provided by the recent Arab Spring.

[19] See, for example, Treisman (2013), while Przeworski et al. (2000) provide a dissenting view.

the jack-knifed mean of democracy in a region times the initial regime cell, which, by construction, leaves out own-country observation.

We, therefore, estimate the following regression in the first-stage:

$$D_{ct} = \mu Z_{ct} + \theta D^{R}_{c,t-1} + \phi D^{F}_{c,t-1} + \Phi \mathbf{Y}_{c,t-1} + \Psi \mathbf{X}_{c} + \chi_{c} + \omega_{t} + \varepsilon_{ct} \quad (2)$$

where Z = regional democratisation wave, χ = country dummies, ω = time dummies, ε = error term, and all the other variables are as previously defined. The exclusion restriction is that regional democratisation wave only affects life expectancy through its influence on democracy.

Table 3, columns (1)-(2) document the results from our 2SLS of the effect of democracy on life expectancy. Column (1) contains the first-stage results, which indicate that regional democratisation wave positively (coefficient = 0.553, standard error = 0.000) and statistically predict democracy at the 99% confidence level, which a priori implies a strong instrument. Moreover, we report the Kleibergen-Paap F-statistic to check for instrument quality (the value of 84.93 is much higher than 16.38, which is the most stringent Stock and Yogo weak ID critical values, such that we can reject the hypothesis that the IV size distortion is larger than 10% at the 5% level of significance).

In column (2) of Table 3, we report the second-stage results. As displayed, the 2SLS estimated coefficient of 0.095 (standard error = 0.019) is statistically different from zero at the 95% confidence level, and underscores our baseline finding that the level measure of democracy raises life expectancy. The economic significance is that a one standard deviation increase in the instrumented level of democracy will yield an increase in life expectancy of 0.04 (approximately one-fifth of a standard deviation). Based on these values, a country initially with a mean level of life expectancy of 54 years can now live on average to more than 63 years.

We next provide a further robustness check on the estimation methods, as a second strategy to allay any concerns relating to our baseline RE and FE estimates. More specifically, we present findings employing the difference (Arellano and Bond 1991) and system (Holtz-Eakin et al. 1988; Arellano and Bover 1995; Blundell

and Bond 1998) generalized method of moments (GMM) estimators. This is of interest here because both approaches allow us to control for the possible endogeneity of all the independent variables and not only for the endogeneity of the level measure of democracy. To implement these procedures, we first difference Equation (1) to expunge both the observed time-invariant vector of variables and unobserved country effects, obtaining:

$$\Delta H_{ct} = \alpha \Delta D_{c,t-1} + \beta \Delta D^{R}_{c,t-1} + \gamma \Delta D^{F}_{c,t-1} + \Theta \Delta \mathbf{Y}_{c,t-1} + \Delta \eta_t + \Delta \epsilon_{ct} \quad (3)$$

where we suppose that the variables are weakly exogenous in that they may be correlated with all shocks from the past until the present, but not with future shocks. With regards to the difference GMM estimator, Arellano and Bond (1991) derived that, under the assumption that the error terms, ϵ_{ct}, are serially uncorrelated, Equation (3) can be estimated based on the following moment conditions: $E[\mathbf{d}_{c,t-s} \Delta \epsilon_{ct}] = 0$ for $s \geq 2$ and $t = 3, ..., T$, where the vector $\mathbf{d} = [D \; D^R \; D^F \; \mathbf{Y}]$.

In any case, the existing literature has identified some potential limitations to using difference GMM. One is that the excluded cross-country vector, $\mathbf{X}$, may likewise be of interest; secondly, lagged levels of persistent variables, such as the level of democracy, GDP pc, and years of schooling, will be weak instruments when models are estimated in differences; and finally, this may pronounce the measurement error problem farther (Grilliches and Hausman 1986; Alonso-Borrego and Arellano 1996; Levine et al. 2000). The system GMM estimator, which exploits both the time series and the cross-sectional characteristics of the data, is a technique developed to resolve some of these practical difficulties.[20] This method estimates Equations (1) and (3) as a system by employing $E[\Delta \mathbf{d}_{c,t-s}(\boldsymbol{\lambda}_c + \varepsilon_{ct})] = 0$ for $s \geq 1$ and $t = 3, ..., T$, as additional moment conditions, with the vector $\boldsymbol{\lambda}_c = \mathbf{X}_c + \delta_c$.

We note that in both our GMM regressions, we treat all the time-varying controls as weakly exogenous and instrument for them using appropriate lags of the relevant moment conditions. In contrast, we consider all time-invariant covariates to be exogeneous. To provide a diagnostic on the weakness or invalidity of

[20] Moreover, Blundell and Bover (1998) provide evidence with Monte Carlo simulation to verify that system GMM estimator outperforms its difference GMM counterpart in terms of small sample efficiency and consistency. See also Hauk and Wacziarg (2009) for a piece of corroborating evidence.

instruments and, therefore, the robustness of our results from both GMM estimators, we present two conventional specification tests. More specifically, we report: (i) the p-value for the second-order autocorrelation test to identify whether there is a serial correlation in the error term; and (ii) the p-value of Hansen's test for joint exogeneity of the moment conditions.

Columns (3)-(4) of Table 3 document the results using both GMM estimators. In column (3), the difference GMM confirms our prior finding that the level of democracy is positively (coefficient = 0.051, standard error = 0.006) related to life expectancy and is statistically different from zero at the 99% confidence level. This estimate is economically considerable, producing slightly less than one-tenth of one standard deviation of life expectancy in response to a one standard deviation increase in the level of democracy. This implies that a country initially with a mean level of life expectancy of 54 years may now experience an additional 4.5 years. In an outcome that is reassuring, the p-values (of 0.204 and 0.413) to, respectively, check for the presence of second-order autocorrelation and test of overidentifying restrictions, suggest that one can reject the null hypothesis in both cases, thereby providing support for our identification strategy and finding.

Table 3, column (4) documents the estimates from the system GMM and is again displaying a positive effect of democracy on life expectancy, which is statistically different from zero at the 95% confidence level. The economic significance of these estimates can be illustrated as follows: a one standard deviation increase in the level of democracy (0.35) corresponds to 0.08 standard deviation increase in life expectancy. Using the estimated coefficient of 0.043 (standard error = 0.022) from the system GMM, this indicates that, for a country initially with a mean level of life expectancy of 54 years, a one standard deviation increase in the level of democracy will increase life expectancy to more than 57 years. As in the case of difference GMM, the system GMM also passes both specification tests.

We further confirm that democracies produce better health outcomes than nondemocracies by experimenting with alternative health measures. The results are documented in Table 4, with columns (1)-(2) focusing on infant mortality, columns (3)-(4) on child mortality, and columns (5)-(6) on crude death. In this exercise, we only present estimates using our baseline methods (RE and FE estimators). The main

result coming out of using other health measures is that democracy promotes good health outcomes, being negatively and significantly correlated with both rates of early life mortality and aggregate death rate.

To place these results concretely, we evaluate the economic implications of each estimated coefficient in Table 4. In columns (1)-(2), the coefficients of -0.195 (standard error = 0.01) and -0.158 (standard error = 0.05) on the level of democracy are both statistically different from zero at the 95% confidence level; in columns (3)-(4), the coefficients of -0.232 (standard error = 0.01) and -0.193 (standard error = 0.03) on the level of democracy are statistically different from zero at the 99% and 95% confidence levels, respectively; and in columns (5)-(6), the coefficients of -0.117 (standard error = 0.043) and -0.134 (standard error = 0.013) on the level of democracy are both statistically different from zero at the 95% confidence level.

Based on the FE estimates in columns (2), (4), and (6) of Table 4, a one standard deviation increase in the level of democracy of 0.35 will, in these instances, reduce the standard deviation of infant mortality, child mortality, and crude death by 0.05, 0.06, and 0.11, respectively. These values translate to a reduction in (i) infant mortality to around 67 per thousand live births for a country initially with a mean level of around 86 per thousand live births; (ii) child mortality to approximately 95 per thousand from approximately 132 per thousand; and (iii) crude death to about 12 per thousand from 13 per thousand. While democracy reduces the probability of all types of mortality more than nondemocracies, we observe that it is more effective in combating infant and child mortality, whereas it is less potent in dealing crude death rate.

4. Conclusion

To better understand the effect of democracy on the poor, we empirically reassessed the political foundations of human biological development. We have represented democracy using both the level and change measures based on data from Marshall et al. (2018), Cheibub et al. (2010), and Bormann and Golder (2013). Our core health measure is life expectancy from WDI (2016). Overall, healthier countries are those with more consolidated democratic values. For instance, after accounting for the various country and time features, a one standard deviation increase in the level of democracy of 0.35 is associated with a 0.11 standard deviation increase in life expectancy in the baseline analysis. This is equivalent to an increase in life

expectancy of around 5 years for a country which initially had a mean level of life expectancy of 54 years.

The baseline results are robust to (i) employing alternative model specifications, such as controlling for the dynamics of the dependent variable and possible nonlinear effect of income; (ii) using different subsamples of the data, such as running the model on observations for the least democratic countries, the most democratic countries, and excluding countries from each continent (Africa, Americas, Asia, Europe, and Oceania) at a time; and (iii) to alternative estimation techniques, such 2SLS, difference GMM, and system GMM estimators. In most of these regressions, however, we find little or no evidence of a meaningful effect for the change measures. Whenever there is a substantial impact, the evidence seems to reveal that the political status quo is preferred to a transition.

We have also utilised infant mortality, child mortality, and crude death from WDI as alternative measures of a country's health status. Our results continue to hold that democracy is pro-poor. More specifically, we obtain that a one standard deviation increase in the level of democracy of 0.35 will, in these instances, reduce the standard deviation of infant mortality, child mortality, and crude death by 0.05, 0.06, and 0.11, respectively. These values lead to a decline in (i) infant mortality to around 67 per thousand live births for a country which initially had a mean level of around 86 per thousand live births; (ii) child mortality to approximately 95 per thousand from approximately 132 per thousand; and (iii) crude death to about 12 per thousand from 13 per thousand.

So, how do we interpret our results in light of the existing literature? Importantly, our paper has gone beyond confirming that the level of democracy has robustly significant and positive effects on the health of a nation to establish that these effects are causal, thereby reinforcing and extending the findings of Safaei (2006) that democracy is beneficial to the poor, as represented by the health conditions in a country. While Safaei presented evidence based on cross-sectional data, this paper has overcome several limitations with such cross-country regression analyses by using data panels. Our findings are also consistent with the results of Wang et al. (2018), who, as we did, used panel data and methods in their empirical investigation of the role of democracy on population health.

These results, however, do not represent a consensus in the political economy literature. For instance,

some authors (see, for example, Gauri and Khaleghian 2002; Shandra et al. 2004; Besley and Kudamatsu 2006; Ross 2006; Gerring et al. 2012) have either shown that there is no robust relationship between democracy and health, or that, if such relationships exist, it is historical and not contemporaneous. In the much-cited work of Ross (2006), he finds that the level measure of democracy is sometimes statistically significant for explaining child mortality but that this effect is not economically large, whereas, he finds that the history of democracy in a country never reached statistical significance. Contrary to Ross (2006), Besley and Kudamatsu (2006) and Gerring et al. (2012) found evidence supporting the view that democratic history is the more important measure of democracy.

Using an alternative approach espoused by Minier (1998), our change measures of democracy are employed to capture the history of democracy in a country. As already discussed above, it is the level, rather than the change, measure of democracy that has a robustly significant and causal effect on health. Given our results vis-a-vis the ones in the existing literature, we are led to conclude that the material role of democracy, as a system of political organisation, and the deep institutional values it represents in promoting human welfare must be taken more seriously. As discussed above, whether it is the level/change (or the contemporaneous/historical) measure of democracy, the evidence suggests that some dimension of democracy is vital for improving the health of a nation.

To conclude, future empirical research endeavours should perhaps focus more on the mechanisms via which democracy may be playing these crucial roles of increasing life expectancy and decreasing all types of mortality rates. This may be notably more helpful in advancing our knowledge on the association between democracy and health. Overall, this paper, and such studies, hold pertinent health policy implications for both national governments and international agencies. In particular, our results are suggestive that the United Nations, as it aims to progress the 2030 agenda, can peddle political reform as well as economic adjustment programmes as preconditions for its agencies to offer necessary development assistance that is focussed on ensuring good health and promoting well-being at all ages.

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Table 1: Descriptive statistics

	All countries					High-democracy countries					Low-democracy countries				
variable, units	n	mean	sd	min	max	n	mean	sd	min	max	n	mean	sd	min	max
Life expectancy, logs	916	4.17	0.18	3.38	4.42	325	4.29	0.098	3.91	4.42	591	4.10	0.18	3.38	4.41
Infant mortality, logs	915	3.37	1.11	0.76	5.23	325	2.48	0.97	0.78	4.91	590	3.86	0.84	0.76	5.23
Child mortality, logs	915	3.66	1.22	0.97	5.95	325	2.68	1.00	0.97	5.31	590	4.19	0.96	1.01	5.95
Crude death, logs	916	2.18	0.44	0.41	3.59	325	2.12	0.26	1.38	2.76	591	2.21	0.52	0.41	3.59
Level of democracy, 0-1	916	0.61	0.35	0	1	325	0.93	0.13	0.19	1	591	0.43	0.31	0	1
Increase in democracy, 0/1	881	0.069	0.25	0	1	323	0.031	0.17	0	1	558	0.091	0.29	0	1
Decrease in democracy, 0/1	881	0.030	0.17	0	1	323	0.0062	0.079	0	1	558	0.043	0.20	0	1
GDP pc, logs	916	8.23	1.57	5.06	11.6	325	9.56	1.17	5.88	11.6	591	7.49	1.25	5.06	11.4
Years of schooling, logs	916	1.51	0.75	-1.63	2.60	325	2.03	0.41	0.21	2.60	591	1.22	0.75	-1.63	2.48
Population density, logs	916	3.90	1.44	0.20	8.94	325	4.16	1.47	0.29	6.43	591	3.76	1.41	0.20	8.94
Growth of GDP pc, %	916	1.84	3.24	-21.6	30.7	325	2.09	2.05	-4.46	8.62	591	1.71	3.73	-21.6	30.7
Ethnic diversity, 0-1	916	0.45	0.26	0.0020	0.93	325	0.31	0.21	0.012	0.75	591	0.52	0.25	0.0020	0.93
British common law, 0/1	916	0.34	0.48	0	1	325	0.37	0.48	0	1	591	0.33	0.47	0	1
French civil law, 0/1	916	0.50	0.50	0	1	325	0.37	0.48	0	1	591	0.57	0.49	0	1
Socialist law, 0/1	916	0.079	0.27	0	1	325	0.074	0.26	0	1	591	0.081	0.27	0	1
German civil law, 0/1	916	0.036	0.19	0	1	325	0.074	0.26	0	1	591	0.015	0.12	0	1
Scandinavian law, 0/1	916	0.039	0.19	0	1	325	0.11	0.31	0	1	591	0	0	0	0
Spanish colony, 0/1	916	0.19	0.39	0	1	325	0.14	0.35	0	1	591	0.21	0.41	0	1
British colony, 0/1	916	0.34	0.47	0	1	325	0.34	0.47	0	1	591	0.34	0.47	0	1
French colony, 0/1	916	0.16	0.37	0	1	325	0	0	0	0	591	0.25	0.43	0	1
Portuguese colony, 0/1	916	0.016	0.13	0	1	325	0	0	0	0	591	0.025	0.16	0	1
Other European colony, 0/1	916	0.043	0.20	0	1	325	0	0	0	0	591	0.066	0.25	0	1
Catholics, %	916	34.3	37.0	0	96.9	325	39.8	39.1	0	96.9	591	31.2	35.5	0	96.2
Muslims, %	916	21.3	34.9	0	99.4	325	4.93	16.5	0	99.2	591	30.3	38.8	0	99.4
Protestants, %	916	12.6	20.8	0	97.8	325	20.6	29.0	0	97.8	591	8.27	12.4	0	58.4
Other religion, %	916	31.8	31.8	0.30	98.6	325	34.7	34.1	0.70	98.6	591	30.1	30.3	0.30	98
Latitude, 0-1	916	0.27	0.19	0.0059	0.72	325	0.40	0.20	0.016	0.72	591	0.19	0.12	0.0059	0.46
Regional democratisation wave, 0-1	907	0.51	0.40	0	1	325	0.85	0.27	0	1	582	0.33	0.33	0	1

Notes: Variable definitions and data sources are provided in the text.

Table 2: Democracy and life expectancy

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	world sample									
	base specification	including lag of dependent variable	including GDP pc squared	excluding countries that are the least democratic	excluding countries that are the most democratic	excluding countries in africa	excluding countries in the americas	excluding countries in asia	excluding countries in europe	excluding countries in oceania
	(a) random effect									
Level of democracy	0.0641***	0.0167***	0.0642***	0.0627***	0.0801***	0.0285**	0.0567**	0.0722***	0.0792***	0.0646***
	(0.0007)	(0.0001)	(0.0007)	(0.0019)	(0.0017)	(0.0275)	(0.0191)	(0.0023)	(0.0003)	(0.0007)
Increase in democracy	-0.0072	0.0016	-0.0072	-0.0059	-0.0112	-0.0081*	-0.0004	-0.0065	-0.0106	-0.0078
	(0.2265)	(0.6791)	(0.2248)	(0.2770)	(0.1583)	(0.0519)	(0.9604)	(0.3871)	(0.1198)	(0.2003)
Decrease in democracy	0.0036	0.0018	0.0035	0.0049	0.0067	0.0029	0.0089	-0.0016	0.0054	0.0035
	(0.7393)	(0.6239)	(0.7447)	(0.6477)	(0.5518)	(0.7461)	(0.4873)	(0.9115)	(0.6250)	(0.7514)
R-squared	0.6122	0.8460	0.6122	0.6050	0.6027	0.8560	0.5705	0.5591	0.6096	0.6111
Countries	115	115	115	111	93	79	90	86	94	111
Observations	916	916	916	828	647	617	699	698	764	886
	(b) fixed effect									
Level of democracy	0.0566***	0.0227***	0.0551***	0.0558**	0.0720**	0.0320**	0.0515*	0.0589**	0.0688***	0.0586***
	(0.0069)	(0.0055)	(0.0087)	(0.0120)	(0.0167)	(0.0114)	(0.0678)	(0.0232)	(0.0050)	(0.0068)
Increase in democracy	-0.0068	0.0005	-0.0063	-0.0065	-0.0116	-0.0072**	-0.0006	-0.0094	-0.0095	-0.0074
	(0.2124)	(0.8777)	(0.2392)	(0.1643)	(0.1390)	(0.0414)	(0.9296)	(0.1627)	(0.1455)	(0.1872)
Decrease in democracy	0.0047	0.0034	0.0049	0.0080	0.0073	0.0075	0.0082	-0.0038	0.0054	0.0053
	(0.6674)	(0.4926)	(0.6573)	(0.4370)	(0.5464)	(0.3856)	(0.5425)	(0.7830)	(0.6421)	(0.6412)
R-squared	0.6333	0.8558	0.6350	0.6408	0.6288	0.8644	0.5890	0.5928	0.6297	0.6314
Countries	115	115	115	111	93	79	90	86	94	111
Observations	916	916	916	828	647	617	699	698	764	886

Notes: Robust standard errors clustered by country are reported in parentheses: significantly different from 0 at *90% confidence, **95% confidence, and ***99% confidence. The methods of estimation are random effect OLS regressions in Panel (a) and fixed effect OLS regressions in Panel (b). The base sample is an unbalanced panel from 1960 to 2015, with data averaged over five-year windows. Life expectancy at birth is the dependent variable and is measured as the average over t, $t+1$, $t+2$, $t+3$, and $t+4$. The independent variables are all lagged one period and are measured as the average over $t-5$, $t-4$, $t-3$, $t-2$, and $t-1$. All regressions include constants, year dummies, and a vector of controls consisting of GDP pc, years of schooling, population density, growth of GDP pc, ethnic diversity, colonial roots, legal origins, religious affiliations, and latitude. Additionally, column (2) includes the lag of the dependent variable, while column (3) includes GDP pc squared.

Table 3: Robustness checks I: Alternative estimation methods

	(1)	(2)	(3)	(4)
	2SLS			
	1st stage	2nd stage	difference GMM	system GMM
Level of democracy		0.0951**	0.0513***	0.0426**
		(0.0190)	(0.0056)	(0.0218)
Increase in democracy	0.1950***	-0.0127	-0.0123***	-0.0050
	(0.0000)	(0.2399)	(0.0048)	(0.5368)
Decrease in democracy	-0.1137***	0.0183	-0.0002	0.0095
	(0.0042)	(0.2182)	(0.9855)	(0.4352)
Regional democratisation wave	0.5525***			
	(0.0000)			
AR2 p-value:			0.2035	0.2614
Hansen J p-value			0.4133	0.9991
Kleibergen-Paap F statistic	84.93			
R-squared	0.6871			
Countries	114	114	115	115
Observations	907	907	801	916

Notes: Robust standard errors clustered by country are reported in parentheses: significantly different from 0 at *90% confidence, **95% confidence, and ***99% confidence. The methods of estimation are two-stage least squares (2SLS) in columns (1)-(2), difference GMM in column (3), and system GMM in column (4). The base sample is an unbalanced panel from 1960 to 2015, with data averaged over five-year windows. Life expectancy at birth is the dependent variable and is measured as the average over t, $t+1$, $t+2$, $t+3$, and $t+4$. The independent variables are all lagged one period and are measured as the average over $t-5$, $t-4$, $t-3$, $t-2$, and $t-1$. All regressions include constants, year dummies, and a vector of controls consisting of GDP pc, years of schooling, population density, growth of GDP pc, ethnic diversity, colonial roots, legal origins, religious affiliations, and latitude.

Table 4: Robustness checks II: Alternative health indicators

	(1)	(2)	(3)	(4)	(5)	(6)
	infant mortality		child mortality		crude death	
	random effect	fixed effect	random effect	fixed effect	random effect	fixed effect
Level of democracy	-0.1948**	-0.1578**	-0.2324***	-0.1925**	-0.1167**	-0.1335**
	(0.0102)	(0.0468)	(0.0051)	(0.0251)	(0.0434)	(0.0127)
Increase in democracy	0.0604**	0.0538**	0.0585**	0.0527**	0.0052	0.0144
	(0.0233)	(0.0319)	(0.0293)	(0.0382)	(0.8031)	(0.3929)
Decrease in democracy	0.0105	0.0161	0.0129	0.0149	0.0183	-0.0070
	(0.7797)	(0.6813)	(0.7516)	(0.7260)	(0.6095)	(0.8288)
R-squared	0.8370	0.8451	0.8334	0.8421	0.5600	0.6223
Countries	115	115	115	115	115	115
Observations	915	915	915	915	916	916

Notes: Robust standard errors clustered by country are reported in parentheses: significantly different from 0 at *90% confidence, **95% confidence, and ***99% confidence. The methods of estimation are random effect OLS regressions in columns (1), (3), and (5) and fixed effect OLS regressions in columns (2), (4), and (6). The base sample is an unbalanced panel from 1960 to 2015, with data averaged over five-year windows. The dependent variables are infant mortality in columns (1)-(2), child mortality in columns (3)-(4), and crude death in columns (5)-(6). The dependent variable is measured as the average over t, $t+1$, $t+2$, $t+3$, and $t+4$. The independent variables are all lagged one period and are measured as the average over $t-5$, $t-4$, $t-3$, $t-2$, and $t-1$. All regressions include constants, year dummies, and a vector of controls consisting of GDP pc, years of schooling, population density, growth of GDP pc, ethnic diversity, colonial roots, legal origins, religious affiliations, and latitude.