

Extreme Bounds of Democracy

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October 15, 2008

Abstract

There are many stories of democracy but little consensus over which variables robustly determine its emergence and survival. We apply extreme bounds analysis to test the robustness of 59 factors proposed in the literature, evaluating over 1.7 million regressions of the emergence of democracy, and over 1.4 million regressions for the survival of democracy. The most robust determinants of the transition to democracy are the number of past transitions (a positive effect), whether the country is a member of the OECD (a positive effect), and GDP growth (a negative effect). There is also some evidence that fuel exporters and Muslim countries are less likely to see democracy emerge, although the latter finding is driven entirely by oil producing Muslim countries. Regarding the survival of democracy, the most robust determinants are level of economic development (a positive effect) and, interestingly, the number of past transitions (a negative effect) – indicating that both supporters and subverters of democracy learn from history. There is also some evidence that having a former military leader as the chief executive has a negative effect on democratic survival, while having other democracies as neighbors has a reinforcing effect.

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1 Introduction

There are many stories of democracy. Efforts to test the empirical implications of various theories of why democracy emerges or breaks down have produced a long list of variables that purportedly explain these transitions. There is, however, little consensus over which variables robustly determine democracy. We address this issue by applying extreme bounds analysis (EBA) as suggested by Leamer (1983) and Levine and Renelt (1992) and modified by Sala-i-Martin (1997) to test the robustness of 59 proposed factors. We assess both the factors leading to the emergence of democracy as well as the factors explaining the persistence of democracy. To be clear from the outset, our approach is extreme. We evaluate over 1.7 million regressions of the emergence of democracy, and over 1.4 million regressions for the survival of democracy.

The most striking of our findings is that most of the variables suggested in the literature do not survive EBA. While many of these factors are shown elsewhere to have significant effects in plausible and well-specified models, when put to the rigors of being tested alongside many other plausible variables, the significance simply does not survive.

We do not suggest that this implies these factors are unimportant. Many of the findings that fail our EBA test are valid within the confines of the original statistical model proposed in the literature. Our empirical approach focuses on reduced form models. Moreover, to the extent that some variables fail our test, this could be because they are poor proxies for otherwise strong theories of democracy. The standard of surviving the test of EBA is just a very a high one, and only the strongest of relationships survive it.

And some variables do indeed survive. We suggest that these variables may be the most important factors determining democracy. Regarding transitions to democracy, we find that economic growth has a robust negative effect. This finding, standing in stark contrast to modernization theory, suggests that autocracies with strong economic performance

are unlikely to see democracy emerge. Instead, economic contraction causes dictatorships to break down. Also in contrast to modernization theory, but consistent with the argument of Przeworski et al. (2000), the level of GDP per capita does not have a robust relationship with the emergence of democracy. Following the literature on the diffusion of democracy (e.g., Pevehouse 2002a,b), we find evidence that membership in one specific international organization has a positive effect on transitions to democracy: the Organisation for Economic Co-operation and Development (OECD). Previous regime transitions also increase the likelihood of the emergence of democracy. The only other variables for which we find any evidence of a robustly significant effect are fuel exports (confirming Ross 2001 and Jensen and Wantchekon 2004) and the share of the population that is Muslim (as cultural theorists argue). Both lose some statistical significance when included exclusively with the other highly robust variables, however, and we suspect that they are really fixed effects of the Middle East. Tests certainly show that the effect of Islam is driven by fuel exports as the effect does not exist among non-fuel exporting Muslim countries.

Regarding the survival of democracy, the most robust determinants are level of economic development (a positive effect) and, interestingly, the number of past transitions (a negative effect) – indicating that both supporters and subverters of democracy learn from history. These findings confirm Przeworski et al. (2000) and Przeworski (2005). There is also some evidence that having a former military leader as the chief executive has a negative effect on democratic survival (in line with Cheibub 2006), while having other democracies as neighbors has a reinforcing effect (consistent with Gleditsch 2002). These latter findings, however, lose significance in the presence of the number of past transitions.

We conclude that while there are many plausible theories of democracy, there are few robust predictors that we can trust as reliable. For policymakers interested in promoting democracy based on such reliable predictors, we suggest that there is little difference policy can make when it comes to the emergence of democracy. But promoting investment in

dictatorships – encouraging vigorous economic growth – is certainly not likely to cause a dictatorial regime to fall.¹ Yet, when it comes to promoting the survival of nascent democracies, raising the level of development helps. So it seems that if the leader of a wealthy democracy decided to make the promotion of democracy a foreign policy goal, and he was willing to spend, say, \$500 billion, the money would be better spent helping poor, *established* democracies develop economically rather than devoted to a country where democracy had never previously existed.

The paper proceeds as follows. We begin with a brief review of the literature. We then introduce the EBA method in detail and subsequently present the results. We conclude by summarizing our findings and deriving policy conclusions.

2 Background

The earliest large-n studies of democracy are culturalist. Almond and Verba (1963), for example, use survey-based research in five countries to show that a “participant” culture (as opposed to a “subject” or “parochial” culture) is required for democracy. This “civic culture” argument is tested cross-nationally in the work of Inglehart (1988), who finds that democracy is correlated with the percentage of people reporting high levels of interpersonal trust, low levels of support for revolutionary change, and high levels of life satisfaction.

These culturalist findings are disputed by Seligson (2003), who shows that the cultural connections to democracy disappear when one controls for level of economic development. Przeworski et al. (2000) test a full range of other cultural variables, finding that none has a robust relationship with democracy once one accounts for level of economic development.

Economic explanations of democracy date back to Lipset (1959) who is often cited as the first “modernization theorist.” Modernization theory argues that as countries develop

¹See Rosendorff (2001) for a formal presentation as to why. Also see Boix (2003) and Acemoglu and Robinson (2006).

economically, social structures become too complex for authoritarian regimes to manage – technological change endows owners of capital with some autonomy and private information, complex labor processes require active cooperation rather than coercion, and civil society emerges.² At some point in this process, dictatorship collapses and democracy emerges as the alternative.

Critical of modernization theory, Huntington (1968) adds that sustainable democracy requires political development along with economic development. While he basically agrees that economic development is a prerequisite for democracy, without political development, rapid economic development can also destabilize democracies.

In their expansive large-n study of democracy and development, Przeworski et al. (2000) thoroughly explore the relationship. They begin with the observation that the correlation between level of economic development and democracy is strong. They question, however, the process by which this correlation is driven. They suggest, in contrast to modernization theorists, that this correlation is possible even if the emergence of democracy is completely random with respect to economic development. The correlation may be driven instead by a relationship between economic development and the survival of democracy.

This is in fact what their book argues. The emergence of democracy has no relationship with level of economic development; the correlation instead is entirely driven by the survival of democracy. In another work, Przeworski (2005, p.253) argues that “democracy prevails in developed societies because too much is at stake in turning against it.” Conversely, in poor democracies, “the value of becoming a dictator is greater and the accumulated cost of destroying capital stock is lower” (Przeworski and Limongi, 1997, p.166 fn.1).

It should be noted, however, that while Przeworski et al. (2000) show that transitions to democracy are not well predicted by economic development and survival of democracy is, the estimated effect of economic development on the transition to democracy is statistically

²See Przeworski et al. (2000).

significant in their specification.³ We suspect (and show below) that it is not a robust relationship.

One important drawback of the Przeworski et al. (2000) study is that it ignores the oil rich countries of the Middle East. As these scholars were originally interested in estimating the effect of regime on economic growth, they chose not to include oil rich countries, whose process of augmenting GDP per capita is much different from that of other countries. Nevertheless, these dictatorships – with their high levels of GDP per capita – present a real challenge to modernization theory that should be considered.

Some argue that political regime itself depends on the availability of oil and other natural resources. Ross (2001), as well as Jensen and Wantchekon (2004) argue that there is a resource curse whereby the rents from natural resources enable dictatorial regimes to use low taxes and high spending to maintain power.

Boix's (2003) compelling story provides a game theoretic mechanism to explain the effect of natural resources.⁴ He argues that level of economic development, income distribution, and – importantly – asset specificity together impact the probability of the emergence of democracy. Where asset specificity is high and the income distribution is highly skewed, such as in many oil-rich countries, the rich face severe redistributive consequences for allowing popular sovereignty, and they have no credible threat to flee the country taking their productive capacity with them. Thus, it is in their interest to pay high costs of repressing democracy, maintaining dictatorial rule. Note that if asset specificity is low, as in South Africa, for example, the rich have a credible exit threat. If the rich flee the country, taking the productive capacity along with them, they can severely harm the national economy. This credible threat restrains the redistributive demands of the poor and may make democracy possible even in countries with relatively low levels of

³The insignificant coefficient reported indicates that the difference between the coefficients for the emergence and survival of democracy is not significant.

⁴See also Boix and Stokes (2003) and Rosendorff (2001) on this matter.

economic development, such as India. Asset specificity aside, if redistributive demands diminish at higher levels of economic development, Boix argues that economic development should make democracy more likely both to emerge and to survive.

Acemoglu and Robinson (2006) also propose a theory of democracy where elites may prefer dictatorship but must pay the costs of repression as the masses threaten disorder. Where repression costs are high and elites cannot credibly promise concessions otherwise, democracy can offer a compelling alternative under specific conditions. Factors identified by their theory of democracy include measures of civil society, political institutions, economic crises, income distribution, the structure of the economy, and the forces of globalization.⁵

Another approach that has implications for the Middle East considers the effects of “diffusion.” Consider the work of Gleditsch (2002), summarized nicely by the title of his book: *All (International) Politics are Local*. Diffusion theorists suggest that through various forces that spill over borders – political, cultural, and economic – the political regime of one country is likely to be correlated with regimes of neighboring countries.⁶ Thus we have solidly democratic regions, such as Europe, dictatorial regions, such as the Middle East, and regions where countries tend to transition together in waves, such as Latin America.

A related story is suggested by Pevehouse (2002a,b), who argues that participation in international organizations with many democratic members influences both the emergence and survival of democracy. He develops an innovative mechanism by which diffusion may operate – participation in regional organizations provides incentives for countries to encourage democratic standards amongst the membership.

This stylized and brief sketch of the literature on the determinants of democracy demon-

⁵For a challenge to the empirical findings of Acemoglu and Robinson (2006), see Freeman and Quinn (2008).

⁶Also see Simmons and Elkins (2004, 2005), Meseguer (2005), Gilardi (2005), and Way (2005).

strates that there is a vigorous debate. In addition to the “culturalist,” “modernization,” “credible threat,” and “diffusion” stories of democracy that we have briefly outlined, Table 8 in the Appendix presents a summary of 14 published panel studies on the determinants of democracy. Most studies, however, present but a handful of potential specifications, controlling for very few of the possible combinations of different variables. Many of them simply ignore other theories when testing their own central arguments. Of course, each study presents valid theoretical justifications for how their particular specifications are chosen. But looking across the literature, there appears to be little consensus on the theory. The only factor that all seem to agree is important is level of economic development, and even here scholars disagree as to how it matters. As for the effects of other proposed factors, findings that are presented as statistically significant in the presence of some variables may not be significant in the presence of other variables proposed by different scholars. We, therefore, suggest testing the bounds of the significance of all previously considered variables.

3 Empirical Method

The purpose of EBA is to validate the statistical significance of the effect of a potential explanatory variable in the presence of different combinations of other control variables. We do not merely check the significance of a variable’s coefficient from *some* specifications – rather, we keep track of its coefficient in *all* possible specifications with additional control variables entering in groups of one, two, and three at a time (along with a core set of standard control variables over which there is a consensus in the literature, included in all regressions). In the end, we present summary statistics reporting the proportion of the coefficient’s distribution that is greater than or less than 0 (whichever is larger), the proportion of times the coefficient is significant at the 5% level, the median coefficient, and

its median standard error.

We apply the EBA on a basic model of democracy which assumes that the probability of observing democracy at time t (measured in years in our data) follows a first order Markov process. Let D be a dummy variable coded 1 if a country is a democracy, and 0 otherwise. Then,

$$\Pr(D_{i,t}|D_{i,t-1}) = (1 - D_{i,t-1}) \cdot \Pr(D_{i,t}|D_{i,t-1} = 0) + (D_{i,t-1}) \cdot \Pr(D_{i,t}|D_{i,t-1} = 1) \quad (1)$$

As the likelihood function for this model is additively separable, it can be easily estimated as two logistic functions with the transition probabilities defined as follows:

$$\Pr(D_{i,t}|D_{i,t-1} = 0) = \Lambda\left(\beta^{AD'} x_{i,t-1}\right) \quad (2)$$

$$\Pr(D_{i,t}|D_{i,t-1} = 1) = \Lambda\left(\beta^{DD'} x_{i,t-1}\right), \quad (3)$$

where Λ is the cumulative distribution function of the logistic distribution, $x_{i,t-1}$ is the vector of (lagged) variables that determine democracy, β^{AD} is a vector of coefficients capturing the effects of these variables on the probability of transition from **A**uthoritarianism to **D**emocracy, and β^{DD} is a vector of coefficients capturing the effects of these variables on the survival of democracy (“transitioning” from **D**emocracy to **D**emocracy). While it is of course not necessary to assume that the same variables determine both the emergence and survival of democracy, most scholars in practice do, and we will be testing all variables in both setups.

To conduct an EBA, we define:

$$\beta^{AD'} x_{t-1} = \beta_M^{AD'} M_{t-1} + \beta_F^{AD'} F_{t-1} + \beta_Z^{AD'} Z_{t-1} \quad (4)$$

$$\beta^{DD'} x_{t-1} = \beta_M^{DD'} M_{t-1} + \beta_F^{DD'} F_{t-1} + \beta_Z^{DD'} Z_{t-1}, \quad (5)$$

where M is a vector of “commonly accepted” explanatory variables; and F is a vector containing the variable of interest; and Z is a vector containing up to three possible additional explanatory variables which, according to the broader literature, are related to the dependent variable (as in Levine and Renelt, 1992).

Using this setup, we conduct a long series of regressions. The commonly accepted variables in M are included as control variables in every regression. All other variables enter one at a time into F . The variable in F is then tested while controlling for M and, following Levine and Renelt (1992), (up to) three control variables at a time in Z . The variables included in the Z vector change for each regression as all possible permutations of the remaining control variables are tested. The values of the coefficient β_F along with the corresponding standard error and its cumulative distribution are recorded and averaged (the same is done for the coefficients of the variables in M). After this, a new control variable replaces the previous in F , and the procedure is repeated. The process continues until all variables have been tested in F .

According to the original EBA test as proposed by Leamer (1983), the effect of a variable is considered robust only if the lower extreme bound for β_F – defined as the lowest value for β_F minus two standard deviations – and the upper extreme bound for β_F – defined as the highest value for β_F plus two standard deviations – both have the same sign.

Sala-i-Martin (1997) argues that this testing criterion is far too strong for most variables. If the distribution of the parameter of interest has both positive and negative support, then a researcher will likely find at least one regression model for which the esti-

mated coefficient changes sign if enough regressions are run. Consequently, we report the percentage of the regressions in which the coefficient of the variable F is statistically different from zero at the five percent significance level. Furthermore, instead of only analyzing the extreme bounds of the estimates of the coefficient of a particular variable, we follow Sala-i-Martin’s (1997) recommended procedure and analyze the entire distribution of β_F . Thus, we report $CDF(0)$, the proportion of all of the cumulative distribution functions of the different estimates of β_F lying on one side of zero. $CDF(0)$ indicates the larger of the areas under the density function either above or below zero (whether this happens to be $CDF(0)$ or $1 - CDF(0)$). So $CDF(0)$ is always between 0.5 and 1.0. We report the median parameter estimate of β_F and the corresponding median standard error.⁷

One important question as to how to proceed with EBA is what variables belong in the vector M of “commonly accepted” variables, included in every regression. In our view, GDP per capita (measured in purchasing power parities) is the only non-contentious regressor. Beyond this variable, none other is included in all other studies. Thus, we choose not to prejudge the importance of other explanatory variables for the outcome of the EBA. We put all other variables through the F vector and test their relevance individually. The list of all variables, their definitions, and sources is given in Table 1.⁸ In order to somewhat

⁷In contrast to Sala-i-Martin, who suggests weighting results according to the goodness-of-fit of each regression, we use the unweighted median parameter estimate of β_F , median standard error, and $CDF(0)$. This is because missing data pose a problem. The number of observations changes depending on which variables are included in each regression. Thus, the dataset essentially changes. In this context, Sturm and de Haan (2002) show that the goodness-of-fit measure may not be a good indicator of the probability that a model is the true model and that the weights constructed in this way are not invariant to linear transformations of the dependent variable. Note that sometimes the algorithm breaks down and reports back extraordinarily high coefficients, so we refrain from using the average parameter estimate and its corresponding average standard error, instead reporting their respective medians to increase the robustness of our results.

⁸As we deal with so many variables multicollinearity could potentially be a problem. We thus checked the correlations between all our explanatory variables. There are only 11 (out of 1,541) pairwise correlations above 0.8. Some of them are very obvious candidates. All are reported as follows: oil producing countries and OPEC; Spanish colony and Spanish language; GDP per capita and life expectancy; GDP per capita and telephone mainlines; GDP per capita and globalization; infant mortality and employment in agriculture; GDP per capita growth and GDP growth; television sets and telephone mainlines; globalization and telephone mainlines; globalization and television sets; European settlers 1900 and population share 16-51.

mitigate potential endogeneity problems and so we can interpret the relationships as being (Granger-)causal, we followed the literature and lagged nearly all variables one year. The exception is the contagion variable; following the proponents of this variable, Pevehouse (2002a,b) and Gleditsch (2002), we do not lag the share of neighboring countries that are democracies. This allows the variable to have a contemporaneous effect.⁹ Obviously for time-invariant variables, lagging is not an issue.

As it is pervasive in the literature we use pooled logit regressions. We include all time-invariant variables previously proposed in the literature to proxy for fixed country effects. Including fixed country effects directly (via conditional fixed effects logit estimations), reduces the sample size to only 200 observations which makes inference unreliable and meaningless (which is indeed why no study in the literature we are aware of uses the fixed effects approach).

So, to summarize, the basic idea of the EBA is to run many regressions continuously permutating through combinations of explanatory variables, testing how the variable in the center of attention “behaves.” Each regression estimation equation includes GDP per capita as well as a combination of up to three further control variables. This tests the significance of GDP per capita. In the F vector regressions, GDP per capita is included as well the variable in focus plus up to three additional variables out of the Z vector. Overall, we estimate a total of 1,776,379 specifications for the emergence of democracy and 1,492,029 specifications for the survival of democracy.¹⁰

As a measure of democracy, we use the Przeworski et al. (2000) dichotomous variable (which follows Schumpeter’s (1942) conception of regime): democracy is the political system in which key government offices are filled through contested elections. The definition

Otherwise, the pairwise correlations were quite low.

⁹Analysis of our final results shows that results are actually stronger when we do lag the variable. Results are available on request.

¹⁰The number of regressions differ because some estimations break down due to a the lack of observations. 3% of all possible combinations break down for the emergence of democracy while 18% were problematic for the survival of democracy.

has two parts: “key government office,” which they define as the executive and the legislature; and “contested,” which implies that more than one party has some probability of winning office through election.¹¹ Elections must be associated with some *ex ante* uncertainty, and be subject to *ex post* irreversibility. Put succinctly, “democracy is a system in which incumbents lose elections and leave office when the rules so dictate” (Przeworski et al., 2000, p.54; also see Cheibub et al. 2008).

Table 1: Variables – definitions, sources and previous studies

Variable	Definition	Source	Proposed by
Africa	Dummy variable for African Countries	Easterly and Sewadeh (2001)	Li and Reuveny (2003); López-Córdova and Meissner (2008)
Arable land	Arable land (hectares)	World Bank (2006)	Crenshaw (1995)
Bonds investment	Portfolio investment, bonds (PPG + PNG) (NFL, current US\$)	World Bank (2006)	Li and Reuveny (2003)
Colony	Dummy variable if ever in a colonial relationship	CEPII (2006)	Barro (1999); Boix and Stokes (2003)
Employment in Agriculture	Employment in Agriculture (% of total employment)	World Bank (2006)	Clague et al. (2001); Crenshaw (1995)
Equity investment	Portfolio investment, equity (DRS, current US\$)	World Bank (2006)	Li and Reuveny (2003)
English speaking	1 if English first language of at least 9% of the population	CEPII (2006)	Clague et al. (2001)
European settlers 1900	Share of European settlers in the country in 1900	Acemoglu and Robinson (2006)	Acemoglu and Robinson (2006)
FDI net inflows	Foreign direct investment, net inflows (% of GDP)	World Bank (2006)	Li and Reuveny (2003)
French colony	1 if ever in colonial relationship with France	CEPII (2006)	Barro (1999)
French speaking	1 if French first language of at least 9% of the population	CEPII (2006)	Clague et al. (2001)

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¹¹Sometimes this is obvious, such as when incumbents lose elections and relinquish power (Przeworski 1991). Sometimes it is not, such as when incumbents successively win contested elections. Also see Vreeland (2003).

Variable	Definition	Source	Proposed by
Fuel exports	Fuel exports (% of merchandise exports)	World Bank (2006)	Ross (2001)
GDP growth	GDP growth (annual %)	World Bank (2006)	Boix and Stokes (2003); Fidrmuc (2003); Li and Reuveny (2003); Muller (1995)
GDP growth p.c.	GDP per capita growth (annual %)	World Bank (2006)	Pevehouse (2002a,b)
GDP PPP p.c., PPP	GDP per capita, PPP (current international \$)	World Bank (2006)	Acemoglu et al. (2008a); Boix and Stokes (2003); Crenshaw (1995); Gleditsch and Ward (2006); Muller (1995); Nieswiadomy and Strazicich (2004)
Globalization	KOF Index of Globalization	Dreher (2006)	This paper
Income taxes	Taxes on income, profits and capital gains (% of total taxes)	World Bank (2006)	Ross (2001)
Industry employment, female	Employees, industry, female (% of female employment)	World Bank (2006)	Ross (2001)
Industry employment, male	Employees, industry, male (% of male employment)	World Bank (2006)	Ross (2001)
Inequality	Industrial pay-inequality based on UNIDO's database of payments	UTIP (2001)	Barro (1999); Crenshaw (1995)
Infant mortality	Mortality rate, infant (per 1,000 live births)	World Bank (2006)	Barro (1999); Nieswiadomy and Strazcich (2004)
Inflation	Inflation, GDP deflator (annual %)	World Bank (2006)	Li and Reuveny (2003)
IO score	Highest democracy score of participated International Organization, calculated as average across all members' Polity IV score excluding the own value	Pevehouse (2002a,b)	Pevehouse (2002a,b)

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Variable	Definition	Source	Proposed by
IO score, change	First difference of IO score (see above)	Pevehouse (2002a,b)	Pevehouse (2002a,b)
Land area	Land area (hectares)	World Bank (2006)	López-Córdova and Meissner (2008)
Latin America	Dummy variable for Latin American countries	Easterly and Sewadeh (2001)	López-Córdova and Meissner (2008)
Life expectancy	Life expectancy at birth, total (years)	World Bank (2006)	Barro (1999); Clague et al. (2001); Nieswiadomy and Strazcich (2004); Ross (2001)
Literacy	Literacy rate, adult total (ages 15 and above)	World Bank (2006)	Clague et al. (2001)
Metal exports	Ores and metals exports (% of merchandise exports)	World Bank (2006)	Crenshaw (1995); Ross (2001)
Middle East	Dummy for Countries from the Middle East	Easterly and Sewadeh (2001)	Li and Reuveny (2003)
Military expenditure	Military expenditure (% of GDP)	World Bank (2006)	Ross (2001)
Military leader	Executive leader is a former military officer	Gandhi and Przeworski (2006)	Cheibub (2006)
Military personnel	Military personnel, total	World Bank (2006)	Crenshaw (1995); Ross (2001)
Muslim share	Share of Muslim population	Przeworski et al. (2000)	Barro (1999); Boix and Stokes (2003); Clague et al. (2001); Muller (1995); Ross (2001)
Neighboring democracies	Share of surrounding democracies	Own calculations	Gleditsch and Ward (2006); Pevehouse (2002a)
Number of past transitions	Number of previous transitions between autocracy/democracy	Przeworski et al. (2000)	Boix and Stokes (2003)
OECD member	Dummy variable for OECD membership	OECD (2008)	Ross (2001)
Oil exporter	Dummy variable for exporters of fuel/oil	Easterly and Sewadeh (2001)	Barro (1999); López-Córdova and Meissner (2008)

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Variable	Definition	Source	Proposed by
OPEC member	Dummy variable for OPEC membership	OPEC (2008)	Nieswiadomy and Strazcich (2004)
Openness	Trade (% of GDP)	World Bank (2006)	Li and Reuveny (2003); López-Córdova and Meissner (2008)
Population (log)	log of total population	World Bank (2006)	Acemoglu et al. (2008a); Barro (1999); López-Córdova and Meissner (2008); Nieswiadomy and Strazcich (2004)
Population share 0-14	Population ages 0-14 (% of total)	World Bank (2006)	Acemoglu et al. (2008a)
Population share 15-64	Population ages 15-64 (% of total)	World Bank (2006)	Acemoglu et al. (2008a)
Population share 65+	Population ages 65 and above (% of total)	World Bank (2006)	Acemoglu et al. (2008a)
Portfolio investment	Portfolio investment, excluding LCFAR (BoP, current US\$)	World Bank (2006)	Li and Reuveny (2003)
Portuguese colony	1 if ever in colonial relationship with Portugal	CEPII (2006)	Barro (1999)
Portuguese speaking	1 if Portuguese first language of at least 9% of the population	CEPII (2006)	Clague et al. (2001)
Service employment, female	Employees, services, female (% of female employment)	World Bank (2006)	Ross (2001)
Service employment, male	Employees, services, male (% of male employment)	World Bank (2006)	Ross (2001)
Settler mortality (log)	log of historical mortality rates of potential European settlers	Acemoglu and Robinson (2006)	Acemoglu and Robinson (2006)
Socialist	1 if present or former socialist country	Easterly and Sewadeh (2001)	Muller (1995)
Spanish colony	1 if ever in colonial relationship with Spain	CEPII (2006)	Barro (1999)
Spanish speaking	1 if Spanish first language of at least 9% of the population	CEPII (2006)	Clague et al. (2001)

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Variable	Definition	Source	Proposed by
Tax revenue	Tax revenue (% of GDP)	World Bank (2006)	Ross (2001)
Telephone mainlines	Telephone mainlines (per 1,000 people)	World Bank (2006)	Ross (2001)
TV sets	Television sets (per 1,000 people)	World Bank (2006)	Ross (2001)
U.K. colony	1 if ever in colonial relationship with United Kingdom	CEPII (2006)	Barro (1999); Boix and Stokes (2003); Clague et al. (2001); Crenshaw (1995)
Urban population	Urban population (% of total)	World Bank (2006)	Barro (1999); Nieswiadomy and Strazcich (2004); Ross (2001)
World democracy	Global share of democracies	Own calculations	Boix and Stokes (2003); Gleditsch and Ward (2006)

4 Results

The results of our empirical analysis are summarized in Tables 2 and 3 as well as Tables 6 and 7 in the Appendix. They read as follows: *Median Beta* gives the median coefficient estimate over all regressions of the coefficient for each variable (when included in the F vector). *Median S.E.* gives the corresponding median standard error. *%Sig.* gives the percentage of regressions in which the coefficient is statistically different from zero at the 5 percent level. *CDF(0)* is the cumulative distribution function which reports the sum of the areas under the density function either above or below zero (which ever area is larger, as described above). All variables are sorted according to this last criterion. The cutoff point for a variable to be considered robustly linked to our dependent variable, following Sala-i-Martin (1997), is a $CDF(0)$ value of 0.9 or higher. *Regres.* represents the number of regressions run for each variable tested, and *Avg. Obs.* reports the average number of observations for these regressions.

Table 2 contains the significant results for the *emergence* of democracy (the insignificant results, of which there are many, are reported in the Appendix, Table 6). The first result to note is that GDP per capita does *not* explain democratic transitions. The very low value

Table 2: Results EBA – transition from autocracy to democracy (robust variables)

Variable	Median Beta	Median S.E.	%Sig.	CDF(0)	Regres.	Avg. Obs.
<i>Base Model</i>						
GDP p.c., PPP (log)	-0.166	0.360	12.8	0.6041	32,558	894
<i>Extended Model</i>						
Number of past transitions	0.535	0.207	87.5	0.9750	30,708	887
OECD member	2.359	0.986	82.1	0.9673	28,263	939
Muslim share	-2.112	1.235	68.9	0.9494	30,860	820
Fuel exports	-0.058	0.041	67.5	0.9472	30,758	543
GDP growth	-0.064	0.041	65.0	0.9267	30,900	878

Notes: ‘Median Beta’ and ‘Median S.E.’ give the median over all regressions of the coefficient and the standard error, respectively. ‘%Sig.’ denotes the percentage of regressions in which the respective coefficient is statistically significant at the five percent level. ‘CDF(0)’ yields the result of the CDF criterion as described in the previous section. All variables are sorted according to this criterion. The cut-off value for a variable to be considered robustly linked to our dependent variable is 0.9. Finally, ‘Regres.’ and ‘Avg. Obs.’ report the number of regressions run for testing each variable and the average number of observations for each regression. The results are derived using logistic regressions conditional on being autocratic the year before.

of the CDF(0) indicates that this result is not even a “borderline” variable. This confirms the Przeworski et al. (2000) critique of the modernization theory literature.

Turning to the other variables, we see that the variable with the highest score on the CDF criterion is the number of previous transitions. Having had past experience with regime transitions increases the probability of democracy emerging again. One could interpret this as a learning effect.

Being an OECD member also increases the likelihood of a change towards a democracy. We include this variable following Ross (2001) and confirm his finding. It also confirms Pevehouse’s (2002a,b) idea that membership in democratic international organizations increases the probability of a transition to democracy. The OECD espouses democracy explicitly and members pressure one another to follow democratic values.¹²

We find that democratic transitions are less likely in Islamic countries, as measured by the (time-invariant) percentage of the population that is Muslim. We are not convinced

¹²There are five cases in which OECD members experienced a transition to democracy: Greece 1974, Portugal 1976, Spain 1977, Turkey 1983 and Mexico 2000. Considering that transitions to democracy are not common (there are 79 of them in the data), this number is notable.

from this finding that Islam is incompatible with democracy. Turkey is a notable example. One possibility is that several Muslim countries are fuel exporters. We find the larger the share of fuel exports, the less likely a country is to become a democracy. This is in part driven by the Arabic oil-producing countries which all have a long non-democratic tradition. The finding is consistent with the resource-curse literature (e.g., Ross, 2001; Jensen and Wantchekon, 2004). The share of Muslims and fuel exports findings require further investigation which we undertake below.

The final variable fulfilling the CDF criterion is annual GDP growth. Countries that perform better economically are less likely to see democracy emerge. In good times, the “need” for a change might not be felt in the population, and autocratic rulers can justify their position. This may seem intuitive, but it defies a basic idea in modernization theory that as a country develops, democracy should become more likely. Economic growth is good for the survival of dictatorships. No other variable tested passes the CDF criterion (see Appendix Table 6).

Table 3 presents the significant results for the *survival* of democracy. Again, insignificant results, of which there are many, are presented in the Appendix, Table 7.

GDP per capita plays a central role. Richer countries are more likely to remain democracies. This confirms the findings in the previous literature. It is perhaps the most agreed upon finding in the literature, and we confirm the consensus. Development is good for the survival of democracy.

Of the remaining variables, we find that having a (former) military leader to have the strongest performance according to the CDF criterion. The result implies that democracies that have a leader with a military background have a lower probability of sustaining a democracy. This confirms the argument of Cheibub (2006).¹³

The next strongest performer is the neighboring democracy variable. This indicates that there are positive spillover effects from democracies as the probability of remaining a democracy increases in the number of democratic neighbors. This confirms the arguments of Gleditsch (2002).

Finally, a very interesting result is the effect of previous transitions, which is the only

¹³For a formal argument as to why, see Acemoglu et al. (2008b).

Table 3: Results EBA – remaining a democracy (robust variables)

Variable	Median Beta	Median S.E.	%Sig.	CDF(0)	Regres.	Avg. Obs.
<i>Base Model</i>						
GDP p.c., PPP (log)	1.504	0.953	68.6	0.9285	31,316	1,014
<i>Extended Model</i>						
Military Leader	-2.590	1.657	77.1	0.9558	22,181	836
Neighboring democracies	2.903	1.999	49.4	0.9294	27,681	821
Number of past transitions	-0.630	0.497	59.2	0.9140	29,012	1,020

Notes: See notes to Table 2 for the explanation of the abbreviations used. The results are derived using logistic regressions conditional on being democratic the year before.

variable that passes the CDF criterion in both models. Previous transitions increase the chances of democratic failure. Taking the result of Table 2 also into account, we can summarize that previous transitions increase the instability of the political system. All remaining variables fail to pass the CDF criterion.

5 Extensions

Regime transitions are rare events. Thus, it really should not be surprising that few variables are correlated with them. Indeed, once a variable has been identified as a robust predictor of regime transition, there may be little variation left to explain. With this in mind, we put our variables that have survived so far to a final set of tests – to see if their robustness ultimately holds up. We proceed to analyze a final set of specifications that pit the most robust predictors up against one another. Recall that with little consensus in the literature, we conservatively placed only GDP per capita in all 3 million regressions analyzed above. The variables that survived the EBA did so controlling for GDP per capita and up to only three other variables at a time. This was already too much for most of the variables we considered, so all of the variables that have survived so far are noteworthy. But with little variation to explain, it is not obvious that the surviving variables will survive

when pitted exclusively against one another. So far, they have faced each other directly in only a handful of literally thousands of specifications, and the precise results have not been checked. We do this below. The results are presented in Tables 4 and 5.

As one would expect, the majority of our variables performs well. For the emergence of democracy, the number of past transitions, OECD membership, and economic growth have the same significant effects reported above. Interestingly, however, the significance of Muslim share and fuel exports is weaker than one might expect following the EBA results. We return to this below.

As for the marginal effects, they are weak but understandable. Our model predicts that the baseline probability of a democratic transition is only 2 percent holding all our explanatory variables to their mean values.¹⁴ Given this low probability, it is actually quite remarkable that each additional prior transition increases this chance by roughly 1%, while each percentage point of GDP growth reduces this probability by roughly 0.1%.

Now, to test whether our finding for the share of the population that is Muslim is really driven by oil, we re-analyze our final model excluding countries classified as oil exporters according to Easterly and Sewadeh (2001).¹⁵ The result is presented on the right hand side of Table 4. We see that upon the exclusion of primary oil exporters the result for the Muslim share vanishes while all other results remain almost unchanged. We conclude that the Islam finding is actually driven by the coincidence of oil and Islam or some other fixed effect of these countries.

Regarding the survival of democracy, only GDP per capita and the number of past transitions have the expected significant effects, while military leader and neighboring democracy do not. So what is going on here?

The effect of military leader turns out to depend on three cases in our estimation sample where democracy breaks down under a chief executive who is a former military leader.¹⁶

¹⁴The unconditional transition probability in our sample is 2.1 percent.

¹⁵In the sample of our final model these are: Algeria, Bahrain, Gabon, Indonesia, Iran, Kuwait, Nigeria, Oman, Saudi Arabia, United Arab Emirates. Note that Easterly and Sewadeh classify countries as oil exporters if more than 50% of total exports of goods and services come from fuels (to be precise, fuels listed under the Standard International Trade Classification category 3 – mineral fuels, lubricants and related materials), so the remaining countries include some that have positive oil exports. Hence we can include our fuel exports variable.

¹⁶The cases are Guatemala 1982, Thailand 1991, and Sierra Leone 1997.

The variable survives EBA analysis, but does not survive a particular specification which includes the number of past transitions (of course, number of past transitions was included in some of the regressions of the EBA, but not all). The reason for this is quite easy to see when one scrutinizes the data. Number of past transitions explains all three of the cases that military leader explains, and also explains further cases.¹⁷

With neighboring democracy, the results also appear to be disappointing at first. Recall from Table 3 that while most of the mass of the cumulative distribution function, $CDF(0)$, is positive (0.9294), the coefficient is significant at the 5% level in only 49.4 percent of the regressions analyzed. So, for about half of the regressions, neighboring democracy is not significant at conventional levels. It turns out that the specifications that include military leader are among those where neighboring democracy is not significant. Nevertheless, we still consider this variable to be among the more robust determinants of the survival of democracy. Indeed, when we remove the military leader variable (which itself is not significant in the presence of the number of transitions variable), neighboring democracy obtains a positive significant effect.

Regarding marginal effects, the probability of remaining a democracy is (at the mean of our variables) 99.8 percent.¹⁸ This explains why basically all marginal effects in the first specification presented in Table 5 are insignificant except for GDP per capita. Note, however, that once the military leader variable is removed from the specification, the marginal effects for all variables become more significant (the weakest is the effect of neighboring democracies, which is borderline significant at the 0.10 level). Considering the rarity of democracy breakdowns, we are most impressed by the significance of these marginal effects.

Looming large over what we have done here, however, is precisely the question of rare events. Although ignored, as far as we know, by the transitions literature, there remains the issue of whether the analysis should be adjusted because regime transitions are rare events. As shown by King and Zeng (2001), using standard logit regressions in such a

¹⁷Democracy breaks down when sum of past transitions is greater than 0 in nine cases: Argentina 1976, Pakistan 1977, Ghana 1981, Guatemala 1982, Nigeria 1983, Sudan 1989, Peru 1990, Thailand 1991, and Sierra Leone 1997.

¹⁸The unconditional survival probability in our sample is 98.2 percent.

setting might lead to an estimation bias. To check the robustness of our results we analyze our final model specifications using the implementation of the rare events logistic regression module provided by Tomz et al. (1999). It turns out that our findings do not depend on the estimator we employ. Using the rare events estimator, our predicted probability of a transition from autocracy to democracy changes from 2.04 percent to 2.21 percent, and significance levels of the effects of the individual variables are not affected. For the survival of democracy, the probability changes from 99.82 percent to 99.74 percent, and – again – the significance levels of the effects of the individual variables are not affected. These results are available on request.

Table 4: Final models – transition from autocracy to democracy

Variable	Coefficient	Marginal		
		Effect	Coefficient	Marginal Effect
Number of past transitions	0.5542 (5.05)***	0.0111 (4.10)***	0.5383 (4.82)***	0.0131 (4.22)***
OECD member	1.1230 (2.19)**	0.0386 (1.40)	1.0909 (2.12)**	0.0443 (1.40)
Muslim share	-1.1606 (1.91)*	-0.0232 (2.06)**	-1.0022 (1.56)	-0.0244 (1.64)
Fuel exports	-0.0066 (0.86)	-0.0001 (0.87)	-0.0117 (0.89)	-0.0003 (0.91)
GDP growth	-0.0711 (2.69)***	-0.0014 (2.70)***	-0.0579 (1.96)**	-0.0014 (1.97)**
Constant	-3.2960 (13.28)***		-3.3072 (12.69)***	
Observations	1,464		1,233	
Pseudo R-squared	0.1204		0.1020	
Predicted Probability	0.0204		0.0250	

Notes: The table shows the logistic regressions including the variables which passed the CDF criterion. On the left all countries are included, on the right we exclude the countries coded as oil exporters by Easterly and Sewadeh (2001). The marginal Effect is given in the respective column. It is calculated at the sample mean of each variable. The predicted probability gives the probability predicted by the model for a transition from autocracy to democracy if all variables are assigned their mean value.

*/**/*** indicates significance at the 10/5/1-% level; absolute t-values are given in parentheses.

Table 5: Final models – remaining a democracy

Variable	Marginal		Marginal	
	Coefficient	Effect	Coefficient	Effect
GDP p.c., PPP (log)	1.8440 (3.78) ^{***}	0.0033 (1.61) [*]	1.3239 (3.75) ^{***}	0.0033 (2.10) ^{**}
Military leader	-0.8219 (1.04)	-0.0022 (0.65)		
Neighboring democracies	1.3768 (1.17)	0.0025 (0.99)	1.8801 (2.01) ^{**}	0.0046 (1.60)
Number of past transitions	-0.7277 (2.39) ^{**}	-0.0013 (1.54)	-0.6198 (2.67) ^{***}	-0.0015 (1.87) [*]
Constant	-9.8800 (3.07) ^{***}		-6.3225 (2.66) ^{***}	
Observations	966		1,374	
Pseudo R-squared	0.3060		0.2568	
Predicted probability	0.9982		0.9975	

Notes: The table shows the logistic regressions including the variables which passed the CDF criterion. The marginal effect is given in the respective column. The marginal effects were calculated at the sample means of each variable. The predicted probability gives the probability predicted by the model for a democracy to remain a democracy if all variables are assigned their mean value.

*/**/*** indicates significance at the 10/5/1-% level; absolute t-values are given in parentheses.

6 Conclusions

We consider 59 variables that have been proposed as determinants of democracy. Using dynamic logit regressions in combination with the extreme bounds analysis, we test the robustness of these factors as determinants of both the emergence and survival of democracy, which we define, following Schumpeter (1942) as the political system that determines leadership through contested elections.

We find a humbling result: only five variables robustly determine the emergence of democracy while just four are reliable predictors of the survival of democracy. One central variable proposed is GDP per capita. Contrary to modernization theory, we find that richer countries are not more likely to become democratic. They are, however, more likely to remain democracies. Both findings are in line with Przeworski et al. (2000). The other key finding is that previous political transitions facilitate future changes. This finding explains

the frequent changes in the political landscape of Latin America. We find that previous transitions on the one hand increase the likelihood of a move towards democratization but on the other hand reduce the survival probability. Learning cuts both ways: people learn how to set up democracy but also how to subvert it (Przeworski et al. 2000). We have an interesting finding for economic growth: it makes dictatorships more likely to survive and lowers the chances for democracy to emerge. This stands in contrast to modernization theory. Instead, *association* with other democracies in the OECD appears to have facilitated democratic transitions. Having democracies as neighboring countries, in turn, increases the chances that democracy survives. The additional variables that may help to explain democratic transitions are not quite as robust: Muslim share and fuel export share (which lower the probability of democracy emerging), and having a former military leader as the chief executive (which lowers the survival rate of democracy). The most dubious of these appears to be Muslim share, whose effect disappears when oil producing countries are removed from the sample. The military leader finding is highly co-linear with the number of past transitions findings, so, while it may have an effect, the past transitions variable trumps it.

Our standard of robustness is a strong one: a version of Leamer's (1983) extreme bounds analysis. Other variables that we test may be significant in specific theoretical models, but they do not survive the rigors of our tests. This does not imply that they are unimportant, but it does imply that the variables that do survive may be the most important factors on which to base policy, since we can be most certain of their effects.

So what policy conclusions we can draw from our analysis? First of all, regime transitions are rare, and most policies variables do not have a robustly systematic impact. Indeed, most of the handful of variables we do find significant are beyond the control of policymakers. Yet, international organizations and Western countries often want to support democratization processes around the world. Our results imply that giving aid or other forms of transfers in order to increase a country's wealth might not be a good idea prior to a democratic transition. Only after a country democracy has been established can such assistance be beneficial for the promotion of democracy. Efforts may be best spent by targeting poor democracies. Short-term growth, however, is not the solution. Only

sustained development can help democracy survive. This calls for a serious commitment to poor democracies. Transfers should be designed to help make the payoffs for complying with the rules of democracy more lucrative than the payoffs from subverting the regime.

Appendix

Table 6: Results EBA – transition from autocracy to democracy (non-robust variables)

Variable	Median Beta	Median S.E.	%Sig.	CDF(0)	Regres.	Avg. Obs.
Openness	-0.014	0.012	57.1	0.8969	30,889	852
Military expenditure	-0.371	0.232	47.5	0.8859	30,847	377
European settlers 1900	0.021	0.016	64.1	0.8854	30,872	837
Military leader	0.913	0.589	61.4	0.8833	30,601	754
French colony	-0.877	0.677	33.2	0.8778	28,782	934
GDP p.c. growth	-0.041	0.043	55.5	0.8706	30,900	877
Spanish colony	0.976	0.720	52.7	0.8602	29,761	909
FDI net inflows	-0.109	0.098	37.0	0.8574	30,893	850
Spanish speaking	1.014	0.729	51.8	0.8570	29,801	909
Latin America	0.912	0.725	54.6	0.8505	29,758	849
Population (log)	0.194	0.172	37.6	0.8399	30,895	882
Employment in agriculture	0.026	0.035	25.6	0.8394	30,790	233
Service employment, male	-0.036	0.070	9.1	0.8232	30,640	181
Neighboring democracies	0.922	0.849	48.6	0.8204	30,890	823
Portuguese speaking	1.487	0.950	18.0	0.8188	22,758	1,088
Colony	-0.922	0.711	38.5	0.8055	29,956	845
Population share 65+	0.131	0.232	48.3	0.8034	30,888	877
Oil exporter	-1.119	0.919	27.9	0.8014	26,309	920
Literacy	0.015	0.016	30.1	0.7968	30,882	756
World democracy	2.931	3.345	44.3	0.7900	30,864	883
IO score	0.045	0.064	42.0	0.7858	30,773	768
French speaking	-0.622	0.676	13.4	0.7822	29,142	925
Military personnel	0.000	0.000	4.2	0.7765	30,909	435
Settler mortality (log)	0.365	0.403	19.4	0.7759	30,712	628
Population share 0-14	-0.032	0.115	31.8	0.7661	30,889	877
Tax revenue	0.042	0.085	16.7	0.7468	30,350	212
IO score, change	0.019	0.222	27.3	0.7411	30,589	770
Bonds investment	0.000	0.000	8.9	0.7225	30,903	786
Socialist	-0.366	0.757	13.0	0.7112	26,998	870
Life expectancy	0.071	0.085	12.0	0.7021	30,489	262
Service employment, female	-0.013	0.036	3.9	0.7012	30,728	181
Population share 15-64	0.034	0.130	18.4	0.6968	30,890	877
Inequality	0.048	0.082	9.0	0.6782	30,632	475
Telephone mainlines	-0.005	0.010	3.4	0.6634	30,900	857
Africa	-0.269	0.684	13.0	0.6615	30,727	827

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Variable	Median Beta	Median S.E.	%Sig.	CDF(0)	Regres.	Avg. Obs.
Land area	0.000	0.000	3.7	0.6579	30,913	878
Metal exports	0.009	0.032	3.5	0.6534	30,615	572
Portuguese colony	-0.060	0.938	3.7	0.6279	22,121	1,095
U.K. colony	-0.153	0.516	7.0	0.6253	30,801	884
Infant mortality	-0.009	0.274	0.4	0.6141	30,301	170
OPEC member	0.042	0.831	10.1	0.6131	26,452	986
Portfolio investment	0.000	0.000	0.0	0.6104	30,910	725
Arable land	0.000	0.000	17.3	0.5989	30,913	878
TV sets	-0.001	0.013	3.7	0.5975	30,898	845
Income taxes	0.010	0.055	4.0	0.5882	30,395	210
Industry employment, female	-0.018	0.058	0.1	0.5819	30,769	180
Middle East	-0.164	0.699	1.8	0.5805	28,785	870
Globalization	-0.004	0.034	7.0	0.5772	30,845	722
Urban population	0.004	0.019	3.8	0.5741	30,886	871
Industry employment, male	-0.025	0.066	3.6	0.5377	30,619	181
English speaking	0.016	0.517	2.9	0.5254	30,743	886
Inflation	0.004	0.016	14.0	0.5220	30,874	865
Equity investment	0.000	0.000	4.3	0.5026	30,885	816

Notes: See notes to Table 2 for the explanation of the abbreviations used. The results are derived using logistic regressions conditional on being autocratic the year before.

Table 7: Results EBA – remaining a democracy (non-robust variables)

Variable	Median Beta	Median S.E.	%Sig.	CDF(0)	Regres.	Avg. Obs.
Colony	1.824	1.238	52.5	0.8884	27,970	965
GDP p.c. growth	0.094	0.133	51.3	0.8159	29,278	1,009
Openness	0.022	0.178	38.5	0.8114	29,361	1,004
English speaking	0.864	1.000	25.1	0.8090	27,983	1,039
Telephone mainlines	0.031	0.513	0.8	0.8065	29,178	1,007
Muslim share	-0.718	2.730	33.7	0.7912	28,901	935
Industry employment, male	0.267	0.298	0.3	0.7904	23,129	602
U.K. colony	0.738	1.051	14.6	0.7846	27,980	1,039
Spanish colony	-0.876	1.079	15.0	0.7759	23,693	1,140
Bonds investment	0.000	0.000	0.1	0.7702	30,360	579
Industry employment, female	0.191	0.300	0.1	0.7701	26,406	568
GDP growth	0.022	0.143	47.5	0.7693	29,244	1,010
Population share 65+	0.353	0.697	0.3	0.7558	29,420	982
Infant mortality	-0.007	0.305	0.4	0.7447	21,627	413
Service employment, female	0.081	0.274	0.2	0.7419	24,304	594
Spanish speaking	-0.731	1.141	7.5	0.7406	23,692	1,140
IO score, change	0.390	0.608	0.6	0.7384	26,107	752
French colony	0.619	0.986	7.0	0.7371	20,309	1,150
Tax revenue	0.256	0.442	0.2	0.7342	21,504	311
World democracy	0.741	7.494	38.3	0.7294	29,324	1,012
Inequality	-0.163	0.209	3.3	0.7220	26,598	685
Military expenditure	-0.172	0.421	1.2	0.7157	28,761	559
IO score	-0.007	0.282	2.5	0.7056	27,054	744
Middle East	-0.976	1.314	5.8	0.6972	26,138	1,008
Inflation	0.085	0.173	20.3	0.6967	29,599	996
Arable land	0.000	0.000	5.0	0.6902	30,489	960
Population (log)	-0.354	0.477	4.7	0.6867	29,182	1,015
OECD member	-0.664	1.249	2.9	0.6786	15,225	1,352
Income taxes	0.017	0.386	1.3	0.6783	21,947	300
FDI net inflows	0.116	0.231	0.2	0.6654	29,419	978
Urban population	0.042	0.087	5.2	0.6622	29,174	1,013
Fuel exports	0.461	0.533	0.1	0.6608	28,233	898
Military personnel	0.000	0.007	3.3	0.6437	30,401	633
Employment in agriculture	-0.049	0.369	2.8	0.6431	23,979	683
Globalization	0.003	0.079	0.7	0.6414	29,197	954
Metal exports	0.714	0.795	11.2	0.6401	28,240	936
TV sets	0.009	0.782	0.5	0.6393	29,737	989

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Variable	Median Beta	Median S.E.	%Sig.	CDF(0)	Regres.	Avg. Obs.
French speaking	-0.486	0.903	1.2	0.6316	20,550	1,144
Life expectancy	-0.153	0.579	0.0	0.6145	20,474	494
Population share 0-14	-0.158	0.262	0.5	0.5929	29,484	981
Literacy	0.012	0.144	2.6	0.5888	29,100	616
Land area	0.000	0.000	0.8	0.5879	30,407	962
Equity investment	0.000	0.000	0.0	0.5842	30,210	586
OPEC member	0.737	1.286	10.1	0.5755	15,115	1,290
Settler mortality (log)	-0.105	0.924	1.6	0.5752	28,785	589
Oil exporter	-1.466	1.346	10.7	0.5672	15,124	1,202
Portfolio investment	0.000	0.000	0.0	0.5585	30,497	902
Socialist	0.062	1.192	0.1	0.5580	16,248	1,051
European settlers 1900	0.006	0.026	0.4	0.5566	23,701	1,090
Service employment, male	0.013	0.153	0.9	0.5509	23,479	603
Population share 15-64	-0.169	0.350	0.7	0.5331	29,431	982
Africa	-0.233	1.020	2.8	0.5083	22,400	1,038
Latin America	0.112	1.131	1.1	0.5027	23,691	1,059

Notes: See notes to Table 2 for the explanation of the abbreviations used. The results are derived using logistic regressions conditional on being autocratic the year before.

Table 8: Summary of previous empirical studies on the determinants of democracy

Democracy									
Author	Period	Cntr.	Obs.	Measure	Explanatory Variables	Effect	Sig.	Method	
Crenshaw (1995)	1980	83	83	Bolen	Democracy index, 1965	~	-	OLS	
					Real GDP p.c., log	+	++		
					Secondary school enrollment	+	+		
					British colony	+	+		
					Military personnel	-	~		
					Agricultural density, log	+	+		
					Demographic inheritance	+	++		
					Agricultural inequality	+	-		
					Income inequality, 1970	-	-		
					Semiperiphery dummy	-	+		
					Periphery dummy	-	-		
					Commodity concentration	-	-		
					Foreign capital penetration, log	+	-		
Muller (1995)	1980	58	58	Bolen	Democracy index, 1965	+	~	OLS	
					Real GDP p.c., log	+	++	reject non-linear	
					GDP growth	+	-	relationship of	
					Income inequality	-	+	GDP	
					Top 20% income share	-	++		
					Communist dummy	-	+		
					British colony	+	++		
					Protestant share	-	-		
					Muslim share	-	-		
					Years of continuous popular elections, log	+	-		

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Democracy								
Author	Period	Cntr. Obs.	Measure	Explanatory Variables	Effect	Sig.	Method	
Barro (1999)	1960-1995	103	103	Freedom	5-year lag of dependent variable	+	++	SUR
				House	10-year lag of dependent variable	+	+	
					GDP, log	+	++	
				Bollen	Years of primary schooling	+	+	
					Gap between male and female primary	-	++	
					Urban population	-	+	
					Population, log	+	~	
					Oil country dummy	-	++	
					Life expectancy at birth, log	+	-	
					Infant mortality rate	-	-	
					Years of upper schooling	-	-	
					Income inequality	-	-	
					Share of middle class in income	+	-	
					Educational inequality	-	-	
					Ethnolinguistic fractionalization	-	+	
					Rule-of-law index	+	-	
					Former colony	-	-	
					British colony	-	-	
					French colony	-	-	
					Spanish colony	+	-	
					Portuguese colony	+	-	
					Dummy for other colony	-	-	
					Muslim share	-	-	
					Protestant share	+	-	
					Hindu share	+	-	
					Buddhist share	+	-	
					Miscellaneous eastern religion share	-	-	
					Jewish share	+	-	
	Nonreligion share	-	+					
	Other religion share	-	-					

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				Democracy				
Author	Period	Cntr.	Obs.	Measure	Explanatory Variables	Effect	Sig.	Method
Ross (2001)	1971-1997	113	2,183	Polity IV	Oil (export value)	-	++	pooled OLS
					Minerals (export value)	-	++	
					GDP	+	++	
					Muslim share	-	++	
					OECD dummy	+	++	
					Food (export value)	+	+	
					Agriculture (export value)	+	-	
					Large states	+	+	
					Mideast	-	++	
					Sub-Saharan Africa	-	++	
					Arabian Peninsula	-	++	
					Taxes	+	++	
					Government consumption	-	++	
					Government/GDP	-	++	
					Military expenditure	-	-	
					Military personnel	-	+	
					Ethnic tensions	-	-	
					Industry employment, male	+	++	
					Industry employment, female	+	++	
					Services employment, male	+	++	
					Services employment, female	-	++	
					Secondary enrollment, male	+	-	
					Secondary enrollment, female	+	-	
					Tertiary enrollment	-	-	
					Telephone mainlines	-	++	
					TV sets	-	-	
					Life expectancy	+	-	
					Urban population	-	-	

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				Democracy					
Author	Period	Cntr. Obs.	Measure	Explanatory Variables	Effect	Sig.	Method		
Clague et al. (2001)	1960-1994	146	146	Clague	Former British colony	+	++	two-sided tobit period averages	
					Island dummy	+	~		
					Freedom	Muslim share	-		++
					House	Labor force in agriculture	-		~
					European ancestry population share	+	++		
					Share of native speakers of Colonizer	+	+		
					Language penetration by British colonizer	+	+		
					Language penetration by democratic colonizer	+	+		
					Ethnic homogeneity	+	+		
					Autocratic minority rule dummy	-	+		
					Literacy rate	+	+		
					Life expectancy, 1962 log	+	++		
Pevehouse (2002a)	1950-1992	76	1,552	Polity IV > 6, GDP p.c.	+	+	Cox hazard model Weibull hazard model (here all signs are multiplied by -1)		
					duration	GDP p.c., change		+	~
						IO score		+	-
					Gasiorowski, duration	IO score, change		+	+
						Share of neighboring democracies		+	-
						Previous democratic breakdown		-	-
						Disputes in region		+	-
						Dummy for political violence		~	-
						Dummy for presidential or mixed system		~	-
						Dummy for established democracies		~	-

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Democracy									
Author	Period	Cntr.	Obs.	Measure	Explanatory Variables	Effect	Sig. Method		
Pevehouse (2002b)	1950-1992	106	2,776	Polity IV > 6	GDP p.c.	-	-	logit	
					GDP p.c., change	~	-		
					Gasiorowski	IO score	+	++	
						IO score, change	~	-	
					Number of democracies in region	+	+		
					Previously democratic	+	++		
					Disputes in region	-	~		
					Dummy for political violence	+	++		
					Dummy for military control	-	++		
Years of independence	+	-							
Boix and Stokes (2003)	1950-1990	135	3,991	Przeworski	GDP p.c.	+	++	dynamic probit	
	1850-1990	6,143			GDP growth	+	-		
					Turnover rate of chief executives	-	++		
					Religious fragmentation	-	++		
					Share Catholic	+	-		
					Share Protestant	+	-		
					Share Muslim	-	-		
					Former colony	+	-		
					Previous democratic breakdowns	-	++		
					British colony	+	++		
					World democracy	+	+		
					Education index	+	~		
					Percentage of family farms	+	-		
					Occupational diversification	-	-		

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Author	Period	Cntr.	Obs.	Democracy		Effect	Sig.	Method
				Measure	Explanatory Variables			
Fidrmuc (2003)	1990-2000	25	250	Freedom	Economic liberalization, t-1	-	-	pooled OLS
				House	Democracy, t-1	+	++	Granger causality
					GDP growth	+	+	
					GNP per capita, log	+	+	
					War dummy	-	-	
					Distance from Brussels	-	++	
					Central planning	-	+	
Li and Reuveny (2003)	1970-1996	127	2,021	Polity IV	Openness	-	++	pooled OLS
					Net inflows of FDI	+	+	fixed effects
				Freedom	Net inflows of portfolio investment	+	+	random effects
				House	Democracy, t-1	+	++	
					Democratic countries in region	+	+	
					Inflation (GDP deflator)	+	+	
					Real GDP p.c., log	+	++	
					Real GDP growth	+	-	
					Time trend	+	++	
					Time trend · FDI	-	+	
					Time trend · portfolio	-	+	
					Time trend · inflation	-	+	
					Time trend · GDP pc	-	++	
					Memberships in international NGOs	+	++	
					Semiperiphery · GDP pc	~	~	
					Periphery · GDP pc	-	-	
					Europe	+	-	
					Middle East	-	+	
					Africa	-	+	
					Asia	-	-	

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Democracy									
Author	Period	Cntr.	Obs.	Measure	Explanatory Variables	Effect	Sig.	Method	
Nieswiadomy and Strazcich (2004)	1972-2001	136	136	Freedom House	Common law	+	~	Tobit	
					Muslim law	-	++	period averages	
					Resources	-	++		
					Education	+	+		
					Economic freedom	+	+		
					Ethno linguistic diversity	-	-		
					GDP p.c.	+	-		
					Infant mortality rate	+	-		
					Life expectancy	-	-		
					Population	+	-		
					Urban population	-	-		
OPEC	-	-							
Gleditsch and Ward (2006)	1951-1998	?	6,159	Polity IV > 6	GDP p.c., log	+	++	dynamic probit	
					Neighboring democracies	+	++		
					Civil war	~	-		
					Years of peace	~	~		
					GDP growth	~	~		
					World democracy	+	~		
					Neighboring transition to democracy	+	++		
					Years of democracy	+	++		
					Years of autocracy	-	-		
Acemoglu et al. (2008a)	1960-2000	150	3,701	Freedom House	Democracy, t-1	+	+	pooled OLS	
	1840-2000	27	662	House	Real GDP p.c., log	~	~	fixed effects	
					Population, log	~	~	Anderson-Hsiao	
				Bollen	Education	~	~	Arellano-Bond	
				Polity IV	Labor share of value added	+	-	2SLS	
					Trade-weighted world democracy	-	-	annual, 5-year and	
					Age structure (0 to 15, 15 to 30, 30 to 45, 45 to 60, and 60 and above)	~	~	10-year intervals	
					Crisis dummy (growth rate drop exceeding 3%; 4%; 5%, respectively)	+	++		

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Democracy							
Author	Period	Cntr.	Obs.	Measure	Explanatory Variables	Effect Sig. Method	
López-Córdova and Meissner (2008)	1870-2000	?	4,184	Polity IV, change	Openness	+ ++ OLS	
					Population	+ + 2SLS	
					Land area	~ ~	
					Landlocked	~ ~	
					No boarders	- +	
					Same language	~ +	
					Democracy, t-1	+ ++	
					instruments	Distance Equator	+ ++
						Ethnolinguistic fractionalization	+ ++
						Primary commodity exporter	- ++
						Petroleum exporter	~ ~
						East Asia	- ++
						Eastern Europe/CIS states	- ++
						Middle East/North Africa	- ++
						South Asia	- ++
						Western Europe	- +
						Sub-Saharan Africa	- ++
					Latin America/Caribbean	- +	

Notes: ‘Cntr.’ and ‘Obs.’ report the number of countries and observations, respectively. A ‘?’ identifies that the respective number is not given in the study. ‘Effect’ yields the sign of the coefficient: ~ indicates changing signs. ‘Sig.’ identifies the significance of each coefficient: ++ is significant at the 1% level, + significant at the 10% level, ~ indicates changing significance level, i.e., sometimes significant sometimes not. ‘Polity IV’ stands for the democracy measure developed by Marshall and Jaggers (2000); ‘Bollen’ is taken from Bollen (1993), Clague corresponds to Clague et al. (1996), ‘Freedom House’ represents Freedom House (2006), ‘Gasiorowski’ refers to Gasiorowski (1996) and ‘Przeworski’ comes from Przeworski et al. (2000).

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